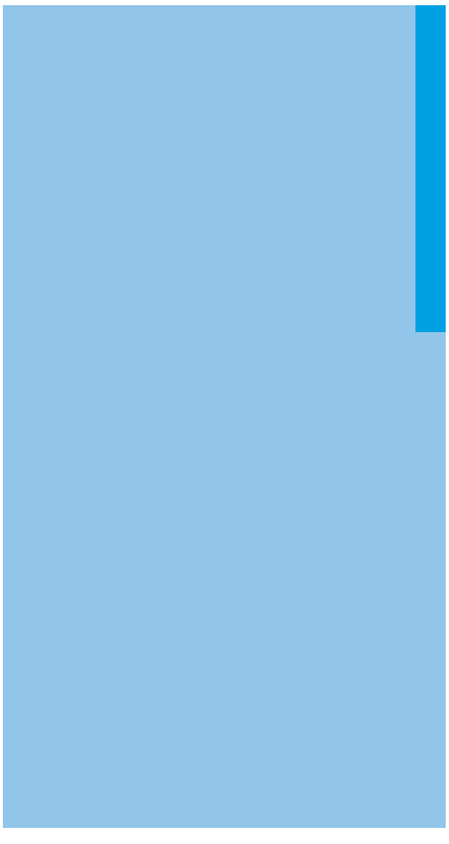
REPUBLIC OF MOLDOVA'S FIRST BIENNIAL TRANSPARENCY REPORT UNDER THE PARIS AGREEMENT

Developed in accordance with the Paris Agreement's Enhanced Transparency Framework



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FOREWORD

Climate change undoubtedly poses a threat to the sustainable development of humanity. Its impacts include rising ocean levels, the increase in the frequency of natural disasters (floods, droughts, heat waves, hurricanes, tornadoes, etc.), increased vulnerability of natural and artificial ecosystems to new climate conditions, etc. This necessitates collective action by nations to reduce the intensity of this process and mitigate the possible consequences caused by this phenomenon.

The first Biennial Transparency Report of the Republic of Moldova, developed to be submitted to the United Nations Framework Convention on Climate Change (UNFCCC), was compiled as a result of the financial assistance provided by the Global Environment Facility under the Project "Republic of Moldova: Enabling Activities for the Preparation of the First Biennial Transparency Report to the United Nations Framework Convention on Climate Change and the Paris Agreement's Enhanced Transparency Framework", initiated on August 19, 2022 and completed on March 31, 2025, managed by the United Nations Environment Programme and implemented by the Public Institution 'Environmental Projects National Implementation Office' (P.I. 'EPNIO') of the Ministry of Environment of the Republic of Moldova.

Compared to the Fifth National Communication of the Republic of Moldova to the UNFCCC (2023), this Report is an updated review of the state of affairs in the Republic of Moldova for the main aspects regulated by the Convention.

These are related to the assessment greenhouse gas (GHG) emission trends at national and sectoral levels between 1990 and 2022; presentation of climate change mitigation measures undertaken at national and sectoral levels in order to achieve the mitigation targets set for 2030 in the updated Nationally Determined Contribution (NDC 2.0) of the Republic of Moldova to the Paris Agreement; assessment of the degree of vulnerability and the needs for adaptation to new climate conditions, determined by climate change, for impacted sectors of the national economy and human health; support and capacity needs necessary to reduce greenhouse gas emissions on a larger scale, and to ensure better resilience and adaptation to new climate conditions determined by climate change, respectively.

It is also important to mention that these assessments will also be utilised to revise the mitigation targets set for 2030 in the third Nationally Determined Contribution (NDC 3.0) of the Republic of Moldova, developed in accordance with Decisions 1/CP.21, 4/CMA.1, 9/CMA.1, 18/CMA.1, 6/CMA.3, and 1/CMA.5.

As a reminder, the NDC is an instrument applicable to signatory Parties to the Convention, in accordance with the objective of the Paris Agreement to maintain global warming at a projected increase well below 2°C by 2100 compared to pre-industrial levels.

The Paris Agreement was signed by the Prime Minister of the Republic of Moldova in New York on September 21, 2016, and was subsequently ratified by Parliament by Law no. 78 as of 04.05.2017 for the ratification of the Paris Agreement. The economy-wide GHG emission reduction targets established in the intended Nationally Determined Contribution (NDC 1.0) of the Republic of Moldova, submitted to the UNFCCC on September 25, 2015, were approved at national level as legally binding targets by Government Decision no. 1470 of 30.12.2016 on the approval of the Low Emission Development Strategy until 2030 (LEDS 2030) and the Action Plan for its implementation.

In accordance with the updated Nationally Determined Contribution (NDC 2.0) of the Republic of Moldova, submitted to the UNFCCC on March 4, 2020, the Republic of Moldova has undertaken to achieve the unconditional economy-wide target of reducing GHG emissions by 70% (by 2030) compared to the level recorded in the base year (1990). The respective reduction commitment could be conditionally increased to approximately 88%, in accordance with this global agreement, which addresses important issues, such as providing low-cost financial resources, technology transfer and technical cooperation, access to which is commensurate with the challenges of global climate change. The reduction targets established in the NDC 2.0 were approved at national level as legally binding targets by Government Decision no. 659 of 06.09.2023 on the approval of the Low Emission Development Programme of the Republic of Moldova until 2030 (LEDP 2030).

The GHG emission reduction targets in NDC 1.0 and NDC 2.0 were established in an emissions budget, covering the period from January 1, 2021 to December 31, 2030.

It is also worth mentioning that the targets associated with the adaptation to new climate conditions determined by climate change of the main sectors of the national economy and human health, established in the NDC 1.0 of the Republic of Moldova, were taken over from the National Climate Change Adaptation Strategy until 2020 and the Action Plan for its implementation, approved by Government Decision no. 1009 as of 10.12.2014.

Simultaneously, the targets associated with the adaptation to new climate conditions determined by climate change of the main sectors of the national economy and human health, established in the updated Nationally Determined Contribution (NDC 2.0), were considered in the National Climate Change Adaptation Programme until 2030 (NCCAP 2030), approved by Government Decision no. 624 as of 30.08.2023.

The preparation of this Report, and the implementation of the country's policies in the field of climate change mitigation and adaptation, constitutes an essential contribution of our country to solving the problem of climate change both at national and global levels, and to achieving the objective of the Paris Agreement of maintaining global warming at a projected increase well below 2°C by 2100 compared to pre-industrial levels.

Dorin POVERJUC,
Director,
Environment Agency of the Republic of Moldova

LIST OF ACRONYMS, ABBREVIATIONS AND UNITS OF MEASUREMENT

AA	Association Agreement
AC	Adaptive Capacity
ACTIE	Agency for Cross-border Cooperation and European Integration
ADA	Austrian Development Agency
ADMA	Agency for Restructuring and Modernization of Agriculture
AE	Advanced Economies
AEZ	Agro-Ecological Zone
Ag. SAP	Agriculture Sector Adaptation Plan
AGEPI	Agency for Intellectual Property
AGGRI	Agriculture Governance, Growth and Resilience Investment
AIPA	Agency for Interventions and Payments in Agriculture
AIS	Automated Information System
AMP	External Assistance Management Platform
AOGCM	Atmosphere-Ocean Coupled General Circulation Model
APM	High Performance Agriculture in Moldova
ANRE	National Agency for Energy Regulations
AR4	IPCC Forth Assessment Report
AR5	IPCC Fifth Assessment Report
AR6	IPCC Sixth Assessment Report
Art.	Article
a.s.	active substance
ASM	Academy of Sciences of Moldova
ATU	Autonomous Territorial Unit
ATULBD	Administrative-Territorial Units on the left bank of the Dniester River
bil.	Billion
BLS	Baseline scenario
BMZ	German Federal Ministry for Economic Cooperation and Development
BNS	National Bureau of Statistics
BTR	Biennial Transparency Report
BUR	Biennial Update Report
°C	Celsius degrees
¢	Cents
CALM	Congress of Local Authorities of Moldova
CBT	Climate Budget Tagging
CCA	Climate Change Adaptation
CCAS	Climate Change Adaptation Strategy
CDD	Consecutive Dry Days
CDM	Clean Development Mechanism
CE	Council of Europe
CERs	Certified Emission Reductions
CESEE	Central, Eastern and Southeastern Europe
CH_4	Methane

CHP	Combined Heat and Power Plant
C.I.F.	Cost, Insurance and Freight (with reference to export)
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CMIP5	Coupled Model Intercomparison Project Phase 5
CMIP6	Coupled Model Intercomparison Project Phase 6
cm	Centimeter
CNED	National Center for Sustainable Energy
CO	Carbon monoxide
CO_2	Carbon dioxide
COP or CP	Conference of the Parties
CPA	Cooperation and Partnership Agreement
CoR	Committee of the Regions
CPAs	Central Public Authorities
CRT	Common Reporting Tables
CSDI	Cold Spell Duration
CS	Country Specific
CV	Coefficient of Variation
CVI	Climate Vulnerability Index
CWD	Consecutive Wet Days
D	Default
DMAT	Disaster Medical Assistance Team
DP	Development Partners
DRA	Disaster Risk Assessment
DRM	Disaster Risk Management
DRMC	Disaster Risk Management Cycle
DRR	Disaster Risk Reduction
DTR	Diurnal Temperature Range
E	Exposure
EA	Environment Agency
EACEA	European Education, Audiovisual and Culture Executive Agency
EB	Energy Balance
EBRD	European Bank for Reconstruction and Development
ECOPact	Green Concrete
ECA	Europea and Central Asia
ECT	Energy Community Treaty
EDGAR	Emissions Database for Global Atmospheric Research
EE	Energy Efficiency
EEA	European Environment Agency
EF	Emission Factor
EIB	European Investment Bank
EMEP	European Monitoring and Evaluation Program
EnC	Energy Community
EnCT	Energy Community Treaty
EnMS	Energy Management System
ENPARD	European Neighborhood Program for Agriculture and Rural Development
ENPEP	Energy and Power Evaluation Program
ENTSO-E	European Network of Transmission System Operators for Electricity
E-OBS	European Ensemble Observational Gridded Dataset
EPMA	Environmental Project Management Agency of the Ministry of Environment of the Republic of Lithuania
E5P	Eastern Europe Energy Efficiency and Environmental Partnership Fund

ESCO	Energy Service Company
ESI	Environmental Sensitivity Index
ESM	Energy Strategy of Moldova
Eq.	Equivalent
EU	European Union
EU ETS	European Union Emission Trading Scheme
EUR	Euro
EVRF	Energy Vulnerability Reduction Fund
EWS	Early Warning System
FACEM	Entrepreneurship and Economic Growth Fund
FAO	Food and Agriculture Organization of the United Nations
FD	Frost Days
FEZ	Free Economic Zone
FOB	Free on Bord (with reference to import)
FOD	First Order Decay Method
FRM	Forest Reproductive Material
FSV	Facilitative Sharing of Views
GATU	Gagauz Autonomous Territorial Unit
Gcal	Gcal
GCF	Green Climate Fund
GCOS	Global Climate Observing System
GD	Government Decision
GDP	Gross Domestic Product
GEF	Global Environmental Facilities
GEFF	Green Economy Financing Facility
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GIZ	German Agency for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH)
GJ	Gigajoule (1GJ = 10^9 joule)
GSL	Growing Season Length
Gt	Gigaton (10^9 tone)
GWP	Global Warming Potential
h	Hour
ha	Hectares
HFCs	Hydrofluorocarbons
HPP	Hydro Power Plant
IAEA	International Atomic Energy Agency
IBRD	International Bank for Reconstruction and Development
ICA	International Consultation and Analysis
ICAS	Forest Research and Management Institute
ID	Ice Days
IDA	International Development Association
IE	Included Elsewhere
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IGSU	General Inspectorate for Emergency Situations
ILO	International Labor Office
IMF	International Monetary Fund
IMPACT	Emission Calculation Model, part of the ENPEP Model Package
iNDC	intended National Determined Contribution

INECP	Integrated National Energy and Climate Plan
IP	Industrial Parks
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
IPRE	Institute for European Policies and Reforms
IGSU	General Inspectorate for Emergency Situations
JICA	Japanese Agency for International Cooperation
JSC	Joint Stock Company
kha	Kilo hectares
kg	Kilogram
km	Kilometer
ktce	Kiloton of coal equivalent
ktoe	Kiloton of oil equivalent
kt	Kiloton
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt-hour
L	Level
LEAP	Long Range Energy Alternatives Planning System
LED	Liechtenstein Development Service
LEDP	Low Emission Development Program until 2030 and the Action Plan for its implementation
LEDS	Low Emission Development Strategy until 2030 and the Action Plan for its implementation
LPAs	Local Public Authorities
LTD	Limited Liability Company
LT-LEDS	Long-Term Low-Carbon Development Strategy
LULUCF	Land Use, Land-Use Change and Forestry
m	Meter
m^2	Square meter
m^3	Cubic meter
M	Millions
MAC-P	Competitive Agriculture in Moldova Project
MAED	Model for Analysis of the Energy
MARCAL	Market Allocation Model
MCA	Multi-Criteria Analysis
MC-EnC	Ministerial Council of the Energy Community
MD	Moldova
MDL	Moldovan Lei
M&E	Monitoring and Evaluation
MESA	Moldova Energy Security Activity
mil.	Million
MIPs	Multipurpose Industrial Platforms
MoEnv	Ministry of Environment
MoEn	Ministry of Energy
MoER	Ministry of Education and Research
MoIA	Ministry of Internal Affairs
MoREFF	Moldovan Residential Energy Efficiency Financing Facility
MoSEFF	Moldovan Sustainable Energy Financing Facility
MRV	Monitoring, Reporting and Verification
MSW	Municipal Solid Wastes
Mt	Megaton (10^6 tone)

MTBF	Mid-Term Budgetary Framework
MTPP	Moldovan Thermal Power Plant
MW	Megawatt (10^6 watt)
NA	Not Applicable
NAER	National Agency for Energy Regulations
NAMA	Nationally Appropriate Mitigation Actions
NAP	National Adaptation Planning
NAP-1	First Cycle of National Adaptation Planning Process
NAP-2	Second Cycle of National Adaptation Planning Process
NBM	National Bank of Moldova
NBS	National Bureau of Statistics
NC	National Communications
NC1	First National Communication
NC2	Second National Communication
NC3	Third National Communication
NC4	Fourth National Communication
NC5	Fifth National Communication
NCCAP	National Climate Change Adaptation Program
NCCAS	National Climate Change Adaptation Strategy
NCCC	National Climate Change Commission
NCDs	Non-Communicable Diseases
NCM	Combined Nomenclature of Goods
NDC	National Determined Contribution
NDS	National Development Strategy
NE	Not Estimated
NECP	National Energy and Climate Plan
NEET	Not in Employment, Education or Training
NF_3	Nitrogen trifluoride
NFARD	National Fund for Agriculture and Rural Development
NGOs	Non-Governmental Originations
NIF	Neighborhood Investment Facility
NIR	National Inventory Report
NIS	National Inventory System
NMVOC	Non-Methane Volatile Organic Compounds
NO	Not Occurring
N_2O	Nitrous Oxide
No.	Number
NPB	National Public Budget
NMRS	National Monitoring and Reporting System
NPV	Net Present Value
NSARD	National Strategy for Agricultural and Rural Development
O_3	Ozone
ODA	Official Development Assistance
ODIMM	Organization for Small and Medium Enterprises Sector Development
ODS	Ozone Depleting Substances
OECD	Organization for Economic Cooperation and Development
OHTL	Overhead Transmission Line
OSCE	Organization for Security and Cooperation in Europe
p	Statistical significance of the trend
PA	Paris Agreement
PD	Parliament's Decision

PHR	Population with habitual residence
PFC	Perfluorocarbons
PFIs	Participating Financial Institutions
P.I. "EPIU"	Public Institution "Environmental Projects Implementation Unit"
P.I. "EPNIO"	Public Institution "Environmental Projects National Implementation Office"
PIM	Public Investment Management
PMR	Pridnestrovian Moldavian Republic
ppb	Parts per billion of volume
ppm	Parts per million of volume
PPP	Purchasing Power Parity
ppt	Parts per trillion of volume
PRCPTOT	Total Wet-Day Precipitation
PRTRs	Pollutant Release on Transfer Registers
PV	Photovoltaic
QA	Quality Assurance
QC	Quality Control
R^2	Determination Coefficient
R10mm	Number of Heavy Precipitation Days – number of days where daily precipitation amount ≥ 10 mm
R20mm	Number of Very Heavy Precipitation Days, where daily precipitation amount ≥ 20 mm
R95p	Very Wet Days
R95pTOT%	Contribution from Very Wet Days
R99p	Extremely Wet Days
R99pTOT%	Contribution from Extremely Wet Days
RCP	Representative Concentration Pathway
RDAs	Regional Development Agencies
REA	European Research Executive Agency
RES	Renewable Energy Sources
R&I	Research and Innovation
RETScren	Clean Energy Management Software
RoM	Republic of Moldova
RX1day	Max 1-day precipitation
RX3day	Max 3-day precipitation
RX5day	Max 5-day precipitation
$	US Dollar
S	Sensitivity to Climate Hazards
SA	Sensitivity Analysis
SACET	Central Heat Supply Systems
SAPs	Sectorial Adaptation Plans
SAR	IPCC Second Assessment Report
SBTi	Science-Based Targets Initiative
SDGs	Sustainable Development Goals
SECAPs	Sustainable Energy and Climate Action Plans
SE	State-Owned Enterprise
SF_6	Sulfur Hexafluoride
SHS	State Hydrometeorological Service
SIDA	Swedish International Development Cooperation Agency
SMEs	Small and Medium-Sized Enterprises
SO_2	Sulphur Dioxide
SOE	State Owned Enterprise
SSPs	Shared Socio-Economic Pathways

SU	Summer Days
t	Ton
T	Trend
T1	Tier 1
T2	Tier 2
ΔT	Air Temperature Change
TIKA	Turkish International Development Cooperation Agency
TIMES	Integrated MARKAL EFOM System
TJ	Terajoule (10^{12} joule)
TN10p	Cold Nights
TN90p	Warm Nights
TNn	Minimum Daily Minimum Temperature
TNx	Maximum Daily Minimum Temperature
toe	Tons of Oil Equivalent
TR	Tropical Nights
TTE	Team of Technical Experts
TX10p	Cold Days
TX90p	Warm Days
TXn	Minimum Daily Maximum Temperature
TXx	Maximum Daily Maximum Temperature
UCIPE	Consolidated Unit for the Implementation and Monitoring of Energy Projects
UN	United Nations
UNDAF	United Nations Development Action Framework
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
US EPA	United States Environment Protection Agency
USA	United States of America
USSR	Union of Soviet Socialist Republics
VAT	Value Added Tax
WAM	With Additional Measures Scenario
WASP	Wien Automatic System Planning
WB	World Bank
WEM	With Existing Measures Scenario
WHO	World Health Organization
WMO	World Meteorological Organization
WMRs	Waste Management Regions
WSDI	Warm Spell Duration Index
WWF	World Wildlife Fund
%	Percent
‰	Promile

CONTENTS

EXECUTIVE SUMMARY

ES.1. Introduction

ES.1.1. Ultimate Objective of the Convention

The ultimate objective of the Convention is to *'stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'*. To date, 198 countries are Parties to this Convention. The UNFCCC was signed by the Republic of Moldova on June 12, 1992 and ratified by Parliament on 16 March, 1995.

Article 4, paragraph 1(a) and Article 12, paragraph 1(a) of the UNFCCC stipulate that each Party shall submit to the Conference of the Parties (COP) a *'national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be agreed upon by the Conference of the Parties, whose use shall be encouraged; a general description of the measures taken or intended to implement the Convention; and any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its Communication, including, if feasible, material relevant for calculations of global anthropogenic emission trends.'*

ES.1.2. Reporting under the Convention

The main mechanism for making this information available is National Communications. At COP 2 (Geneva, 1996) Guidelines on National Communications for non-Annex I Parties were adopted (Decision 10/CP.2). In line with the respective Guidelines, from 1998 to 2000, under the UNDP-GEF Project '*Enabling Activities for the preparation of the First National Communication in accordance with its obligations under the UNFCCC'*, the RoM developed its First National Communication to the UNFCCC, presented at COP 6 (The Hague, 2000).

COP 8 (New Delhi, 2002) adopted new Guidelines for the preparation of national communications of non-Annex I Parties (Decision 17/CP.8). In conformity with these Guidelines, from 2005 to 2009, the Republic of Moldova prepared its Second National Communication (NC2); from 2010 to 2014 – its Third National Communication (NC3); from 2014 to 2018 – its Fourth National Communication (NC4); and from 2019 to 2023 – its Fifth National Communication (NC5) of the Republic of Moldova to the UNFCCC.

The Kyoto Protocol, adopted at COP 3 (Kyoto, 1997), deepened the commitments under the Convention by requiring industrialised countries and economies in transition, included in Annex I to the Convention, to reduce total direct GHG emissions by at least 5% in the first commitment period of the Kyoto Protocol (2008-2012), compared to the emissions recorded in the base year (1990). The Republic of Moldova ratified the Kyoto Protocol on February 13, 2003. As a country not included in Annex I to the Convention, the Republic of Moldova had no commitments to reduce GHG emissions in the first commitment period of the Kyoto Protocol.

COP 15 (Copenhagen, 2009) approved and proposed for implementation a policy statement supporting the goal of limiting global warming to no more than 2°C compared to pre-industrial level, in the context of equity and sustainable development. This statement, known as the Copenhagen Accord, reaffirms development issues in the context of climate change, including through the implementation of Low Emission Development Strategies (LEDS). In January 2010, the RoM associated itself with the Copenhagen Accord.

At COP 16 (Cancun, 2010), the Cancun Agreements were adopted, which encourage developing countries to prepare LEDS for sustainable development and to undertake National Appropriate Mitigation Actions (NAMAs). The Cancun Agreements highlight the fact that 'stopping climate change requires a paradigm shift towards building a low-carbon emissions society, which offers substantial opportunities and ensures continued

economic growth and sustainable development'. The periodicity of preparing NCs for non-Annex I countries was also established (Decision 1/CP.16) at the 16th COP in Cancun, according to which non-Annex I Parties are to submit NCs to the UNFCCC Secretariat every four years as well as Biennial Update Reports (BURs) every two years, which is to contain a National Inventory Report (NIR) as a summary or as a technical annex.

COP 17 held in Durban in 2011 adopted the Guidelines on preparing and reporting BURs to the UNFCCC for non-Annex I Parties (Decision 2/CP.17 and Annex 3 to this Decision). In accordance with the existing capacities at national level and at the level of international support obtained for reporting, non-Annex I Parties had to submit their 1st BUR to the UNFCCC Secretariat by the end of December 2014. The Report was to be submitted to the UNFCCC Secretariat every two years as a stand-alone report or as a summary of the NC, should their reporting years coincide. Regarding the non-Annex I Parties, the COP 17 in Durban approved (Decision 2/CP.17 and Annex IV) the Modalities and Guidelines for International Consultation and Analysis (ICA), consisting of two steps: (i) the Technical Analysis of BURs; and (ii) a Facilitative Sharing of Views (FSV) among Parties on the content of BURs and the results of Technical Analysis.

As for the BUR1 of the RoM to the UNFCCC, its technical analysis by the team of technical experts took place between the 19th and 23rd of September 2016, the Summary Report being published on the UNFCCC Secretariat's web page on February 20, 2017. The FSV among UNFCCC Parties on the content of the BUR1 of the RoM and the results of Technical Analysis was carried out during the 3rd FSV workshop, organised by the UNFCCC Secretariat on May 15, 2017, in Bonn, Germany.

COP 18 (Doha, 2012) adopted the Doha Amendment to the Kyoto Protocol. The amendment includes new commitments for countries included in Annex I of the Kyoto Protocol in the second commitment period (January 1, 2013 - December 31, 2020); a revised list of GHG to be reported by Annex I countries in the second commitment period; and a series of amendments to several articles of the Kyoto Protocol regarding the first commitment period and which were to be reviewed to remain valid in the second commitment period. Under the Doha Amendment to the Kyoto Protocol, within the second commitment period, highly industrialised countries are to reduce their GHG emissions by at least 18% compared to 1990 levels. The Doha Amendment came into effect on December 31, 2020.

At COP 19 (Warsaw, 2013), the Parties agreed to communicate their intended nationally determined contributions (iNDCs) (Decision 1/CP.19), in order to be included into the 2015 Climate Agreement adopted by COP 21 (Paris, 2015), which is to cover a new commitment period (January 1, 2021 - December 31, 2030) with respect to the reduction of GHG emissions. Likewise, COP 19 in Warsaw adopted general Guidelines for domestic measurement, reporting and verification of NAMAs by developing countries (Decision 21/CP.19). This document provided a solid foundation for the 2015 Paris Climate Agreement.

At COP 20 (Lima, 2014), the Parties agreed over the Lima Call for Climate Action and were repeatedly invited (Decision 1/CP.20) to communicate their iNDCs to the UNFCCC Secretariat in order to achieve the objectives of the Convention as set out in Article 2. According to the Lima Call for Climate Action, countries were invited to communicate their iNDCs by March 31, 2015, the deadline for the submission being September 30, 2015. The UNFCCC Secretariat was asked to prepare a Synthesis Report on the global aggregate effect of the iNDCs by November 1, 2015.

The Paris Agreement was signed by the Prime Minister of the RoM in New York on September 21, 2016, and was subsequently ratified by Parliament by Law No. 78 of 04.05.2017 for the ratification of the Paris Agreement.

On the 25th of September 2015, the Republic of Moldova communicated its intended Nationally Determined Contribution (NDC 1.0) and the accompanying information to facilitate clarity, transparency, and understanding, with reference to decisions 1/CP.19 and 1/CP.20.

In accordance with NDC 1.0, the Republic of Moldova has undertaken to achieve the unconditional economy-wide target of reducing its net GHG emissions by 64% by 2030 compared to the level recorded in the base year (1990) and to make maximum efforts to reduce GHG emissions by 67% compared to the level recorded in 1990. The respective reduction commitment could have been conditionally increased to approximately 78%, in the case of access to low-cost financial resources, technology transfer and technical cooperation.

GHG emission reduction targets were set in an emissions budget, covering the period between January 1, 2021 and December 31, 2030.

The economy-wide GHG emission reduction targets, set in the NDC 1.0 of the RoM, were subsequently transposed into the national level by Government Decision no. 1470 as of 30.12.2016 on the approval of the Low Emission Development Strategy until 2030 (LEDS 2030) and the Action Plan for its implementation.

On March 4, 2020, the Republic of Moldova submitted its updated national determined contribution (NDC 2.0) to the UNFCCC Secretariat, according to which the RoM intended to reach much more ambitious GHG emission reduction targets by 2030. The unconditional economy-wide reduction target was thereby to increase from 64-67% to 70% compared to the level recorded in the base year (1990), and the conditional target was to increase from 78% to approximately 88%, respectively, compared to the level recorded in 1990. The new economy-wide GHG emission reduction targets were introduced into the Low Emission Development Programme until 2030 (LEDP 2030), approved by Government Decision no. 659 as of 06.09.2023.

The BUR2 of the RoM to the UNFCCC was submitted to the UNFCCC Secretariat on December 27, 2018, and later, the two technical annexes: National Inventory Report: 1990-2016, Greenhouse Gas Emission Sources and Sinks in the Republic of Moldova on January 24, 2019; and the Report on the National GHG Inventory System in the Republic of Moldova – 2018, on February 26, 2019, respectively. The Technical Assessment of the BUR2 of the RoM to the UNFCCC, conducted by the Team of Technical Experts, took place between May 27-31, 2019, the Summary Report being published onto the UNFCCC Secretariat's web page on October 28, 2019. The FSV among UNFCCC Parties on the content of the BUR2 of the RoM and results of Technical Analysis were carried out during the 9th FSV workshop, held online by the UNFCCC Secretariat between November 24-27, 2020.

The BUR3 of the RoM was submitted to the UNFCCC Secretariat on December 21, 2021, along with two technical annexes: National Inventory Report: 1990-2019, Greenhouse Gas Emission Sources and Sinks in the Republic of Moldova, and the Report on the National GHG Inventory System in the Republic of Moldova – 2021. The Technical Assessment of the BUR3 of the RoM to the UNFCCC, conducted by a Team of Technical Experts, took place between June 20-24, 2022, the Summary Report being published on the UNFCCC Secretariat's web page on November 8, 2022. The FSV among UNFCCC Parties on the content of the BUR3 of the RoM and results of Technical Analysis were carried out during the 14th FSV workshop, held by the UNFCCC Secretariat between June 6-7, 2023, in Bonn, Germany.

ES.2. Relevant National Circumstances Relevant to the Trend in Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases

ES.2.1. Institutional Arrangements

On behalf of the Government, the Ministry of Environment (MoEnv) oversees the implementation of international environmental treaties to which the Republic of Moldova is a Party (including the UNFCCC). The MoEnv representatives also hold the position of UNFCCC Focal Point.

In accordance with Government Decision no. 425 as of 12.06.2024, the *National Commission on Climate Change* was established. Its nominal composition is approved by the Government and includes the following members under the auspices of the Prime Minister: the Minister of the Environment, the Minister of Finance, the Minister of Energy, the Minister of Infrastructure and Regional Development, the Minister of Agriculture and Food Industry, the Minister of Health, the Minister of Labour and Social Protection, the Minister of Education and Research, the Minister of Internal Affairs. The National Commission is an inter-institutional body established for the purpose of coordinating policies in the field of climate change, public capital investment projects, in the context of climate change mitigation and adaptation, and natural disaster risk management.

The Environment Agency, established in accordance with Government Decision no. 549 as of 13.06.2018, has been designated as the competent authority responsible for ensuring the operation of the *National Monitoring and*

Reporting System (NMRS) of greenhouse gas emissions and other information relevant to climate change, established by Government Decision no. 1277 as of 26.12.2018.

The Public Institution 'Environmental Projects National Implementation Office' (P.I. 'EPNIO'), established by Government Decision no. 1249 as of 19.12.2018, has the mission of providing support to the MoEnv and organizational structures under its competence, for the purpose of efficient implementation of external and internal financial and technical assistance projects in the field of environmental protection and the use of natural resources.

The project implementation units under P.I. 'EPNIO' are involved in the activities associated with the preparation of NCs, BTRs, NIRs and national GHG inventories, having been delegated these responsibilities by the Environment Agency, through Letter no. 3471 as of 25.09.2019.

ES.2.2. Administrative-Territorial Organisation, Population Profile and Demographics

Administrative-territorial organisation. The RoM is divided into 32 districts (Anenii Noi, Basarabeasca, Briceni, Cahul, Cantemir, Calarasi, Causeni, Cimislia, Criuleni, Donduseni, Drochia, Dubasari, Edinet, Falesti, Floresti, Glodeni, Hancesti, Ialoveni, Leova, Nisporeni, Ocnita, Orhei, Rezina, Rascani, Sangerei, Soroca, Straseni, Soldanesti, Stefan Voda, Taraclia, Telenesti, Ungheni), five municipalities – Chisinau, Balti, Comrat, Tiraspol and Bender (Tighina) and two autonomous territorial units (GATU and ATULBD).

Population. On 01.01.2024, the population of the Republic of Moldova constituted approximately 2.9 million inhabitants (including ATULBD), with a density of about 85 inhabitants/km^2. Between 1990 and 2023, the number of inhabitants decreased by about 34% or by 1.48 million inhabitants. This decrease is determined by the negative natural balance and the negative balance of external migration. In the gender structure, women represent 53.6% of the population, compared to only 46.4% men. The population is mainly concentrated in rural areas (1614 rural settlements) totalling 52% of the total population, or about 930 inhabitants on average per settlement. The urban population constitutes 48%, or 26.5 thousand inhabitants on average per locality. According to the latest population census data (2014) (conducted separately, for the territory on the left and right banks of the Dniester River), Moldovans/Romanians constituted – 73.1%, Ukrainians – 8.8%, Russians – 7.6%, Gagauz – 4.0%, Bulgarians – 1.9%, Roma – 0.3%, other ethnicities – 0.7% and the population that did not declare their ethnicity – 3.5%.

Demographics. Between 1990 and 2023, demographic processes were marked by negative dynamics, manifested by the instability of demographic indicators and phenomena such as: decreasing birth rate, increasing mortality, aging population, depopulation and others. In 2023, the birth rate (9.8‰) sharply decreased compared to the level of 1990 (17.7‰), well below the mortality rate – 13.7‰, which increased compared to the level of 1990 (9.7‰); infant mortality constituted 10.0‰ (19.0‰ in 1990); the 'life expectancy at birth' indicator was about 71.9 (68.0 years in 1990), of which 67.5 years for men (63.9 years in 1990) and 76.4 years for women (71.9 years in 1990).

ES.2.3. Geographic Profile and Natural Resources

Geographical position. Moldova is located in central Europe, in the northwestern Balkans, covering 33.849 thousand km^2. To the north, east and south it is surrounded by Ukraine, and to the west – separated from Romania by the Pruth River. Moldova is part of the group of countries of the Black Sea basin – its southern border extends almost to the Black Sea, the exit to the sea opening through the Dniester River estuary and the Danube River.

Landscape. The landscape of Moldova is represented by hills and plains, dominated by plateaus in the central part of the country. Absolute altitudes range between 429 m (Balanesti Hill) and 4 m in the Dniester River floodplain (Palanca commune).

Land resources and soil cover. Moldova has a unique land fund, which is distinguished by the predominance of chernozem soils (about 75%) with high agricultural productivity, a very high degree of valorisation (>75%) and a rugged terrain (over 80% of agricultural land is located on slopes). As of January 1, 2024, the total land area constituted 3,384.9 thousand ha (NBS, 2024), including 2,467.0 thousand ha (72.9%) – agricultural land; of which 1,870.5 thousand ha (55.3%) – arable land, 265.7 thousand ha (7.8%) – perennial plantations; 310.9

thousand ha (9.2%) – hayfields and pastures; 19.9 thousand ha (0.6%) – fallow land; 435.1 thousand ha (12.9%) – forests and land with forest vegetation; 92.1 thousand ha (2.7%) – rivers, lakes, basins and ponds, and 390.7 thousand ha (11.5%) – other lands.

Aquatic resources. The hydrographic network covers about 2.7% of the country's territory and has a total length of about 16 thousand km. The main rivers are the Dniester, Pruth, and access to the Danube via a small portion in the south. The density of the hydrographic network on average in the country is 0.48 km/km^2: ranging from 0.84 km/km^2 in the north of the country to 0.12 km/km^2 on the left side of the Dniester River. There are about 60 natural lakes and over 4,475 thousand artificial water accumulations on the territory of the country. There are also about 5 thousand wells, about 179 thousand wells and about 3 thousand springs on the territory of Moldova, which ensure 1.8 million m^3/day of confirmed reserves.

Biological resources. The flora currently includes approximately 5,513 species of plants (higher – 1,989 species, lower – 3,524 species). According to the floristic composition, the richest are the forest ecosystems (over 850 species), followed by steppe (over 600 species), meadow (about 650 species), petrophyte (about 250 species), aquatic and marsh (approximately 160 species) ecosystems. The fauna is relatively rich and varied. Over 15.0 thousand species of animals live in the country, including 461 species of vertebrates and over 14 thousand species of invertebrates. Among vertebrates, there are 70 species of mammals, 281 species of birds, 14 species of reptiles, 14 species of amphibians and 82 species of fish. Among vertebrate animals, the most numerous is the class of birds – 281 species and subspecies, and among invertebrates – insects: over 12 thousand species. There are five scientific reserves (Codrii, Iagorlac, Padurea Domneasca, Plaiul Fagului, Prutul de Jos) with a total area of 19.2 thousand ha.

Mineral resources. Useful mineral resources are explored in the country from approximately 400 deposits, the most important being: limestones, granites, bentonite and sandy clays, diatomite, gypsum and chalk. Most mineral resources are exploited in quarries and only some types of limestone in galleries.

ES.2.4. Climate

The climate is temperate continental, characterised by relatively mild winters with little snow, with long, warm summers and low humidity. The country is located between Atlantic air masses in Western Europe, excessive-continental in the northeast and Mediterranean in the southwest. In the territorial distribution of climatic elements between 1991-2023, several distinct regularities were recorded: (i) the increase in temperature towards the south, from an annual average value of 8.1°C in the north to 10.9°C in the south; (ii) the zonal distribution of average annual precipitation with decreasing values from north to south: from the annual average value of 613-618 mm in the north to 550-516 mm in the south; and (iii) an increase of approximately 100 mm in average multiannual precipitation values in the plateau regions, relative to the neighbouring plains.

Over the past 135 years, Moldova has experienced changes in average temperature and precipitation values. The country has become warmer, with an average temperature increase of more than 1.2°C, while the increase in precipitation has been only 51.3 mm.

ES.2.5. Economic Profile

Gross Domestic Product. In 2023, the share of industry in the GDP structure constituted 9.2%, agriculture – 7.4%, transport and communications – 5.1%, construction sector – 6.9%, trade – 17.7%, other sectors – 36.6%, net taxes on product and import – 15.3%.

The country's economy was in decline before 1991. However, the separation from the USSR accelerated this process. The GDP had decreased continuously from 1990 through 1999, when it dropped to 34% of the level recorded in 1990. The only exception was in 1997, when, due to excellent agricultural production, and determined by favourable climatic conditions, a slight increase was recorded – 1.6% compared to the previous year. The were multiple causes of the economic collapse: Moldova was fully integrated into the economic system of the USSR and once it became independent, subsidies and transfers from the central government ceased; the end of the Soviet era with well-established trade ties created obstacles to the movement of products and restrictions on access to emerging markets; the lack of energy resources and its own raw materials made the country's economy remain

heavily reliant on the rest of the former USSR; there were also multiple internal causes, such as the transition from a centralised economy to a market economy, the loss of industrial branches located in the Transnistrian area, frequent droughts and civil conflict.

The considerable GDP growth since 2000 indicates that the economy is on the right track, albeit in 2023 the GDP value constituted only around 81% of the level recorded in 1990.

Trade Balance Deficit. Import expenditure far exceeds the country's export earnings, leading to a very serious trade deficit. This deficit has risen from 23.7% of GDP in 2000 to 27.9% of GDP in 2023. This reflects the country's dependence on imported energy resources and the growing demand for imported products. The increase in imports is fuelled by massive inflows of remittances from abroad, which are channelled into household consumption.

Money Transfers and Remittances. In 2023, net foreign exchange inflows from Moldovans working abroad amounted to approximately 1.63 billion US dollars or approximately 9.6% of the GDP. Money transfers from abroad, especially remittances from people working abroad, are of great importance for the country's economy. Globally, Moldova is among the leaders in terms of the share of remittances in the GDP.

Investments. Investments play a major role in economic growth, which have increased significantly compared to previous years. In 2022, approximately 37.1 billion MDL were invested in the national economy, equivalent to approximately 1,963 billion US dollars (13.5% of GDP). Simultaneously, in 2023, foreign direct investments (FDI) attracted to the national economy (net inflows) amounted to 0.587 billion US dollars (3.5% of GDP), well below the level of 2008, when foreign direct investments attracted to the national economy amounted to 0.727 billion US dollars (12.0% of GDP). Moldova, as of 31.12.2022, remained a net debtor nation in the international investment position – -6.184 billion US dollars, the negative balance increasing by 18.5% compared to the end of 2021. The gross external debt, as of 30.09.2023, constituted 9.764 billion US dollars, increasing by 1.8% compared to the beginning of the year.

Social sector. In 2023, the average gross nominal salary in the national economy amounted to 12,355 thousand MDL and increased compared to 2022 in nominal value by 18.3% (10,447 thousand MDL). The average monthly pension established on January 1, 2023 amounted to 3,156 thousand MDL, which increased by 22.4% compared to the previous year. The number of pensioners registered on January 1, 2023 constituted 675.7 thousand people. In 2023, the number of unemployed people, according to the definition of the International Labor Organisation (ILO) was 42.6 thousand people. The unemployment rate (the proportion of unemployed ILO workers in the active population) constituted 4.6% in 2023, a 3.1% increase compared to 2022.

ES.2.6. Evolution of Real Sectors of the Economy

Industry. The volume of industrial production manufactured in 2022 constituted only approximately 64.8% of the 1990 level. Between 1990 and 2023, the evolution of the industrial sector fluctuated, with the best results recorded in 2001, 2003, 2011 and 2021, and the most negative results, respectively, in 1992, 1994, 1998, 1999, 2006, 2007, 2009, 2012, 2020 and 2022. The situation in the industrial sector is mainly determined by the activity of enterprises in the manufacturing industry, which accounted for approximately 86% of the total production volume obtained by large enterprises with main industrial activities. In the manufacturing industry, the most representative activity is the food and beverage industry (production, processing and preservation of meat and meat products, fruits and vegetables; dairy products; milled products; ready-made animal feed; bread and pastry products; sugar; manufacture of chocolate and confectionery; manufacture of distilled alcoholic beverages, wine, beer, etc.), as well as other products from non-metallic minerals (manufacture of glass and glassware; bricks and tiles made of burnt clay; manufacture of cement; lime; plaster; elements made of cement, plaster and concrete).

Energy. Between 1990 and 2023, electricity production decreased by 54%, electricity consumption – by 49%, and thermal energy production – by 84%. The main energy production units in Moldova include MTPP in Dnestrovsk with an installed capacity of 2,520 MW (approx. 950 MW available capacity); CHP-1 in Chisinau with an installed capacity of 46 MW and an installed thermal capacity of 455 MW; CHP-2 in Chisinau with

an installed capacity of 240 MW and an installed thermal capacity of 1425 MW; CHP-North in Balti with an installed capacity of 28.5 MW and an installed thermal capacity of 610 MW; CHPs in sugar factories – with a total installed capacity of 98 MW (approx. 20 MW available capacity), Dubasari CHP with an installed capacity of 48 MW (approx. 30 MW available capacity) and Costesti CHP with an installed capacity of 16 MW (approx. 10 MW available capacity).

In 2023, the total amount of electricity produced from renewable sources (photovoltaic, wind, biogas and hydroelectric) constituted around 283 million kWh. The respective amount of electricity produced increased by about 44.1%, compared to 2022 levels (196 million kWh). Of the total amount of electricity generated from renewable sources, the largest share is held by electricity generated using wind potential (67.6%), followed by electricity produced from solar energy (27.5%), and electricity produced from biogas (4.9%).

Agriculture. Between 1991 and 2023, the evolution of agricultural production fluctuated, with the best results being recorded in 1993, 1997, 2004, 2008, 2010, 2011, 2013, 2014, 2017 and 2021, and the worst, respectively, in 1992, 1994, 1996, 1998, 2003, 2007, 2012, 2015, 2019, 2020 and 2022. Between 1990-2022, the sown areas of certain agricultural crops were significantly reduced (the sown areas with oats decreased during the respective period by 57.1%, melons – 76.1%, vegetables – 46.36%, potatoes – 44.4%, winter and spring barley – 57.2%, grain legumes – 55.1%, perennial plants for green fodder, silage and feed – 100.0%, buckwheat – 100.0%, sugar beet – 85.6%, corn for silage and green mass – 97.7%, etc.). The volume of agricultural production in 2022 amounted to approximately 44,817 billion MDL (at the current price), and the agricultural production volume index compared to 2021 decreased by 25.1% (on comparable terms). Between 1990 and 2022, the number of some domestic animal species decreased significantly: cattle – by 90.2% (dairy cows – by 82.7%), swine – by 81.2%, sheep – by 66.2%, horses – by 58.5%, donkeys – by 35.3%.

Transport. In its structure, the transport sector includes: road, railways, air transport and water-borne navigation. The public road network, with a total length of about 9.4 thousand km (of which with rigid pavement – 9.1 thousand km). The road network is sufficiently developed (the density of public roads is approximately 322 km/1000 km^2, and that of public roads with rigid pavement – about 306 km/1000 km^2). In recent years, large-scale repair and restoration works of the national road network have been carried out. During the reference period, an intense increase in the number of motor transport units was recorded. Railway transportation has been operating for over 140 years. The length of the railway is about 1.15 thousand km, and the density of communication routes per 1000 km^2 is about 34 km. River transport is developing and increasing, both in terms of the number of ships and ports. The length of inland waterways for general use is currently about 476 km (including 410 km on the right bank of the Dniester River, and 66 km on the left bank of the Dniester River). There are four airports in the country: in Chisinau, Balti, Cahul and Marculesti, of which only the airport in Chisinau operates regular passenger routes. The airports in Cahul and Marculesti are pending certification. The airport in Balti is certified, but only operates irregular flights. Compared to 1990, both the quantity of goods transported by means of transport has been considerably reduced (from 331.1 million tonnes in 1990 to 49.0 million tonnes in 2022), and the distance of goods transported (from 21,648 million tonnes-km in 1990 to 7,872 million tonnes-km in 2022). In the same period, both the number of passengers transported (from 757.7 million passengers in 1990 to 257.4 million passengers in 2022) and the distance of passengers transported (from 10,102 billion passenger-km in 1990 to 5,518 billion passenger-km in 2022) have been significantly reduced.

Buildings. As of December 31, 2022, the housing stock amounted to 90.5 million m^2 (0.6% more than in the previous year, and about 16.2% more than in 1990, respectively). Between 1990 and 2022, indicative energy consumption per m^2 of total area decreased in the residential sector of Moldova from about 26.0 kg c.e./m^2 in 1990 to about 17.5 kg c.e./m^2 in 2022. Between 1990-2022, the country's gasification was successfully achieved: the length of natural gas networks increased by about 12.9 times (from 1,873 thousand km in 1990 to 25,362 thousand km in 2022). This allowed for a considerable reduction in the consumption of solid and liquid fuels in favour of natural gas consumption, and, after 2010, likewise in favour of renewable energy sources (especially biomass).

ES.3. National Greenhouse Gas Inventory

ES.3.1. The Country's Relative Contribution to Global Warming

The country's historical responsibility for greenhouse gas emissions is low. In 2022, Moldova generated only approximately 0.022% of total global emissions. Fossil CO_2 emissions per capita in 2022 were two times lower than the global average (2.17 t CO_2 per capita compared to 4.84 t CO_2 per capita). Our country also has a low level of historical cumulative CO_2 emissions recorded since 1750, below 0.076% of global cumulative CO_2 emissions. Between 1990 and 2022, net direct greenhouse gas emissions decreased in the same period by approximately 69.5%: from 43.81 Mt CO_2 equivalent in 1990 to 13.37 Mt CO_2 equivalent in 2022 (likewise, net emissions decreased by 8.8% compared to the level of 2021).

ES.3.2. Institutional Arrangements

The Ministry of Environment (MoEnv) is the state authority responsible for developing and promoting state policies and strategies in the field of environmental protection, natural resources and combating climate change.

In accordance with GD no. 549 as of 13.06.2018 on the establishment, organisation and operation of the Environment Agency, it was assigned competences in the field of atmospheric air protection and climate change. Simultaneously, in accordance with GD no. 1277 as of 26.12.2018 on the establishment and operation of the National Monitoring and Reporting System (NMRS) of greenhouse gas emissions and other information relevant to climate change, the Environment Agency was designated as the competent authority responsible for ensuring the operation of the NMRS of greenhouse gas emissions and other information relevant to climate change, providing that the operation of the NMRS is carried out at the expense and within the resources approved in the state budget of the institutions that are parties to the system, as well as from other sources provided by law, including external financing (*activities carried out on the basis of technical assistance and capacity building projects*).

The Environment Agency requested by Letter no. 3471 as of 25.09.2019 that the Public Institution 'Environmental Projects National Implementation Office' (P.I. 'EPNIO') examine and identify the possibility of providing the necessary support for the accomplishment of the tasks in the field of climate change by organising the entire process of preparing the reports of the Republic of Moldova to the UNFCCC, in accordance with the rules, procedures and decisions of the Conference of the Parties to the UNFCCC.

ES.3.3. Methodological Aspects

The national inventory is structured to meet the UNFCCC reporting requirements and is divided into five sectors, each sector being further broken down by source category. Direct greenhouse gas emissions (CO_2, CH_4, N_2O, HFC, PFC and SF_6) were estimated using the methodologies available in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Indirect greenhouse gas emissions (NO_x, CO, NMVOC and SO_2) were estimated using the methodologies available in the EEA/EMEP Air Pollutant Emission Inventory Guidebook (2019, 2023).

ES.3.4. Key Category Analysis

In order to prioritise the country's efforts to improve the quality of the inventory, in accordance with the recommendations of the 2006 IPCC Guidelines, key categories were identified for the period 1990-2022, without 'LULUCF', by applying the Tier 1 method – 20 key categories by level assessment (L) and 19 key categories by trend assessment (T), by applying the Tier 2 method – 18 key categories by level assessment (L) and 16 key categories by trend assessment (T); with 'LULUCF', by applying the Tier 1 method – 27 key categories by level (L) and 23 key categories by trend (T), respectively, by applying the Tier 2 method – 22 key categories by level (L) and 18 key categories by trend (T).

ES.3.5. Quality Assurance and Quality Control

The primary activities carried out for quality assurance and quality control included specific detailed procedures and typical forms for verification and quality control, by applying Tier 1 methodological approaches – general

procedures and Tier 2 – specific procedures for individual source categories, as well as the technical review (audit) carried out by personnel not directly involved in the process of preparing and developing the national inventory; verification of the quality of activity data, including by comparing data sets obtained from different sources; planning and coordination of the inventory process at the inter-institutional level; as well as continuous documentation of the development process of the national inventory. All the paperwork used in its compilation is held by P.I. 'EPNIO' and the Environment Agency.

ES.3.6. Recalculations

The RoM revised and recalculated GHG emissions and CO_2 removals for each calendar year included in the national GHG inventory for the period 1990-2020, part of the NC5 to the UNFCCC (2023). The respective activities were carried out within the continuous process of improving the quality of the national GHG inventory (including by taking into account updated activity data, methodological approaches available in the 2006 IPCC Guidelines, considering new source categories in the inventory for the first time, updating the values of country-specific emission factors and correcting identified errors, but also resulting from the updated global warming potential (GWP) values for the 100-year horizon available in the IPCC AR5, replacing those available in the IPCC AR4. Compared to the results recorded in the NC5 of the RoM to the UNFCCC, the changes made in the inventory compilation process resulted in a slight increase in total and net GHG emissions in the period 1990-2018, and in a slight decrease in total and net GHG emissions in 2019-2020, respectively.

ES.3.7. Uncertainty Assessment

The assessment of GHG emissions was carried out with the highest possible accuracy; however, the results obtained have a certain degree of uncertainty. Some assessments, such as CO_2 emissions from fossil fuel combustion, or CO_2 emissions from cement production, are considered to have minimal uncertainty. For other source categories, however, due to the relatively low quality of activity data, the use of default emission factors, as well as the use of an insufficiently clear vision of the emission generation process, emission uncertainty is high. The overall uncertainty of the national inventory for the period 1990-2022, carried out by applying the Tier 1 method, reveals a ±6.02% level uncertainty, and a ±1.89% trend uncertainty, respectively.

ES.3.8. Inventory Completeness

The national inventory represents, for the most part, a complete registry of the following direct GHGs – CO_2, CH_4, N_2O, HFC, PFC, and SF_6. The national inventory also included indirect GHGs, as follows: CO, NO_x, NMVOC, and SO_2. Despite the effort to include all existing source and sink categories in the inventory, certain gaps persist in the inventory, most of which are determined by the lack of activity data for the assessment of the respective GHG emissions or removals.

ES.3.9. Metrics

In the current reporting cycle, the GWP_{100} values available in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5, 2014) were used.

ES.3.10. Direct Greenhouse Gas Emissions Trends

In 2022, direct greenhouse gas emissions were distributed was as follows: CO_2 – 72.6% (in 1990 – 81.4%), CH_4 – 17.7% (in 1990 – 13.2%), N_2O – 7.9% (in 1990 – 5.5%), and that of F-gases (cumulatively) was only approximately 1.8%.

Between 1990 and 2022, total CO_2 emissions (without LULUCF) decreased by approximately 74.6% (from approx. 37.00 Mt in 1990 to 9.40 Mt in 2022). CH_4 emissions (without LULUCF) had decreased by approximately 61.8% (from approx. 6.00 Mt CO_2 equivalent in 1990 to 2.29 Mt CO_2 equivalent in 2022), and N_2O emissions (without LULUCF), respectively, had decreased by 58.7% (from approx. 2.48 Mt CO_2 equivalent in 1990 to 1.02 Mt CO_2 equivalent in 2022). Even if the share of F-gases in the structure of total emissions is currently insignificant, the evolution of these emissions have revealed a stable upward trend in recent years (increasing from approx. 0.94 kt CO_2 equivalent in 1995 to approx. 234.84 kt CO_2 equivalent in 2022).

The Energy Sector constitutes the most important source of total national direct greenhouse gas emissions, its share varying between 84.7% (1990) and 69.2% (2022). Other relevant sources of direct greenhouse gas emissions are represented by the Agriculture Sector (11.6% in 1990, and 10.1% in 2022, respectively), Waste Sector (3.9% in 1990, and 10.8% in 2022, respectively) and Industrial Processes and Product Use Sector (3.7% in 1990, and 6.7% in 2022, respectively). During the entire reporting period, except for the years 2021 and 2022, the LULUCF sector constituted a net source of carbon removals. With the decrease in direct GHG emissions at national level, the relevance of this sector in the structure of net GHG emissions at national level demonstrated a similar trend: in 1990, about 3.8% of net GHG emissions were removed at national level, while in 2022 this sector contributed about 3.2% of net direct GHG emissions at national level.

Between 1990 and 2022, total direct GHG emissions had a downward trend: emissions from the Energy Sector decreased by about 75.1%, those from the IPPU Sector – by about 43.9%, from the Agriculture Sector – by 73.4%, from the LULUCF Sector – by 125.1%, and those from the Waste Sector – by 14.5%.

ES.3.11. Indirect Greenhouse Gas Emissions Trends

Photochemically active gases, such as carbon monoxide (CO), nitrogen oxides (NOx) and non-methane volatile organic compounds (NMVOCs), are not considered greenhouse gases, but contribute to the greenhouse effect in the atmosphere indirectly. All these gases are considered precursors for ozone in the atmosphere, influencing the formation and depletion of ozone in the atmosphere. They mainly persist in exhaust fumes from transport units, but also come from fossil fuel combustion at stationary sources, from the use of solvents and other household products, etc.

Emissions from the following ozone precursor gases and aerosols: NO_x, CO, NMVOC and SO_2 have thereby been included in the national greenhouse gas inventory. Between 1990 and 2022, total NO_x emissions decreased by about 72.7%, total CO emissions decreased by about 57.0%, NMVOC emissions decreased by about 35.3%, and SO_2 emissions decreased by about 96.7%.

ES.4. Description of the Nationally Determined Contribution

On September 25, 2015, the Republic of Moldova officially submitted its intended Nationally Determined Contribution (NDC 1.0) and associated information to facilitate clarity, transparency and understanding in relation to the provisions of decisions 1/CP.19 and 1/CP.20. In accordance with this, the Republic of Moldova has undertaken to achieve the unconditional target of reducing GHG emissions by 64% by 2030, compared to the level recorded in the base year (1990), and committed to making maximum efforts to reduce GHG emissions by 67% compared to 1990 levels. The respective reduction commitment could be conditionally increased to approximately 78%, should important issues be considered, such as providing low-cost financial resources, technology transfer and technical cooperation, access to all of these to an extent commensurate with the challenges of global climate change.

The GHG emission reduction targets were established in an emissions budget, covering the period from January 1, 2021 to December 31, 2030. The economy-wide GHG emission reduction targets, set in the NDC 1.0 of the Republic of Moldova, were subsequently transposed into the national legislation by Government Decision no. 1470 as of December 30, 2016 on the approval of the Low Emission Development Strategy until 2030 (LEDS 2030) and the Action Plan for its implementation.

On March 4, 2020, the Republic of Moldova submitted the updated Nationally Determined Contribution (NDC 2.0) to the UNFCCC Secretariat. In accordance with it, the RoM has undertaken to achieve more ambitious economy-wide GHG emission reduction targets by 2030. The unconditional target thereby increased from 64-67% to 70% compared to the level recorded in the base year (1990), and the conditional target increased accordingly, from 78% to approximately 88%, compared to the level recorded in 1990. The new economy-wide GHG emission reduction targets were introduced in the LEDP 2030, approved at national level by Government Decision no. 659 as of 06.09.2023.

According to NDC 2.0 (2020), total emissions in the base year (1990) amounted to 44.9 Mt CO_2 equivalent, without LULUCF, and 43.4 Mt CO_2 equivalent, with LULUCF. The difference observed between NDC 1.0

and NDC 2.0 was due to the complete transition from the Revised 1996 IPCC Guidelines to the 2006 IPCC Guidelines, but also due to using the 100-year Global Warming Potential (GWP_{100}) values available in the Fourth Assessment Report (IPCC AR4) in place of those available in the Second Assessment Report (IPCC SAR), as well as due to recalculations undertaken as a result of utilising higher tier methods, revised values of country-specific and default emission factors, updating of the time series for activity data and considering new emissions and removals categories in the national GHG inventory for the first time, etc.

The circumstances in which the RoM would update its reference indicator values could arise from the need to improve the quality of the national GHG inventory, by considering the availability of updated activity data, higher tier methods available in the 2006 IPCC Guidelines, updated country-specific emission factors, and the recalculation of GHG emissions and removals, as a result of implementing the recommendations resulted from the implementation of the Quality Assurance and Quality Control Plan.

The commitment to reduce GHG emissions was established for the period January 1, 2021 - December 31, 2030. The achievement of this commitment shall be monitored at least once every two years, by means of the national inventory of greenhouse gas emissions by sources and removals by sinks, submitted to the UNFCCC as a technical annex to the Biennial Transparency Reports (BTRs).

The GHG mitigation objective corresponds to the absolute reduction in net GHG emissions generated by the entire economy, compared to the base year (1990).

The geographical coverage corresponds to the internationally recognised geopolitical borders of the country (thus including the administrative-territorial units on the left bank of the Dniester River).

The RoM intends to account, on a net-net accounting basis, for 100% of national greenhouse gas emissions and removals for the reference year, as published in the National Inventory Reports.

Gases covered: all greenhouse gases not covered by the Montreal Protocol are as follows – carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3).

Sectors covered: Energy; Industrial Processes and Product Use (IPPU); Agriculture; Land Use, Land-Use Change and Forestry (LULUCF); and Waste.

Both the categories of anthropogenic emissions and removals and the sectors taken into account are included in the categories and sectors available in the 2006 IPCC Guidelines, used by the RoM to calculate national greenhouse gas emissions. The country has taken into account paragraph 31, letters (c) and (d) of Decision 1/CP.21.

Moldova intends to include all categories of emissions by sources and removals by sinks, as well as all stocks and gases, as reported in the national greenhouse gas emission inventory; to account for the land sector using a net-net approach; and to use a 'production approach' to account for harvested wood products, in accordance with the 2006 IPCC Guidelines. Moldova may exclude emissions from natural disturbances, in accordance with IPCC recommendations.

In estimating emissions and removals in the land sector, there are challenges related to material data collection, as well as methodological challenges. In line with the good practices of the 2006 IPCC Guidelines, Moldova shall continue to enhance its greenhouse gas emissions reporting from LULUCF, which will also involve an update of the methods used.

According to NDC 2.0 (2020), the RoM has undertaken to reduce unconditionally its net GHG emissions, from 43.4 Mt CO_2 equivalent in 1990 to 12.8 Mt CO_2 equivalent in 2030, i.e. approximately 3.4 times less over a 40-year period, thus contributing to stabilising GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system and would guarantee that the country's food production is not threatened and would allow for sustainable economic development.

It should be mentioned that the LEDP 2030, approved at national level by GD no. 659 as of 06.09.2023, the legal instrument for achieving the mitigation objectives in NDC 2.0 (2020), also provides sector-specific objectives aimed at reducing direct GHG emissions until 2030, for both the unconditional and conditional scenarios.

ES.5. Climate Change Mitigation Policies and Measures

ES.5.1. Clean Development Mechanism of the Kyoto Protocol

To date, ten requests to launch CDM projects have been registered, of which eight had been registered by the CDM Executive Committee, all by 2012. Only two of these are still ongoing.

ES.5.2. Economic Instruments

In recent years, changes in legislation have been made in order to stimulate imports of new means of transport with a shorter operating period (less polluting) and, respectively, to discourage the purchase of old means of transport (with higher or increased pollutant levels). For example, starting in 2020, imports of means of transport equipped with an electric motor were exempted from VAT.

ES.5.3. Activities Related to Nationally Appropriate Mitigation Actions

In order to achieve the general and specific targets of the LEDP 2030, for each sector examined (Energy, Transport, Buildings, Industry, Agriculture, LULUCF, and Waste) nationally appropriate mitigation actions (technologies and/or measures) (NAMAs) have been identified, and they were prioritised with the participation of all parties. The largest contribution to meeting the conditional target of NDC 2.0 is expected to be obtained through the financial mechanisms of the Paris Agreement, including from the Green Climate Fund (GCF). In this regard, in 2019, the Country Programme of the RoM for projects supported by the GCF for 2019-2023 years was developed. Since this Programme was not approved, the Country Programme of the RoM for projects supported by the GCF for 2024-2027 years was developed more recently and is currently under consideration.

ES.5.4. Sectoral Policies and Measure for Climate Change Mitigation

Policies and measures for climate change mitigation are reflected in strategies, programmes and action plans presented in the respective chapters, their key elements being presented below.

Energy

The primary document that outlines policies in the energy sector is the Energy Strategy of the Republic of Moldova until 2030 (ESM 2030). Approved in 2013, the document contains concrete objectives only until 2020. Compared to 2010, the planned objectives of reducing energy intensity, losses in transmission and distribution networks; energy consumption in buildings had been met by 2020. The use of renewable sources in relation to the total gross domestic consumption exceeded the planned level of 20%. Simultaneously, ensuring the 10% share of annual electricity production from renewable energy sources had been met, accounting for 2.6%. In 2022, the initiative to update the ESM 2030 was launched. With the support of USAID/MESA, the concept of the Energy Strategy of the Republic of Moldova until 2050 (ESM 2050) was prepared, and subsequently the ESM 2050 itself, currently in the process of public consultation.

With reference to renewable energy sources (RES), the capacity limits of the maximum quotas and RES capacity categories were established by GD no. 401/2021, recently amended by GD no. 117/2023, which provide for the ensuring of the following operating RES by 31.12.2025: intermittent sources – 320 MW, including wind sources – 120 MW, and photovoltaic sources – 200 MW; non-intermittent sources – 90 MW, including biogas-based cogeneration installations 65 MW.

It should be mentioned that the LEDP 2030 provides for the reduction of GHG emissions from the energy sector by 2030, compared to 1990, unconditionally – by 81% and conditionally – up to 87%.

The Integrated National Energy and Climate Plan 2030 (INECP 2030), which is to be approved earlier in 2025, includes 95 policies and measures (PaMs) until 2030. INECP 2030 provides for the decarbonization of the energy sector by installing 220 MW photovoltaic parks, 510 MW wind parks, 6 MW photovoltaic-thermal systems, 372 MW heat pumps, the development of three 400 kV interconnection lines with Romania, etc. by 2030.

Industry

Over the past twenty years, several policies related to monitoring and reduction of GHG emissions in the industrial sector have been approved and are in the process of being developed. These include policies to promote

energy efficiency and the green economy, which also have an impact on the industrial sector, as stipulated in the Programme for the Promotion of the Green Economy in the RoM 2018-2020 and the Action Plan for its implementation, approved by GD no. 160/2018, and in the Programme for Promoting Green and Circular Economy in the RoM 2024-2028, approved by GD no. 495/2024, respectively.

It should be mentioned that the LEDP 2030 provides for the reduction of GHG emissions by 2030 from the industrial sector compared to 1990, unconditionally – by 27% and conditionally – by up to 31%.

With respect to the reduction of GHG emissions in this sector, the following should likewise be mentioned: The 'Net Zero Carbon Emissions Science-Based Target' Commitment signed by the LafargeHolcim group on September 21, 2020 at the New York Climate Conference, the Kigali Amendment to the Montreal Protocol to phase down the use of hydrofluorocarbons worldwide, signed on October 15, 2016, ratified by the Republic of Moldova by Law no. 178 as of 30.06.2023; and Law no. 43 as of 3.03.2023 on fluorinated greenhouse gases, respectively, which establishes the legal framework for the implementation of climate change mitigation measures and environmental protection by reducing fluorinated greenhouse gas emissions.

Agriculture

At the level of 2024, the policies approved in the RoM and purposely oriented towards reducing greenhouse gas emissions in the agriculture sector (encompassing both the plant production and soil resources branch, as well as the animal breeding) are the LEDP 2030, approved by GD no. 659/2023, and the Environment Strategy for 2024-2030, respectively, approved by GD no. 409/2024. Thus, LEDP 2030 provides for the reduction of GHG emissions by 2030 from the agriculture sector, compared to 1990, unconditionally – by 44% and conditionally – up to 47%.

At the same time, the National Strategy for Agricultural and Rural Development (NSARD) for the years 2023-2030, approved by GD no. 56/2023, provides for measures associated with the cross-cutting objective of the EU Common Agricultural Policy, which aims to modernise the agriculture sector by stimulating and sharing knowledge, by promoting innovation and digitalisation, adaptation to climate change, and the sustainable development of rural areas. NSARD 2030 also provides for the application of good agricultural practices, including conservative ones, on an area of at least 150 thousand ha of agricultural land and supporting agri-environmental and climate practices (cultivation of green manures, protein crops, ensuring crop rotation, using no-till or mini-till practices) for at least 5% of the country's agricultural land. According to sectoral policies, the emphasis in agriculture will be placed on reducing nitrogen mineralization in soils, including through the use of green fertilisers together with the implementation of the conservation tillage system, based on 'no-till' and 'mini-till' technologies, increasing the share of organic fertilisers in the soil, keeping plant residues from the main crop in the field to form mulch, etc. In order to achieve the objective of increasing zootechnical productivity, programmes and strategies are being implemented, which improve the gene pool of domestic animals and poultry. Likewise, animal manure will be used to produce biogas for energy purposes and increase soil fertility, which will also contribute to reducing GHG emissions.

Forestry

The Forest Code no. 887/1996 is the primary document which regulates forest use, the protection of land and water, as well as the use and conservation of the plant and animal kingdom within the forest fund. Another important document related to the LULUCF Sector is the Land Code no. 828/1991, which regulates land tenure, establishes the means of allocation and change of land-use purpose and land-use categories, regulates the land ownership regime, protection and improvement of land. LEDP 2030 provides for the unconditional increase by up to 10%, by 2030, of the carbon dioxide removal capacity in the LULUCF sector and the conditional GHG removal by up to 391%, compared to 1990.

Likewise, the National Forest Extension and Rehabilitation Programme for the period 2023-2032 and the Action Plan for its implementation for the period 2023-2027, approved by GD no. 55/2023, provides for extensive activities for planting trees/saplings and rehabilitating/promoting forest vegetation on an area of at least 145 thousand ha for a period of 10 years.

To achieve the general objective of the Programme, two directions were proposed: (1) expansion (through afforestation) – activities to create new forest crops, the primary objective being social (energy, economic) and ecological security (forest habitats, biodiversity shelter) by creating forests with production functions (energy, industrial) – approximately 110 thousand ha; and (2) rehabilitation (mainly through reforestation) – restoration or reconstruction of lands with forest vegetation strongly affected by various forms of degradation, where forest vegetation is practically absent or in an unfavourable condition, the primary objective being the restoration of natural forests and the predominant maintaining ecological functions (carbon removal, hydrology, biodiversity conservation, etc.); young stands and/or forest crops until they become massifs, which have not achieved the optimal parameters set out in the establishment projects or/and according to the site conditions (composition; consistency; success, etc.) will also be considered – approximately 35 thousand ha.

In the above context, it is necessary to point out that the policies applied in the forestry sector are oriented towards increasing the forested areas up to 15% of the country's territory by 2030, with the subsequent increase in the wood mass remaining after its harvesting; reducing the areas affected by fires; gradually increasing the windbreaks, tree and shrub plantations, orchards and vineyards, improving the quality of plantations. Likewise, the increase in grassland is not anticipated. Moreover, they will have a decreasing trend, as the number of domestic animals is in a continuous decrease.

Waste

In the Republic of Moldova, the national policy in the field of waste management is focused on the development of the infrastructure and services necessary for the adequate protection of the environment at the global, national and local levels from the effects associated with the management of waste generated by the population, enterprises and institutions, according to the provisions of the Waste Management Strategy in the RoM for 2013-2027, approved by GD no. 248/2013, LEDP 2030, approved by GD no. 659/2023 and the National Waste Management Programme for 2023-2027, approved by GD no. 972/2023.

LEDP 2030 provides for the reduction of GHG emissions by 2030 from the waste sector, compared to 1990, unconditionally – by 14% and conditionally – by up to 18%.

Simultaneously, the National Waste Management Programme for 2023-2027 will contribute to the development, by 2027, of an integrated waste management system that is economically efficient and ensures the fundamental right to a healthy and safe environment and the achievement of the main indicators of sustainable development. The Program will also serve as a basis for planning investments in the development of an efficient integrated waste management infrastructure, stimulating the transformation of waste into resources and taking action towards the circular economy, as well as raising awareness of the benefits of environmental actions in addressing global waste management challenges. In the above context, the most relevant measures to mitigate GHG emissions from the waste sector include: developing regional waste disposal infrastructure through the construction of regional MSW landfills and transfer stations; expanding the current primary waste collection and disposal system from urban to rural areas; and improving water supply and sanitation infrastructure, respectively.

ES.6. Projection of GHG Emissions, Impact of Mitigation Scenarios, Working Assumptions and Methodologies Applied

ES.6.1. Assumptions and Instruments used at Sectoral Level

Within the BTR1 of the RoM to the UNFCCC, greenhouse gas emission projections were developed for the years 2025, 2030, 2035 and 2040, and carried out for two scenarios: (1) the scenario With Existing Measures (WEM) and (2) the scenario With Additional Measures (WAM). The need to develop a Baseline Scenario (BLS) was no longer necessary as at the stage of identifying mitigation targets in the context of NDC 1.0 (2015), the Republic of Moldova chose the objective of reducing emissions compared to the base year (1990). Thus, GHG emissions under the WEM and WAM are compared with emissions recorded in 1990, not with those in the BLS. The scenarios were generated for the following sectors: energy; industrial processes and product use; agriculture; land use, land-use change and forestry; as well as for the waste sector. In the above-mentioned scenarios, aggregate

emissions were considered, as well as emissions from the following direct greenhouse gases: CO_2, CH_4, N_2O and F-gases. To assess the potential for mitigating GHG emissions, the 2006 IPCC Guidelines were used, calculation tools developed by national experts were applied, using the top-down and bottom-up methods. To simulate the evolution of GHG removals/emissions in the LULUCF sector, the Land Use and Land-Use Change Matrix for the period 1970-2022 (extended for 2025-2040) was used, and to develop scenarios for the development of electricity sources, the TIMES model was used.

ES.6.2. Aggregate Projections of Direct Greenhouse Gas Emissions

As a result of promoting policies and measures to mitigate GHG emissions, applied in the WEM and WAM concepts, their impacts were calculated for the sectors defined by the IPCC, expressed in CO_2 equivalent.

The projections of GHG emissions in the WEM show values somewhat lower than those related to the commitments made by the Republic of Moldova in NDC 2.0 (2020). Thus, by 2030 they are expected to be lower than those recorded in 1990 by 69.1%, compared to 70% according to the unconditional scenario in NDC 2.0. By 2040, net GHG emissions continue their downward trend, reaching a 69.5% reduction compared to 1990. As for the WAM, GHG emission reductions by 2030 will be lower than those provided for in the conditional scenario in NDC 2.0, due to considerations specific to each sector, examined separately in Chapter 2 of BTR1.

With reference to the evolution of net individual GHG emissions, according to the WEM and WAM scenarios, compared to the emission level recorded in 1990, the amount of CO_2 and CH_4 emissions tends to decrease compared to 2020, while that of N_2O, conversely, to increase after this year. The evolution is explained by the gradual increase in the amounts of nitrogen fertilisers between 2020-2040, as well as the loss of carbon through the mineralisation process as a result of agricultural land-use changes and soil management practices until 2040, with an impact of increasing N_2O emissions (especially those from category 3D 'Agricultural Soils'). It should be noted that the share of N_2O in the total volume of direct GHG emissions between 2020-2040 represents approximately 10-15% in WEM, and 10-22% in WAM, respectively.

ES.6.3. Projections of Direct GHG Emissions at Sectoral Level

Energy Sector

The energy sector, with most GHG emissions in the Republic of Moldova (69.2%, 2022), will contribute considerably to achieving the country's GHG emission reduction commitments. Thus, by 2040, the level of GHG emissions in the WEM and WAM will be 31.0% and 23.2%, respectively, compared to 1990.

Industrial Processes and Product Use

In 2022, Sector 2 'IPPU' contributed about 6.7% of total GHG emissions. By 2040, GHG emissions will constitute about 71.5% of the level of direct GHG emissions recorded in the base year (1990) in the case of WEM, and about 62.0% in the case of WAM, respectively. The slight upward trend in direct GHG emissions from this sector, however, will be maintained in the case of WEM until 2040. The implementation of mitigation policies at sectoral level will lead to a reduced growth rate of direct GHG emissions in the case of WAM. In both scenarios assessed, a dominant share of carbon dioxide emissions is projected, compared to hydrofluorocarbons and emissions of other direct GHGs; it is also worth noting the trend of a significant reduction in the share of HFCs between 2020 and 2040 as a result of the implementation of the measures and policies envisaged to mitigate F-gases with increased global warming potential. According to both scenarios considered, by 2040, category 2A 'Mineral Industry' will continue to have the largest share in the structure of total GHG emissions at sectoral level; at the same time, the share of source category 2F 'Product uses as substitutes for ODS', conversely, will register a downward trend.

Agriculture Sector

In 2022, Sector 3 'Agriculture' contributed about 10.1% of total GHG emissions. Compared to the base year (1990), in 2040, the level of GHG emissions within the WEM and WAM will be 35.1% and 33.7%, respectively. The slight downward trend in direct GHG emissions from the agriculture sector will continue until 2040. Both scenarios assessed continue to envisage an upward trend in the share of nitrous oxide emissions, compared to that of methane and carbon dioxide emissions. Towards 2040, the share of categories 3A 'Enteric Fermentation'

and 3B 'Manure Management' will register a downward trend, whereas the share of categories 3D 'Agricultural Soils' and 3H 'Urea Application', conversely, will register an upward trend.

Land Use Land-Use Change and Forestry Sector

The policies applied in the development of mitigation scenarios (WEM and WAM) within the LULUCF sector are aimed at increasing forested areas up to 15% of the country's territory, with the subsequent increase in the volume of timber; reducing the areas affected by forest fires; gradually increasing the number of windbreaks, tree and shrub plantations, orchards and vineyards, improving the quality of plantations, etc. CO_2 reductions within WAM (3.95 Mt) by 2040 will exceed those in the WEM (2.52 Mt) by approximately 1.6 times. However, to achieve this performance, significant support is required from development partners and donors.

Waste Sector

In 2022, Sector 5 'Waste' contributed approximately 10.8% of total GHG emissions. Compared to the level of emissions recorded in the base year, in 2040 the level of GHG emissions in the waste sector will constitute 51.9% in the case of WEM and 53.1% in the case of WAM.

International Transport

It is estimated that compared to the last year covered by the national GHG emissions inventory (2022), emissions from international air transport will increase by approximately 1.4 times by 2040.

ES.7. Information Related to Climate Change Impacts and Adaptation under Article 7 of the Paris Agreement

ES.7.1. National Circumstances, Institutional Arrangements and Legal Framework regarding the Impacts and Adaptation to Climate Change

The Republic of Moldova is located in the South-Eastern part of Europe, near the geographical midpoint of Europe (28°32′ long. E), to the West it is separated from Romania by the Pruth River, and in the other three cardinal directions it is bordered by Ukraine. The country's area is 33.8 thousand km^2.

The RoM is located in the temperate-continental climate zone, with mild winters and little snow, warm summers and low humidity, which influences the properties of waters, the organic world, and conditions the formation of forest-steppe and steppe natural regions. The average annual air temperature in 2023 was within the limits of 11.0°C-13.3°C, and annual precipitation varied from South to North – from 390 mm to 460 mm.

Water resources consist of surface waters and groundwater. Surface waters total over 3.6 thousand rivers and streams and over four thousand water accumulations. Groundwater falls into the following groundwater bodies: Alluvial-Deluvial aquifer, Holocene, Pliocene-Pleistocene aquifer, Pontian aquifer, Upper Sarmatian-Meotian aquifer, Middle Sarmatian (Congerian) aquifer, Badenian-Sarmatian aquifer, Silurian-Cretaceous aquifer, Vendian-Riferic aquifer. Total groundwater reserves are estimated at 3.47 million m^3/day, of which about 80% belongs to the Dniester river basin and 20% to the Danube-Pruth and Black Sea basins.

Institutional arrangements for climate change impact and adaptation in RoM involve several institutions. The MoEnv is the central public administration authority that coordinates national efforts to mitigate and adapt to climate change, the main objective of which is the development, promotion and implementation of environmental policy documents, such as environmental protection, climate change, sustainable management of natural resources. The Government has established the National Commission on Climate Change with the task of coordinating and approving climate change policies and public capital investment projects in the context of mitigation and adaptation to climate change, as well as natural disaster risk management.

ES.7.2. Impacts, Risks, and Vulnerabilities to Climate Change

Vulnerability to climate change is assessed as a function of exposure, sensitivity, and adaptive capacity. Between 2008 and 2022, in the North Region, Falesti district has a 'very high degree of vulnerability' (0.5354), whereas Drochia district (0.5213), Balti municipality (0.5155), Soroca (0.5137) and Sangerei – a 'high degree of

vulnerability' (0.5122), while a 'low degree of vulnerability' to climate risks is recorded in Floresti district (0.4887). In the Central Region, the district with a 'very high degree of vulnerability' to climate risks was Hancesti (0.5472), whereas Rezina (0.5281), Dubasari (0.5195), Soldanesti (0.5151) and Nisporeni districts – have a 'high degree of vulnerability' (0.5118). The lowest degree of vulnerability to climate change was recorded in Ialoveni (0.4587) and Anenii Noi (0.4604) districts. In the South Region, the 'very high degree of vulnerability' is recorded in Leova district (0.5313), and a 'high degree of vulnerability' in Basarabeasca district (0.5209), while a 'low degree of vulnerability' is recorded Cahul (0.4785), ATU Gagauzia (0.4836), Cimislia (0.4893) and Taraclia (0.4895) districts.

With reference to the anticipated impact of climate change on the water resources sector, the modelling of annual water runoff for the period 2021-2040 shows that the water runoff layer will decrease by 20% on average for the entire territory of the country in all scenarios, without major changes at regional level. The water runoff layer for the years 2041-2060 differs from one scenario to another and from one region to another. Water runoff in the north and centre of the country will decrease by about 25% under the SSP1-2.6 scenario, by about 37% under SSP2-4.5 and by about 52% under SSP5-8.5. The decrease in water runoff for the southern region is higher compared to the others by about 2-3% in all scenarios. The most significant reductions in water runoff are forecast for the period 2081-2100. In the north of the country, the decrease in water runoff will constitute about 29% under the SSP1-2.6 scenario, about 52% in SSP2-4.5, and about 77% in SSP5-8.5. In the central region, the values are similar, and in the south, the decrease under SSP5-8.5 will reach up to 80.6%.

ES.7.3. Adaptation to Climate Change

The difficulties faced by the country in the field of environmental protection and climate change are addressed in the National Climate Change Adaptation Programme until 2030 (NCCAP 2030) and the Environmental Strategy for 2024-2030. NCCAP 2030 aims to strengthen the climate resilience of the Republic of Moldova, vertical and horizontal synergies between priority sectors, and ensure the implementation of the provisions of the UNFCCC and the Paris Agreement.

The National Development Strategy 'European Moldova 2030' (NDS 2030) is a national policy document of a long-term strategic vision, which determines the development directions of the country and society and which adapts to the national context the priorities, objectives, indicators and objectives of the international commitments assumed by the Republic of Moldova.

The Water Supply and Sanitation Strategy (2014-2030) aims to present an updated and detailed roadmap for the development of the water supply and sanitation sector and for ensuring the human right to safe drinking water as a fundamental right.

The National Strategy for Agricultural and Rural Development for 2023-2030 is aimed at developing a sustainable agri-food sector in response to climate change. The strategy defines four general objectives, aligned with the objectives of the European Union's Common Agricultural Policy. One of the general objectives refers to 'strengthening the potential of the primary agricultural sector and promoting smart, sustainable and climate-resilient agricultural practices'.

The Energy Strategy until 2030 includes measures to adapt the energy infrastructure to the impact of climate change, such as modernising distribution networks and developing energy storage capacities.

The implementation of the National Health Strategy 'Health 2030' will ensure the stability of efficient and sustainable mechanisms for strengthening public health services and capacity to respond to public health emergencies, natural disasters and humanitarian crises, including adaptation to climate change.

ES.7.4. Cooperation, Good Practices, Experience and Lessons Learned

The participation of the RoM in the Eastern Europe, Caucasus and Central Asia Initiative for the UNFCCC facilitates the exchange of information, experiences and good practices among member countries, including the development and implementation of the Republic of Moldova's NCCAP 2030 and NDC 2.0. The efforts of the RoM to improve scientific knowledge, develop effective plans and policies, and engage in international

collaborations are essential for establishing long-term resilience to the impacts of climate change. The experience accumulated by the RoM in policy innovation and pilot and demonstration projects provides a solid basis for the development of climate change adaptation strategies, which can be applied at national and international levels. The RoM has improved the sustainability and effectiveness of climate change adaptation actions by developing and implementing specific national programmes in the context of climate change adaptation and transboundary and international cooperation projects, through investments in renewable energy and energy efficiency, through partnerships and knowledge exchange, and through education and public awareness.

ES.8. Financial, Technical and Capacity Needs

ES.8.1. Capacity-Building Needs in the Field of Climate Change Mitigation

Between 2015 and 2024, approximately 2.819 million US dollars were allocated to finance the development of the NDCs and reporting to the UNFCCC, respectively, and the actual disbursement by October 2024 amounted to approximately 2.629 million US dollars.

Capacity needs in the field of mitigating greenhouse gas emissions and adaptation to climate change were identified for four areas: conducting climate studies, research, and assessments; developing climate strategies and policies; implementing climate strategies and policies; negotiating climate issues at international level, mainly to attract funds.

The total amount of support needed to strengthen the respective capacities until 2027 was estimated at approximately 13.582 million US dollars.

ES.8.2. Financial Needs in the Context of NDC Implementation

The financial resources required to achieve the conditional objective of the LEDP 2030 are directly linked to the achievement of its unconditional objective and to the support from donors and international financial institutions. Thus, for the achievement of the general objective of the LEDP for the period 2024-2027, the volume of financial resources to achieve the unconditional objective was estimated by the Government at approximately 23.96 billion MDL, and for the conditional one – an additional 9.55 billion MDL.

As for NCCAP 2030, for the period 2023-2027, the financial needs were estimated at approximately 1.8 billion MDL, the total cost of implementing the NCCAP 2030 for the period up to 2030 being estimated at approximately 3.0 billion MDL.

ES.8.3. Financial Support Received in the Field of Climate Change Mitigation

The total amount of financial commitments in the field of climate change mitigation from the development partners of the Republic of Moldova for the period 2011-2027 was estimated at approximately 1.669 billion US dollars, of which 0.994 billion in the form of loans and 0.675 billion as grants.

Between 2011 and 2023, 0.952 billion US dollars were disbursed, of which 62% (0.594 billion US dollars) in the form of loans and 38% (0.358 billion US dollars) in the form of grants. The largest disbursements for the implementation of climate change projects between 2011 and 2023 belong to: the European Investment Bank – 268.5 million US dollars, the International Development Association – 132.3 million US dollars, the United States Agency for International Development – 102.3 million US dollars, European Commission – 101.7 million US dollars, BERD – 79.5 million US dollars, World Bank Group – 64.7 million US dollars, etc. Approximately 59% of financing commitments in the field of combating climate change were for GHG emission mitigation measures, 19% for climate change adaptation measures, and 22% for cross-cutting projects. With reference to actual disbursements, 62% of the allocated funds were for mitigation measures, 10% for adaptation measures, and 28% for cross-cutting projects.

ES.8.4. Activities Related to Technology Transfer

With regard to activities related to technology transfer, the following could be mentioned:

- 10 industrial parks have been established in the Republic of Moldova since 2011;
- in order to reform the national science and innovation system, new amendments to the Code on Science and Innovations entered into force in 2018 (it was updated in 2023);
- in 2019, the National Program for Research and Innovation (2020-2023) and the Methodology for financing projects in the field of research and innovation were approved, and in 2023, respectively, the National Program for Research and Innovation (2024-2027) was approved;
- there are 50 research organisations operating in the RoM;
- in the international 'ease of doing business' index, developed by the WB, the RoM is ranked 48th out of 190 countries;
- a favourable legal framework has been created for the long and medium term development of SMEs;
- the total amount of financing required for the transfer of technologies in the field of mitigating GHG emissions and adaptation to climate change until 2027 was estimated at approximately US$ 982 million;
- by considering the entire spectrum of support in the field of technology transfer agreed with development partners for the period 2011-2027, the commitments of development partners in technology transfer for the RoM during that period amounted to approximately US$ 1.435 billion, including US$ 446.5 million in the form of grants and US$ 988.6 million in the form of loans;
- with regard to the actual support received (disbursed) between 2011 and 2023, it amounted to US$ 884.7 million.

ES.9. Activities Related to Mainstreaming Gender Issues in National Climate Policies

ES.9.1. The Nexus between Gender and Climate Change

It is regarded at international and national levels that climate change adaptation and mitigation is essential for protecting the means of well-being and achieving continued progress in sustainable development. Climate change affects all members of society, but its impact may be different for men and women. Thus, it is important to understand and capitalise on gender considerations when working on climate change adaptation and/or mitigation measures, including the reduction of greenhouse gas emissions, taking into account the different roles and responsibilities, consumption patterns and behavioural patterns of women and men in society. Women and men have different life and work experiences, perceive and identify risks related to health, work and life in the context of climate change differently. The capacities to reduce vulnerability and risks are determined by several factors: poverty, social class, education, age, ethnicity and gender norms/relations, etc. Given that climate change has a stronger impact on marginalised groups, women and girls are most seriously exposed to its risks, experiencing higher rates of morbidity, mortality and economic impact, due to reduced resilience capacities to risks.

ES.9.2. Integrating a Gender Perspective into Sectoral Climate Change Mitigation Measures

In the context of climate change, the integration of a gender perspective into climate change policies and actions, low-emission development is achieved by taking into account the following key aspects:

- considering men and women as users of resources (energy, water, land, transport, etc.) with different levels of responsibility and understanding their importance in the context of climate change.
- men and women's access to resources (energy, land, water, forests, etc.) and to their derived products and services in the context of climate change and low-emission development.
- engaging men and women as providers of various resource-based services in the context of climate change and low-emission development.
- the participation of men and women as a workforce in different sectors affected by climate change, which contribute to reducing greenhouse gas emissions.

– participation of men and women in decision-making and consultation processes in the context of climate change and low-emission development.

In the process of planning and implementing climate change adaptation and low-emission development, it is important to involve all interested parties, especially those representing vulnerable groups. Thus, given that groups of women and men are not homogeneous, participation implies intersectionality: addressing the needs of women and men in connection with other variables, such as age, residential environment, disability, socioeconomic status, family status, etc.

ES.9.3. Recommendations on Gender Mainstreaming and Activities to Combat Climate Change

- Development of a list of indicators for monitoring and evaluation of gender mainstreaming issues;
- Gender mainstreaming review from the perspective of climate change;
- Mapping state and non-state stakeholders with relevance to the gender perspective associated with climate change, climate change adaptation and climate change resilience that could inform the NBS data bank;
- Collection and analysis of data and information for certain cyclic periods and analysis of dynamics in the context of new policy documents in the field of climate change until 2030 (NCCAP 2030, LEDP 2030, other related documents);
- Gender-responsive budgeting in climate change area;
- Mainstreaming of the gender perspective into the new Program and Action Plan for Gender Equality (accelerating gender equality) for the next policy cycle for the period 2027-2032/or developing a separate Program and Action Plan for Accelerating Gender Equality in the environmental area;
- Mainstreaming gender issues associated with climate change as a cross-cutting issue in new policy documents and national programs related to the environment, gender equality, safety, healthcare, energy, agriculture, etc.;
- Mapping the needs and opportunities of women and girls affected by climate change in the Republic of Moldova and in the region;
- Development and/or strengthening of capacities and skills on climate change and climate change resilience (guidelines, methodologies, standard operating procedures, guidance and orientation materials, awareness building or information, etc.);
- Creation of a network associated with gender mainstreaming and climate change for sharing information, good practices and transfer of experience, including active communication.

INTRODUCTION

The Republic of Moldova (RoM) ratified the United Nations Framework Convention on Climate Change (UNFCCC) on March 16, 1995, and on February 13, 2003, the Kyoto Protocol, thus recognising the importance of the complex issue of climate change on the destiny of humanity.

As a developing country party to this Convention, the RoM has undertaken to promote the principles of sustainable development, to contribute to achieving the ultimate objectives of the Convention and to assist Parties included in Annex I to achieve their quantified GHG emission limitation and reduction commitments.

In this context, the following areas are included: inventorying greenhouse gases; identifying and implementing measures to mitigate greenhouse gas emissions; identifying and implementing measures to adapt to climate change; transferring environmentally friendly technologies; improving the national environmental observation system and surveillance networks; improving information systems for collecting, processing and storing data; developing, maintaining and updating databases associated with climate change; as well as various capacity-building activities, education, awareness and training of society and the younger generation on climate change issues.

The First Biennial Transparency Report (BTR1) of the Republic of Moldova to the UNFCCC reflects the degree of compliance with the provisions of the Convention at national level and reflects the progress made in achieving the objectives of the Paris Agreement, and the targets set in the updated Nationally Determined Contribution (NDC 2.0) of the Republic of Moldova to the Paris Agreement, information is updated at the level of 2022/2023 years, depending on the availability of statistical data.

The report is based on the results obtained under the project '*Republic of Moldova: Enabling Activities for the Preparation of the First Biennial Transparency Report to the United Nations Framework Convention on Climate Change and the Paris Agreement's Enhanced Transparency Framework'*, initiated in August 2022 and to be completed in March 2025, implemented by the Public Institution 'Environmental Projects National Implementation Office' (PI 'EPNIO') of the Ministry of Environment and the United Nations Environment Programme, with financial support provided by the Global Environment Facility.

The Republic of Moldova's First Biennial Transparency Report under the Paris Agreement, developed in accordance with the Paris Agreement's Enhanced Transparency Framework, outlines a series of relevant actions in the above-mentioned areas, indicating directions for future activity and laying the foundations for effective partnerships.

The wide dissemination of information related to the phenomenon of climate change has contributed to better awareness among the population, the scientific community, and decision-makers in the Republic of Moldova.

It can thereby be stated that the process of developing the BTR1 has strengthened the country's potential necessary for the promotion and implementation of strategies, policies, action plans and programmes focused on mitigating the effects caused by these changes.

We would also like to mention the need for continuity in this direction, which would not only make it possible for the RoM to engage in global efforts to mitigate climate change, but would also involve in this activity the country's scientific and technical potential, experts with professional qualifications relevant to the process of adapting economic, social and environmental components to new climate conditions at national level.

The RoM was fully dedicated to the adoption of the Paris Agreement at the 21st Conference of the Parties – a legally binding document in accordance with the provisions of the Convention, applicable to all Parties, in line

with the objective of keeping global warming at a projected increase well below 2°C by 2100 compared to the pre-industrial period.

The Paris Agreement was signed by the Prime Minister of the Republic of Moldova in New York on September 21, 2016, and was subsequently ratified by Parliament by Law no. 78 as of 04.05.2017 on the ratification of the Paris Agreement.

On September 25, 2015, the Republic of Moldova officially submitted its intended Nationally Determined Contribution[1] (NDC 1.0) and associated information to facilitate clarity, transparency and understanding in relation to the provisions of decisions 1/CP.19 and 1/CP.20.

In accordance with this, the Republic of Moldova has undertaken to achieve the unconditional economy-wide target of reducing GHG emissions by 64% by 2030 compared to the level recorded in the base year (1990), and to make maximum efforts to reduce GHG emissions by 67% compared to the level recorded in 1990. The respective reduction commitment was to be conditionally increased to approximately 78%, in accordance with this global agreement, which addresses important issues such as providing low-cost financial resources, technology transfer and technical cooperation, access to all of these to an extent commensurate with the challenges generated by global climate change.

The GHG emission reduction targets, set in the intended Nationally Determined Contribution (NDC 1.0) of the RoM, were subsequently transposed at national level by GD no. 1470 as of 30.12.2016 on the approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 (LEDS 2030) and the Action Plan for its implementation.

On March 4, 2020, the Republic of Moldova submitted the updated Nationally Determined Contribution[2] (NDC 2.0) to the UNFCCC Secretariat, according to which the Republic of Moldova has undertaken to achieve more ambitious economy-wide reduction targets by 2030. Thus, the unconditional economy-wide reduction target was to increase from 64-67% to 70% compared to the level recorded in the base year (1990), and the conditional economy-wide reduction target was to increase accordingly, from 78% to approximately 88%, compared to the level recorded in 1990.

The economy-wide reduction targets from NDC 2.0 of the RoM to the Paris Agreement were introduced in the Low Emission Development Programme until 2030 (LEDP 2030), approved by GD no. 659 as of 06.09.2023. Likewise, the climate change adaptation targets from NDC 2.0 were considered in the National Climate Change Adaptation Programme until 2030 (NCCAP 2030), approved by GD no. 624 as of 30.08.2023.

It should be mentioned that the GHG emission reduction targets in NDC 1.0 and NDC 2.0 were established in an emissions budget covering the period from January 1, 2021 to December 31, 2030.

[1] <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Moldova/1/INDC_Republic_of_Moldova_25.09.2015.pdf>
[2] <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>

CHAPTER 1. NATIONAL GREENHOUSE GAS INVENTORY

1.1. Background information on GHG inventories and climate change

1.1.1. Climate change and the greenhouse effect

In the context of the United Nations Framework Convention on Climate Change (UNFCCC), climate change is defined as *"a change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, often referred to as global warming and which is in addition to natural climate variability, observed over comparable time periods"*. Human activities change the atmospheric concentrations and distribution of greenhouse gases and aerosols. These changes can produce a radiative forcing by changing either the reflection and absorption of solar radiation or the emission and absorption of terrestrial radiation.

Box 1-1: Climate change – definitions and evolution scenarios

To better understand the climate change definition, it is important to note the difference between the concepts of "weather" and "climate". Weather is the state of the atmosphere in a certain period of time and in a certain place, perceived as a change in temperature, air pressure, humidity, wind speed, cloudiness and precipitation. The term weather is used when the above-mentioned conditions are related to short time periods. The concept of climate usually refers to average weather conditions recorded in a certain region of the planet over a longer period (at least 30 years). Thus, climate can be defined as a pattern of weather conditions of a certain region of the globe. Climate elements are precipitation, temperature, humidity, solar radiation, wind speed and phenomena such as: fog, frost, sleet, hail, etc. Climate change refers to long-term changes in weather patterns caused by both natural phenomena (astronomical: solar activity, the influence of some planets, etc.; geological-geophysical: change in the angle of the earth's axis, change in the earth's orbit, etc.; geographical: change in the structure of the active surface - volcanic eruptions, massive landslides), as well as human induced phenomena (induced by man), such as pollution of the terrestrial atmosphere (change in the chemical composition of the atmosphere through GHG generation).

According to the 6th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2021), each of the past four decades has been successively warmer than any decade since 1850. Global land surface temperature in the first two decades of the 21st century (2001-2020) was 0.99°C [between 0.84 and 1.10] higher than in the 1850-1900 period. In addition, global land surface temperature was 1.09°C [between 0.95 and 1.20] higher in 2011-2020 than in 1850-1900.

Between 1901 and 2018, the global average sea level rose by 20 cm [between 15 and 25]. Over the 1901-1971 period, the average sea-level rise was about 1.3 mm/year [between 0.6 and 2.1], rising by 1.9 mm/year [between 0.8 and 2.9] during the 1971-2006 period and by 3.7 mm/year [between 3.2 and 4.2] during the 2006-2018 period. Human impact is very likely the main driver of the global glacier retreat since the 1990s and the reduction of Arctic Ocean ice area between 1979-1988 and 2010-2019 (by about 40% in September and by about 10% in March). Between 2011 and 2020, the average annual Arctic Sea ice area reached its lowest level since 1850. During the summer season, the Arctic Sea ice area was smaller than at any time during the last 1000 years. The global phenomenon of synchronous glacier retreat observed since the 1950s is unprecedented for the last 2000 years.

Heat waves (warm extreme phenomena) have become more frequent and more intense in most of the land regions since the 1950s, while cold waves (cold extreme phenomena) have become less frequent and less severe. Also, maritime heat waves have also doubled in frequency since the 1980s. in addition, the frequency and intensity of heavy precipitation events have increased since the 1950s in most land areas for which observational data are sufficient to analyze weather trends.

According to the 6th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2021), global surface temperature is projected to continue to rise until at least the middle of the 21st century under all considered Shared Socioeconomic Pathway Scenarios (SSPs). Global warming of 1.5-2.0°C will be exceeded during the 21st century, if there are no reductions in CO_2 and other greenhouse gas emissions occurs in the coming decades. In comparison with the 1850-1900 period, the global mean surface

temperature over the 2081-2100 period will most likely be 1.0°C – 1.8°C higher in case of the scenario with very low GHG emissions (SSP1.0-1.9), 2.1°C – 3.5°C higher in case of the medium GHG emission scenario (SSP2.0-4.5) and 3.3°C – 5.7°C higher in case of the high GHG emission scenario (SSP5.0 -8.5). The last time the global land surface temperature was maintained at a level 2.5°C higher than the level recorded during the 1850-1900 period was 3 million years ago.

Heavy rainfall is very likely to intensify and become more frequent in most land regions. Globally, extreme daily precipitation events are projected to increase by about 7% for every 1°C of global warming. Also, an increase in the share of maximum intensity tropical cyclones (category 4-5) is anticipated along with intensification of global warming.

According to some projections, global warming will further amplify the thawing of permafrost and the loss of seasonal snow cover, land ice, and Arctic Sea ice. By the 2050s, the Arctic will be virtually ice-free in September. The global water cycle will continue to intensify as global temperatures rise, precipitation and surface water flows, as predicted, could become more variable across most land regions across seasons and from year to year.

As compared to the 1995-2014 period, over the last two decades of the 21st century (the 2081-2100 period), global mean annual precipitation is assumed to increase by 0-5% in the very low GHG emissions scenario (SSP1.0-1.9), by 1.5-8% - in the scenario with medium GHG emissions (SSP2.0-4.5) and by 1-13% in the scenario with very high GHG emissions (SSP5.0-8.5).

Global mean sea level will continue to rise in the 21st century. In comparison with the 1995-2014 period, the global average sea level rise by 2100 will be 28-55 cm in the very low GHG emission scenario (SSP1.0-1.9), 44-76 cm in the medium GHG emission scenario GHG (SSP2.0-4.5) and 63-101 cm in the scenario with very high GHG emissions (SSP5.0-8.5).

Towards the end of the 21st century, an increase in the frequency of natural hazards (floods, droughts, heat waves, hurricanes, tornadoes, etc.) is anticipated. In some regions the impact could be devastating, while others could even benefit from climate change. The impact will depend on the form and magnitude of these changes, while in cases of adverse effects - on the ability of natural and anthropogenic systems to adapt to climate change.

In other words, the greenhouse effect of the atmosphere is similar to the effect that can be observed in greenhouses, when the function of glass or polyethylene is taken over by greenhouse gases in the atmosphere. Short-wave solar radiation freely penetrates greenhouse gases, reaching the earth's surface and heating it. Long-wave radiation (infrared rays), emitted by the earth's surface, is captured by gases and partially remitted to the planet's surface. As a result, the average temperature of the atmosphere is 33°C higher than it would have been without the impact of the greenhouse effect. This phenomenon basically makes possible the existence of life on earth.

1.1.2. Greenhouse gases

The most important greenhouse gas in the atmosphere is water vapor (H_2O) responsible for about 2/3 of the total greenhouse effect. The water content in the atmosphere is not directly influenced by human activities, being determined rather by the natural water cycle, more plainly described as a difference between evaporation and precipitation.

Carbon dioxide (CO_2) accounts for 30 percent of the greenhouse effect, while methane (CH_4), nitrogen oxide (N_2O) and ozone (O_3), account for 3 per cent each. The group of man-made substances: chlorofluorocarbons (CFCs) and their substitutes, hydrofluorocarbons (HCFCs, HFCs) and other substances such as perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) are also attributed to direct greenhouse gases. There are other photochemically active gases, such as carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOCs) (including substances such as: propane, butane and ethane), which are not directly assigned to greenhouse gases, but indirectly contribute to the greenhouse effect. These gases are considered to be tropospheric ozone precursors, influencing the formation and disintegration of ozone in the atmosphere in the presence of solar rays (ultraviolet radiation).

Although GHGs are believed to be natural components of the air, their presence in the atmosphere is strongly affected by human activity. An increase in the GHG concentration in the atmosphere (caused by human induced emissions) leads to enhancing of the greenhouse effect, thus causing additional warming of the atmosphere. The GHG concentration in the atmosphere is determined by the difference between GHG emissions and removals. It has been found with certainty that atmospheric GHG concentrations have increased significantly as compared to pre-industrial times. Thus, from 1750 to the beginning of 2024, the CO_2 concentration increased by about

153.3%, the CH_4 concentration of – by 264.7%, and the N_2O concentration – by about 125.0%[3] (Tab. 1-1). These trends can be largely attributed to human activity – particularly burning of fossil fuels and the on-going deforestation of wooded areas.

Table 1-1: Tropospheric (Northern Hemisphere) concentration, rate of concentration change and tropospheric lifetime of direct greenhouse gases

Greenhouse gases	Pre-industrial tropospheric concentration (1850-1900)	Tropospheric concentration in the beginning of 2024	Global warming potential for a 100-year horizon (IPCC, 2014)	Tropospheric lifetime (years)
Carbon dioxide (CO_2)	278.3 ppm	426.6 ppm	1	~ 50-200
Methane (CH_4)	729.2 ppb	1930.6 ppb	28	11.8
Nitrous oxide (N_2O)	270.1 ppb	337.5 ppb	265	109

Note: ppm – concentration in parts per million by volume; ppb – concentration in parts per billion by volume.

In 2022, globally, the amount of annual carbon dioxide emissions from fossil fuels burning was about 36.8 gigatons (Gt)[4], 0.3 Gt more than the level recorded in 2021. The most important sources of carbon dioxide emissions are believed to be fossil fuels burning of, deforestation and industrial processes (for example, cement production). The lifetime of carbon dioxide in the atmosphere varies between 50 and 200 years. It can be removed from the atmosphere by a complex of natural storage mechanisms. It is also estimated that about 26% of the carbon dioxide emitted can be absorbed by the oceans. Photosynthesis, in vegetation and plankton in the sea, represents an important mechanism for removing CO_2 emissions, although it is a transitional one, since upon decay of a plant, carbon dioxide is emitted again into the atmosphere.

The methane concentration in the atmosphere is affected to the extent of about 60% by human activities, such as rice cultivation, livestock (enteric fermentation and manure management), coal, oil and natural gas extraction, natural gas transportation and distribution, solid household waste disposal, biomass burning etc. The decay of methane in the atmosphere occurs through chemical reactions (via OH radicals). The lifetime of methane in the atmosphere is about 11.8 years. Annual global emissions of CH_4 from the energy sector alone are about 135 Mt[5], given that the energy sector accounts for about 40% of global methane emissions of human origin, with only the agriculture sector having a greater contribution[6]. The latest published reports[7] show a level of global methane emissions of about 360 Mt (uncertainty: 340-380 Mt).

It was shown that about 43% of atmospheric N_2O is human induced[8], originating from application of nitrogenous chemical fertilizer, soil cultivation, livestock (manure management), wastewater treatment, adipic acid and nitric acid production, fossil fuel burning, waste and biomass burning. The other 57% of atmospheric N_2O comes from the soil and from the water denitrification process under anaerobic conditions. N_2O decays photochemically in the atmosphere. Annual global N_2O emissions from human activities are about 7.3 Mt[9].

HFCs (hydrofluorocarbons), PFCs (perfluorocarbons) and SF_6 (sulphur hexafluoride) are human induced greenhouse gases. HFCs are mainly used to replace ozone-depleting substances, but they are also emitted in the production process of HCFC-22. PFCs and SF_6 are emitted in various industrial processes, including aluminium and magnesium production, semiconductor manufacturing, power transmission and distribution, etc. All these gases have a long lifetime in the atmosphere and have a considerable capacity to absorb infrared radiation, so that in the future they could have a considerable impact on the global warming phenomenon.

1.1.3. The Convention, the Kyoto Protocol and the Paris Agreement

The United Nations Framework Convention on Climate Change (UNFCCC) was adopted on May 9, 1992 at the UN Conference on Environment and Sustainable Development in Rio de Janeiro, being considered as a response of the international community to the global warming phenomenon caused by atmospheric pollution and increase of greenhouse gas concentration in the atmosphere.

[3] <https://www.esrl.noaa.gov/gmd/ccgg/trends/>.
[4] <https://library.wmo.int/viewer/68532/download?file=GHG-19_en.pdf&type=pdf&navigator=1>
[5] <https://www.iea.org/news/methane-emissions-remained-stubbornly-high-in-2022-even-as-soaring-energy-prices-made-actions-to-reduce-them-cheaper-than-ever>
[6] <https://www.iea.org/reports/global-methane-tracker-2023/overview>
[7] <https://www.globalmethanepledge.org/sites/default/files/documents/2023-11/UNEP%20CCAC%282022%29GMA%20BASELINE%20EMISSIONS%20REPORT%20-%20FULL.pdf>
[8] <https://www.wmo.int/pages/mediacentre/press_releases/pr_1002_en.html>, <https://library.wmo.int/index.php?lvl=notice_display&id=21795#.YIKYFaFDOUk>.
[9] <https://library.wmo.int/viewer/68532/download?file=GHG-19_en.pdf&type=pdf&navigator=1>.

The ultimate objective of the Convention is to *"stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system"*. UNFCCC entered into force on March 21, 1994. To date, 198 countries are Parties to this Convention. The convention was signed by the Republic of Moldova on June 12, 1992, and ratified by the Parliament on March 16, 1995.

Article 4, paragraph 1(a) and Article 12, paragraph 1(a) of UNFCCC provide that all Parties shall submit to the Conference of the Parties (COP) *a "national inventory of anthropogenic emissions by sources and removal by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties, to the extent their capacities permit; also a general description of the steps taken or envisaged to implement the Convention; and any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global anthropogenic emission trends"*.

The main mechanism for submission of this information is national communication (NC). At COP 2 (Geneva, 1996) the Guidelines for preparation of national communications by Parties not included in Annex I was adopted (Decision 10/CP.2). According to these Guidelines, between 1998-2000 the Republic of Moldova developed its First National Communication (FNC) to UNFCCC within the UNDP-GEF Project *"Republic of Moldova: Enabling Moldova to prepare its First National Communication in response to its commitments to the UNFCCC"*. The NC1 was presented at COP 6 (The Hague, 2000).

At COP 8 (New Delhi, 2002) new Guidelines for development of national communications of countries not included in Annex I were adopted (Decision 17/CP.8). According to them, over the period 2005-2009, the Second National Communication (NC2) was developed; over the period 2010-2014 – the Third National Communication (NC3), over the period 2014-2018 – the Fourth National Communication (NC4), and over the period 2019-2023 – the Fifth National Communication (NC5) of the Republic of Moldova to UNFCCC were developed.

With reference to the tools for implementing the UNFCCC, it should be mentioned that at COP 3 (Kyoto, 1997) the Kyoto Protocol[10] was adopted, which represents an instrument for deepening the commitments of the Parties in the framework of the Convention, by obliging countries with highly developed industry and those with economies in transition (a total of 37 countries with a highly developed industry and the EU) included in Annex I to the Convention to reduce during the period January 1, 2008 - December 31, 2012 (the first commitment period of the Kyoto Protocol) total direct GHG emissions by at least 5%, as compared to emissions recorded in the reference year (1990). The Republic of Moldova ratified the Kyoto Protocol on February 13, 2003. As a country not included in Annex I to the Convention, the Republic of Moldova had no commitments to reduce GHG emissions during the first commitment period of the Kyoto Protocol.

At COP 13 (Bali, 2007) the Bali Action Plan was adopted. At this Conference of the Parties, developing countries agreed for the first time to develop and implement *National Appropriate Mitigation Actions (NAMAs)* in the context of sustainable development, supported through technology transfer, adequate funding and capacity building actions.

At COP 15 (Copenhagen, 2009) a political declaration adopted in support of limiting global warming to no more than 2°C as compared to the pre-industrial level, in the context of fair and sustainable development, was approved and proposed for implementation. This declaration, known as the *Copenhagen Agreement*, reaffirms development aspects in the context of climate change, including through implementation of Low Emission Development Strategies (LEDS). The Republic of Moldova joined the Copenhagen Agreement in January 2010.

During the 2010-2012 period, the draft version of the Low Emission Development Strategy (LEDS) of the Republic of Moldova until 2020 was developed, a strategic document that was to enable it to adjust its development pathway towards a low-carbon economy and achieve sustainable green development based on the country's socioeconomic and development priorities. LEDS 2020 also aimed to support the achievement of global goals by providing a strategic national context to mitigation efforts for which countries benefit from international support for nationally appropriate mitigation actions. The LEDS 2020 comprised a set of measures that were to contribute to greenhouse gas emissions reduction, quantification of such emission reduction for each measure,

[10] The Kyoto Protocol entered into force on 16 February 2005, 90 days after its ratification by the Russian Federation in November 2004, thus covering at least 55 signatory Parties to the Convention, including Annex I countries, which contribute at least 55% of the total carbon dioxide emissions recorded in 1990.

as well as financial requirements for their implementation. The measures proposed in the Action Plan of the Strategy included appropriate mitigation actions at the national level, as provided for the Signatory Parties not included in Annex No. I to the UNFCCC. The strategy provides the implementation procedure, the deadlines, as well as provisions regarding monitoring, measurement, reporting and verification of the results obtained. LEDS 2020 was developed under the leadership of the Ministry of the Environment, the process being guided by the Interministerial Working Group for Climate Change with support from the UNDP country office. The Strategy development process involved wide consultation with stakeholders who were represented by line ministries, research institutions, donor organizations, non-governmental organizations and the civil society. LEDS 2020 was envisaged to be reviewed and approved by the Government by the end of 2013, but this occurred only by the end of 2016, the strategy implementation period being extended until the end of 2030[11].

At COP 16 (Cancun, 2010) the *Cancun Agreement* was adopted which encouraged developing countries to prepare LEDSs in the context of sustainable development and undertake the NAMAs). The Cancun Agreement *"recognizes that stopping climate change requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continuous economic growth and sustainable development"*.

At COP 16, the periodicity of drawing up national communications of countries not included in Annex I was also established (Decision 1/CP.16). In accordance with this, the countries not included in Annex I are to submit to the UNFCCC Secretariat, once in four years, *National Communications*, respectively, once in two years, *Biennial Update Reports (BURs),* either comprising a summary of a *National Inventory Report (NIR)* or the latter Report as a technical annex, a component of the inventory, which should describe in detail and transparently the procedure for completing the national inventory of anthropogenic greenhouse gas emissions from sources or removals of carbon dioxide by sinks, including information on emission trends, key categories, activity data, emission factors, estimation methods, quality assurance and quality control, uncertainties, recalculations and expected improvements, for each source or sink category included in the national inventory.

During COP 17 (Durban, 2011), the *UNFCCC Biennial Update Reporting Guidelines by countries not included in Annex I* were adopted (Decision 2/CP.17 and Annex III to this decision). In accordance with existing national capacities and the level of international support obtained for reporting, the non-Annex I countries had to submit to the UNFCCC Secretariat by the end of December 2014, the first Biennial Update Report (BUR1). It was to be developed every two years and reported to the UNFCCC Secretariat as a stand-alone document or as a summary of some parts of the National Communications, in case their reporting year coincided.

The Republic of Moldova initiated the process of drawing up its First Biennial Update Report in July 2014, and succeeded to present it to the UNFCCC Secretariat on April 5, 2016. The BUR1 was submitted to the UNFCCC Secretariat together with two technical annexes: National Inventory Report: 1990-2013. Greenhouse Gas Sources and Sinks in the Republic of Moldova and Report on the National Inventory System of the Republic of Moldova – 2015.

Regarding countries not included in Annex I, at the 17th Conference of the Parties in Durban (Decision 2/CP.17 and its Annex IV) the launch of the process of international consultation and analysis (ICA) was approved). This process consists of two stages: (i) the technical evaluation of the BURs; and (ii) facilitating an exchange of views between UNFCCC Signatory Parties regarding the content of the BURs and the results of the technical assessment. The process of international consultation and analysis aims to increase transparency and accountability in respect to the information reported by countries not included in Annex I in the BURs. The technical assessment is initiated within six months of the official presentation of the BURs to the UNFCCC Secretariat, being carried out by a team of technical experts (TTE).

The technical evaluation of the BUR1 of the Republic of Moldova to UNFCCC by the technical team of experts was carried out between September 19 and 23, 2016, the evaluation report being published on the website of the UNFCCC Secretariat on February 20, 2017[12]. Facilitative Sharing of Views (FSV) between the signatory Parties of UNFCCC regarding the content of the BUR1 of the Republic of Moldova and the results of the technical evaluation took place during the 3rd FSV workshop organized by UNFCCC Secretariat on May 15, 2017 in Bonn, Germany[13].

[11] <https://www.legis.md/cautare/getResults?doc_id=140002&lang=ro>.
[12] <http://unfccc.int/files/national_reports/non-annex_i_parties/biennial_update_reports/submitted_burs/application/pdf/mda.pdf>.
[13] Conclusions of the Third FSV on the First Biennial Update Report of the Republic of Moldova to UNFCCC and the outcomes of the Technical assessment are available of the website: <http://unfccc.int/files/national_reports/non-annex_i_parties/ica/facilitative_sharing_of_views/application/pdf/20170529_mda_v04.pdf>; the presentation of the Republic of Moldova during the third FSV workshop is available on: <http://unfccc.int/files/national_reports/non-annex_i_parties/ica/facilitative_sharing_of_views/application/pdf/moldova_fsv_workshop_presentation_15.05.2017.pdf>, and the video record of the presentation and interventions of

At COP 18 (Doha, 2012) the *Doha Amendment to the Kyoto Protocol* was approved. The amendment contains new commitments for countries included in Annex I to the Kyoto Protocol during the second commitment period (January 1, 2013 – December 31, 2020); a revised list of greenhouse gases to be reported by Annex I countries during the second commitment period; and a number of amendments to several articles of the Kyoto Protocol that refer specifically to certain issues related to the first commitment period and which were to be reviewed in order to remain valid in the second commitment period. By December 21, 2012, the Doha Amendment to the Kyoto Protocol was sent by the Secretary-General of the United Nations, acting as Depositary, to all signatory Parties to UNFCCC, in accordance with the provisions of Articles 20 and 21 of the Protocol. According to the Doha Amendment to the Kyoto Protocol, during the second commitment period, countries with a highly developed industry are to reduce greenhouse gas emissions by at least 18% as compared to the level of the reference year (1990). The Doha Amendment entered into force on 31st December 2020.

At COP 19 (Warsaw, 2013), the Parties agreed to communicate the intended National Determined Contributions (iNDCs) (NDCs 1.0) (Decision 1/CP.19), to be included in the new Climate Agreement to be debated and approved at COP 21 (Paris, 2015) and covering a new commitment period (January 1, 2021 – December 31, 2030) on reduction of greenhouse gas emissions. Also, at the 19th Conference of the Parties in Warsaw (Decision 21/CP.19), the *General Guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing countries* was approved. These Guidelines provide a solid foundation for the new 2015 Paris Climate Agreement.

At COP 20 (Lima, 2014) Parties announced the *Lima Call for Climate Action*. In Lima, the Parties were repeatedly invited (Decision 1/CP.20) to submit to the UNFCCC Secretariat iNDCs (NDCs 1.0) to achieve the target of the Convention as set out in Article 2. The Parties agreed that in order to facilitate greater clarity, transparency and understanding iNDCs (NDCs 1.0) should include, as appropriate, the following areas: quantifiable data on the reference period; the timeframe and period of preparing the contribution; the scope (including gases and sectors), the type of contribution and what it comprises; planning processes in the context of the approval of nationally determined contributions; key assumptions and methodology approaches that will be used to quantify GHG emissions and reductions; and information on the country's reasoning on how fair and ambitious its intended nationally determined contribution is, taking into account specific national circumstances; respectively, how its Intended Nationally Determined Contribution will facilitate the achievement of the Convention's objective, as set out in Article 2. In accordance with the *Lima Call for Climate Action*, countries were invited to submit iNDCs (NDCs 1.0) by 31 March 2015, the deadline for submission being 30 September 2015. The UNFCCC Secretariat was requested to prepare by 1 November 2015 a synthesis report on the global aggregate effect of intended nationally determined contributions.

The Paris Agreement was signed by the Prime Minister of the Republic of Moldova in New York on September 21, 2016, and later ratified by the Parliament by Law no. 78 of 04.05.2017 on ratification of the Paris Agreement[14].

On September 25, 2015, the Republic of Moldova had officially declared its intended Nationally Determined Contribution (NDC 1.0)[15] and the associated information to facilitate clarity, transparency and understanding in relation to the provisions of decisions 1/CP.19 and 1/CP.20. In line with this, the Republic of Moldova has committed to reach by 2030 the unconditional target of reducing GHG emissions by 64% as compared to the level recorded in the reference year (1990) and to undertake maximum efforts to reduce GHG emissions by 67% as compared to the 1990 level. Such reduction commitment could be conditionally increased up to about 78%, in accordance with this global agreement that addresses important topics such as providing low-cost financial resources, technology transfer and technical cooperation, access to all of which to be granted to the extent of global climate change challenges. The GHG emissions reduction targets were established in an emissions budget covering the period starting from January 1, 2021 and ending on December 31, 2030. The GHG emission reduction targets established in the intended nationally determined contribution (NDC 1.0) of the Republic of Moldova were officially approved later at the national level by Government Decision no. 1470 of 30.12.2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 (LEDS 2030) and the Action Plan for its implementation[16].

Parties are available at: <https://www.youtube.com/playlist?list=PL-m2oy1bnLzpmdRpG2pTBzUeOH3qrXlZt>
[14] <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=370323>
[15] <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Moldova/1/INDC_Republic_of_Moldova_25.09.2015.pdf>
[16] <https://www.legis.md/cautare/getResults?doc_id=140002&lang=ro#>

On March 4, 2020, the Republic of Moldova submitted to the UNFCCC Secretariat the updated version of the nationally determined contribution (NDC 2.0)[17]. In accordance with this, the Republic of Moldova has committed to reach more ambitious targets on reduction of GHG emissions by 2030. Thus, the unconditional target is to increase reduction from 64-67% to 70%, as compared to the reference year level (1990), while the conditional target could be increased accordingly from 78% to about 88% as compared to the 1990 level. The new targets for reducing GHG emissions were introduced in the Low Emission Development Program of the Republic of Moldova until 2030 (LEDP 2030), approved at the national level by Government Decision no. 659 of 06.09.2023[18].

The BUR2 of the Republic of Moldova to UNFCCC (2019) was presented to the UNFCCC Secretariat on December 27, 2018, and its 2 technical annexes, a little later: National Inventory Report: 1990-2016, Greenhouse Gas Sources and Sinks in the Republic of Moldova – on January 24, 2019, and the Report on the National Inventory System of in the Republic of Moldova – 2018, respectively on February 26, 2019.

The technical assessment of the BUR2 of the Republic of Moldova to UNFCCC was carried out by a technical team of experts between May 27 and 31, 2019, the evaluation report being published on the UNFCCC Secretariat's website on October 28, 2019[19]. The facilitative sharing of views (FSV) between the signatory Parties of UNFCCC on the content of the BUR2 of the Republic of Moldova and the results of the technical analysis took place within the 9th FSV cycle organized online by the UNFCCC Secretariat during November 24-27, 2020[20].

The BUR3 of the Republic of Moldova to UNFCCC was submitted to the UNFCCC Secretariat on December 21, 2021, together with 2 technical annexes: the National Inventory Report: 1990-2019, Greenhouse Gas Sources and Sinks in the Republic of Moldova and the Report on the National Inventory System of the Republic of Moldova – 2021[21].

The technical analysis of the BUR3 of the Republic of Moldova to UNFCCC was carried out by the technical team of experts between June 20 and 24, 2022, the evaluation report being published on the website of the UNFCCC Secretariat on November 8, 2022[22]. The facilitative sharing of views (FSV) between the signatory Parties of UNFCCC on the content of the BUR3 of the Republic of Moldova and the results of the technical analysis took place within the 14th FSV cycle organized by the UNFCCC Secretariat on June 6-7, 2023 in Bonn, Germany[23].

1.1.4. Relative contribution of Moldova to global warming

Table 1-2 shows the evolution of total direct emissions and removals of greenhouse gases in Moldova for the 1990-2022 period. As can be seen from the table, the total direct greenhouse gas emissions (without LULUCF) have decreased over the reference period by 71.5%, from 45.48 Mt CO_2 equivalent in 1990 to 12.95 Mt CO_2 equivalent in 2022 (direct GHG emissions decreased by another 11.3% as compared to the level of 2021).

At the same time, the net direct GHG emissions (with LULUCF) decreased over the same period by 69.5%, from 43.81 Mt CO_2 equivalent in 1990 to 13.37 Mt CO_2 equivalent in 2022 (net direct GHG emissions decreased by 8.8% as compared to the level of 2021).

The historical responsibility of the Republic of Moldova in terms of greenhouse gas emissions is reduced. In 2022, the Republic of Moldova generated only about 0.022% of total global emissions[24].

CO_2 emissions of fossil origin per capita in 2022 in the Republic of Moldova were twice lower than the global average (2.17 t CO_2 per capita as compared to 4.84 t CO_2 per capita) [25].

Also, the Republic of Moldova has a low level of historical cumulative CO_2 emissions recorded since 1750, below 0.076% of global cumulative CO_2 emissions[26].

[17] <https://unfccc.int/sites/default/files/NDC/2022-06/MD_Updated_NDC_final_version_EN.pdf>
[18] <https://www.legis.md/cautare/getResults?doc_id=139980&lang=ro>.
[19] <https://unfccc.int/sites/default/files/resource/tasr2_2019_MDA.pdf>, <https://unfccc.int/ICA-cycle2>.
[20] The conclusions of the 9th FSV workshop on the Second Biennial Update Report of the Republic of Moldova to UNFCCC and the outcomes of the technical assessment are available on the website: <https://unfccc.int/ICA-cycle2>, including the presentation of the Republic of Moldova to the 9th FSV workshop and the video record and intervention of Parties.
[21] <https://unfccc.int/BURs>.
[22] <https://unfccc.int/sites/default/files/resource/tasr2022_MDA.pdf>, <https://unfccc.int/ICA-cycle3>.
[23] Concluziile celui de-al 14-lea seminar FSV cu referire la Raportul Bienal Actualizat Trei al Republicii Moldova către UNFCCC şi rezultatele evaluării tehnice sunt disponibile pe pagina web: <https://unfccc.int/ICA-cycle3>, inclusiv prezentarea Republicii Moldova la cel de-al 14-lea seminar FSV şi înregistrarea video a prezentării şi intervenţiile Părţilor.
[24] 2023 GHG emissions of all world countries. <https://edgar.jrc.ec.europa.eu/report_2023>
[25] 2023 GHG emissions of all world countries. <https://edgar.jrc.ec.europa.eu/report_2023>
[26] Our World in Data. CO2 and Greenhouse Gas Emissions database. By: Hannah Ritchie, Pablo Rosado and Max Roser. <https://ourworldindata.org/co2-emissions>.

Table 1-2: National greenhouse gas emissions in the Republic of Moldova for 1990-2022 period

SOURSES OF GREENHOUSE GAS EMISSIONS	1990	1995	2000	2005	2010	2015	2020	2021	2022
	CO_2 equivalent (kt)								
1. Energy	**37,087.56**	**12,467.03**	**7,018.53**	**8,935.27**	**9,574.49**	**9,317.70**	**9,466.98**	**10,460.91**	**9,249.65**
A. Fuel combustion (sectorial approach)	36,066.86	11,639.59	6,274.33	7,984.74	8,832.63	8,597.45	9,193.48	10,182.87	9,014.96
1. Energy industries	21,359.99	7,191.16	3,159.28	3,233.22	4,053.06	3,688.43	3,638.38	3,936.22	3,345.93
2. Manufacturing industries and construction	1,904.84	382.22	520.27	575.18	517.00	654.13	694.91	757.79	672.30
3. Transport	4,830.86	1,658.41	1,004.59	1,864.52	2,185.47	2,305.29	2,508.94	2,775.47	2,776.78
4. Other sectors	7,855.70	2,281.29	1,553.40	2,285.56	2,049.60	1,947.77	2,350.07	2,711.79	2,217.25
5. Other	115.46	126.51	36.78	26.26	27.51	1.83	1.19	1.60	2.70
B. Fugitive emissions from fuels	1,020.70	827.44	744.21	950.54	741.85	720.25	273.49	278.04	234.70
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and natural gas	1,020.70	827.44	744.21	950.54	741.85	720.25	273.49	278.04	234.70
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Industrial processes and product use	**1,605.24**	**456.56**	**315.31**	**570.74**	**553.69**	**749.79**	**970.54**	**996.76**	**900.00**
A. Mineral industry	1,338.96	351.66	240.78	439.19	405.39	507.99	538.63	582.07	491.38
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	28.50	26.24	36.27	41.94	9.70	17.28	18.70	22.26	12.20
D. Non-energy products from fuels and solvent use	234.36	76.56	32.64	68.19	66.32	84.58	203.98	176.31	159.11
E. Electronic industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Product use as substitutes to ODS	NO	0.94	4.66	20.20	70.54	137.88	206.62	213.27	234.84
G. Other product manufacture and use	3.42	1.17	0.97	1.22	1.74	2.06	2.61	2.84	2.47
H. Other	NA	NA	NA	NA	NA	NA	NA	NO	NO
3. Agriculture	**5,101.04**	**3,220.29**	**2,178.48**	**2,070.93**	**1,804.19**	**1,655.97**	**1,479.01**	**1,679.02**	**1,357.09**
A. Enteric fermentation	2,452.16	1,812.26	1,216.08	1,034.91	802.68	694.45	434.00	429.07	414.83
B. Manure management	1,323.77	690.57	397.14	394.82	359.11	292.96	199.38	194.35	181.39
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural soils	1,324.53	717.39	564.83	641.03	640.65	657.32	803.13	1,036.99	738.21
E. Savannah burning	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	IE	IE	IE	IE	IE	IE	IE	IE	IE
G. Liming	NO	NO	NO	NO	NO	NO	NO	NO	NO
H. Urea application	0.58	0.06	0.44	0.17	1.74	11.24	42.50	18.61	22.66
I. Application of other carbon containing fertilizers	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO
4. LULUCF	**-1,676.01**	**-2,058.69**	**-2,156.04**	**-1,699.22**	**-1,256.74**	**-1,202.92**	**-22.06**	**49.11**	**420.66**
A. Forest land	-2,563.08	-2,045.06	-2,307.44	-2,409.49	-2,484.02	-2,158.40	-1,886.09	-1,919.47	-1,590.66
B. Cropland	2,382.50	1,319.84	1,224.00	1,272.01	1,271.86	1,112.68	1,630.01	1,713.81	1,730.63
C. Grassland	-1,205.69	-1,601.10	-1,291.95	-1,058.12	-691.99	-418.46	-223.15	-138.64	-123.13
D. Wetlands	-555.38	-469.44	-328.42	-187.41	-46.40	-82.79	-82.81	-83.05	-84.25
E. Settlements	235.46	329.96	363.44	308.41	275.13	207.99	176.16	183.61	187.56
F. Other land	152.36	401.13	178.52	416.50	441.48	86.82	329.13	285.13	304.27
G. Harvested wood products	-122.18	5.97	5.81	-41.11	-22.80	49.24	34.69	7.73	-3.78
H. Other	NE	NO	NE	NE	NE	NE	NE	NE	NE
5. Waste	**1,690.28**	**1,791.14**	**1,708.15**	**1,607.45**	**1,563.54**	**1,439.62**	**1,475.44**	**1,471.47**	**1,445.09**
A. Solid waste disposal	1,228.09	1,388.07	1,318.27	1,195.79	1,196.05	1,098.55	1,156.70	1,144.56	1,130.39
B. Biological treatment of solid waste	2.39	1.11	0.92	1.06	1.72	2.11	2.19	2.08	2.16
C. Incineration and open burning of waste	25.01	25.21	25.03	23.90	21.39	18.97	17.48	16.79	16.51
D. Wastewater treatment and discharge	434.80	376.76	363.93	386.70	344.38	319.99	299.06	308.05	296.03
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo Items:									
International bunkers	**193.68**	**35.05**	**63.73**	**38.36**	**41.49**	**58.86**	**41.73**	**161.61**	**146.96**
International aviation	193.68	35.05	63.73	38.36	41.49	57.45	35.52	153.02	143.37
International river transport	NO	NO	NO	NO	NO	1.41	6.21	8.60	3.59
Multilateral operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass burning	**232.81**	**230.05**	**272.37**	**307.39**	**341.05**	**1,436.50**	**2,992.97**	**2,904.28**	**2,429.50**
CO_2 removal	NO	NO	NO	NO	NO	NO	NO	NO	NO
Long term C storage in solid waste deposits	NE	NE	NE	NE	NE	NE	NE	NE	NE
Indirect N_2O emissions	664.92	350.51	238.46	256.59	249.71	232.67	240.64	284.38	213.70
Indirect CO_2 emissions	207.55	65.45	28.60	61.06	59.38	77.88	196.38	168.17	151.27
Total (without LULUCF)	**45,484.11**	**17,935.02**	**11,220.47**	**13,184.39**	**13,495.90**	**13,163.08**	**13,391.96**	**14,608.16**	**12,951.83**
Total (with LULUCF)	**43,808.10**	**15,876.32**	**9,064.43**	**11,485.17**	**12,239.16**	**11,960.16**	**13,369.90**	**14,657.27**	**13,372.49**

Abbreviations: IE – Included Elsewhere; NE – Not Estimated; NO – Not Occurring.

1.2. A description of national circumstances and institutional arrangements

1.2.1. National competent authority

The Ministry of Environment (MoEnv) is the state authority responsible for developing and promoting state policies and strategies in the field of environmental protection, natural resources and combating climate change. On behalf of the Government, the MoEnv is responsible for implementation of international environmental treaties to which the Republic of Moldova is a party. The MoEnv representative also holds the position of UNFCCC Focal Point[27].

In accordance with Government Decision (GD) no. 549 as of 13.06.2018 on establishment, organization and operation of the Environmental Agency[28], the later was assigned the following competences in the field of *atmospheric air protection and climate change*: implementation of provisions of policy documents and international environmental treaties to which the Republic of Moldova is a party in the field of air quality protection and protection of the ozone layer; *in the field of reducing greenhouse gas emissions and adaptation to climate change*: development and presentation to the Ministry of Environment of information on their achievement; participation in the activity of the *National Commission for Climate Change*; ensuring the implementation of the *monitoring, reporting and verification system of greenhouse gas emissions; carrying out the process of collecting, centralizing, validating and processing the data and information necessary for preparation of inventories and reports of emissions of atmospheric pollutants and greenhouse gases; providing to MoEnv technical support for development of national communications and biennial update reports*, in line with UNFCCC provisions.

At the same time, in accordance with GD no. 1277 as of 26.12.2018 on establishment and operation of the National Monitoring and Reporting System (NMRS) on greenhouse gas emissions and other information relevant to climate change, the Environment Agency was designated as the competent authority responsible for ensuring the operation of the NMRS on greenhouse gas emissions and other information relevant to climate change, provided that the operation of the NMRS is carried out at the expense and within the limits of funds approved in the state budget of the institutions which are part of the system, as well as from other sources provided by legislation, including from external funding (*activities carried out on the basis of technical assistance and capacity building projects*).

Within the Environment Agency, during the 2019-2023 period, the Department for Environmental Policies Implementation was responsible for ensuring the operation of the NMRS on greenhouse gas emissions and other information relevant to climate change. Starting from 2024, this responsibility was transferred to the Department for the Environmental Quality Monitoring.

Also, in accordance with GD no. 1249 as of 19.12.2018 on the organization and operation of the Public Institution "Environmental Projects National Implementation Office" (P.I. "EPNIO")[29], the latter has the mission of providing support to the Ministry of Environment and the organizational units within its scope of competence, in order to effectively implement external and internal financial and technical assistance projects in the field of environmental protection (environmental protection, *climate change*, sustainable management of natural resources), according to the provisions of the regulatory framework on implementation of requirements of international conventions to which the Republic of Moldova is a party and alignment with international standards in the field of environmental protection, given that the basic functions of P.I. "EPNIO" consist of: efficient implementation of projects in the fields of competence in accordance with established objectives; supervision and verification of the quality of services, works and goods provided within the established terms; managing the funds allocated to projects in own fields of competence, in accordance with the assistance agreements and the approved budget; management of the National Ecological Fund; development of project proposals in own field of competence, coordinated at each stage with the Ministry of Environment; preparing and submitting progress reports on implementation of projects and use of project funds.

The governing body of P.I. "EPNIO" comprises the Director of the institution (executive body), respectively, a Supervisory Committee – a higher collegial body that leads and supervises the activity of the institution. The committee consists of 5 members and is appointed for a 4-year term. The nominal composition of the Committee

[27] <https://unfccc.int/process/parties-non-party-stakeholders/parties/national-focal-point>
[28] <https://www.legis.md/cautare/getResults?doc_id=119162&lang=ro>
[29] <https://www.legis.md/cautare/getResults?doc_id=113696&lang=ro>.

is established by the Minster of Environment Order, with the mandatory inclusion, at least, of a representative of the Ministry of Finance, the Environment Agency, the academia and civil society. The position of Chairperson of the Committee is exercised by the Minister of Environment, who chairs the meetings of the Committee and performs other established duties. In the absence of the Chairperson of the Committee, the meeting is chaired by one of its members, elected by the members attending the meeting.

The national monitoring and reporting system (NMRS) on greenhouse gas emissions and other information relevant to climate change to UNFCCC, approved by GD no. 1277 as of 26.12.2018, includes two subsystems as integral parts:

1. The national inventory system that provides the institutional, legal and procedural framework established to estimate anthropogenic emissions from sources and sequestration by sinks of all greenhouse gases, compiled in the national inventory of greenhouse gas emissions, as well as in order to report and archive inventory information, in accordance with decisions adopted under UNFCCC and the Paris Agreement;
2. The national system for policies, measures and projections that provides the institutional, legal and procedural framework for evaluating progress in implementation of climate change mitigation policies, for development of projections related to anthropogenic emissions from sources or removals by sinks of greenhouse gases.

Through the implementation of the NMRS, collection and appropriate processing of data and information necessary is done for: (1) development and reporting of the national inventory; (2) development and reporting projections of anthropogenic emissions from sources or removals by sinks of greenhouse gases; (3) evaluation and reporting of: progress made in reaching targets of the NDCs provided for in the Paris Agreement and any updates thereof; progress made in implementation of the long-term low-carbon development strategy (LT-LEDS) and any updates thereof; climate change vulnerabilities, climate change impacts and progress in implementing adaptation actions; aggregated financial and technology support, received from the industrially developed countries, mentioned in Annex I to UNFCCC, respectively provided to developing non-Annex I countries, implementation of climate change mitigation and adaptation actions, technical assistance and capacity building projects in climate change areas; priority measures on improvement in implementation of reporting requirements.

In the context of GD no. 1277 as of 26.12.2018, the NMRS aims to ensure transparent, accurate, consistent and comprehensive monitoring and reporting of greenhouse gases to the UNFCCC Secretariat, through the reporting tools provided, including actions taken for adaptation to climate change consequences, respectively, actions to ensure monitoring and reporting of the progress recorded nationally in terms of compliance with the commitments undertaken under UNFCCC, the Paris Agreement, the Treaty establishing the Energy Community (EnCT) and the decisions adopted pursuant to them.

With reference to the National Inventory System (NIS), it is established and managed in such a way as to adhere to the principles of transparency, consistency, comparability, completeness in development of the national greenhouse gas emissions inventory, in accordance with the provisions of the 2006 IPCC Guidelines on development of national greenhouse gas inventories.

The Environment Agency, as competent authority, in direct collaboration with competent authorities and institutions that are part of the NMRS and with support of the central authority for sustainable management of natural resources, environmental protection and climate change (Ministry of Environment), ensures the organization and operation of the NIS, by periodically improving the institutional, legal and procedural framework, in accordance with the national and international legal framework.

Within the NIS, the competent authority prepares, once every two years, and starting from 2025, annually, the national inventory of anthropogenic greenhouse gas emissions. The national inventory data are submitted according to the format set out in Table 1 of Annex 1 to GD no. 1277 as of 26.12.2018. In case of direct greenhouse gas emissions, the national inventory is carried out in accordance with the 2006 IPCC Guidelines, using the software and reporting platforms recommended by the IPCC and UNFCCC, while in case of indirect greenhouse gas emissions, the national inventory is done in line with the updated editions of the Guideline on inventory of atmospheric pollutant emissions, the technical guidance for the inventory of national emissions, published and periodically updated by the European Environment Agency (EEA) within the European Monitoring and Evaluation Program (EMEP).

Based on the national greenhouse gas emissions inventory, the competent authority is responsible for drawing up, once in years, and starting from 2025, annually, a National Inventory Report (NIR), using the structure provided for in the relevant decisions of the Conferences of signatories of UNFCCC, namely: (1) Executive summary; (2) National circumstances, institutional arrangements and cross-cutting information; (3) Trends in greenhouse gas emissions; (4) Energy; (5) Industrial processes and product use; (6) Agriculture; (7) Land use, land use change and forestry; (8) Waste; (9) Recalculations and improvements; (10) Annexes; and (11) References.

The competent authority publishes once in two years, and starting from 2025, annually, on its official website (<http://am.gov.md/>), the National Inventory Report (NIR), as well as the national greenhouse gas emission inventory in table format. The CRT tables, approved by the decisions of the Conferences of the Parties to the UNFCCC and the Conferences of Parties to the Paris Agreement, will present trends in greenhouse gas emissions by gas type and activity sector.

The competent authority ensures the quality of national inventories by going through the stages of planning, preparation and management that include collection of activity data, appropriate selection of estimation methods and emission factors, estimation of the level of anthropogenic greenhouse gas emissions, conducting uncertainty analysis, carrying out activities for quality assurance and quality control, as well as data verification procedures included in the national inventory.

At the planning stage of the national inventory, the following activities are carried out:

1) allocation of the funds necessary for preparation of the national inventory and establishment of the responsibilities of the staff involved in preparation of the national inventory, including for collection of activity data, selection of emission factors and estimation methods, implementation of quality assurance and quality control measures, estimation of key categories, evaluation of uncertainties, carrying out of recalculations and improvements envisaged for each category of sources or sinks included in the national inventory;
2) development, periodic update and approval of a QA/QC Plan of the national inventory, in order to establish the necessary framework for implementation of procedures for ensuring the quality of the national inventory and achieving its quality objectives and describing the general and specific quality control procedures that are to be implemented in the process of drawing up the national inventory;
3) analysis of ways to improve quality of activity data, emission factors, estimation methods and other relevant technical elements of the national inventory of anthropogenic greenhouse gas emissions;
4) publication on the official site of the competent authority of electronic and postal addresses, including the one where the information contained in the national inventory is made available;
5) establishing procedures for review and approval of the national inventory, prior to its reporting to the UNFCCC Secretariat and the Secretariat of the Energy Community.

At the stage of preparing the national inventory, the following activities are carried out:

1) identification of key categories by applying the estimation methods provided in the 2006 IPCC Guidelines;
2) collecting activity data and emission factors and processing the information in such a way as to ensure application of selected methods for estimating the level of greenhouse gas emissions;
3) estimating the level of anthropogenic emissions from sources and removals by sinks of all greenhouse gases, in accordance with the default calculation methods (Tier 1) provided in the 2006 IPCC Guidelines, while in case of key categories - higher rank calculation methods (Tiers 2 or 3) shall be used;
4) quantitative estimation of the degree of uncertainty of the inventory as a whole and for each category separately, according to the 2006 IPCC Guidelines;
5) recalculation, if necessary, of the estimates of the level of anthropogenic emissions from sources and removals by sinks of greenhouse gases, in accordance with the 2006 IPCC Guidelines;
6) compilation of the national inventory in accordance with the decisions adopted under UNFCCC and the Paris Agreement;
7) implementation of the general quality control procedure (Tier 1) in accordance with the QA/QC Plan, following the best practice recommended in the 2006 IPCC Guidelines;

8) use of specific quality control procedures (Tier 2) in accordance with the QA/QC Plan, both for key categories and for categories where revisions of the calculation methods took place, as well as for the activity data and emission factors, following the good practice recommendations of the 2006 IPCC Guidelines;
9) assessment of the inventory by an independent third party or a representative of the team of technical experts who has not been involved in its development, before its submission to the central authority for the sustainable management of natural resources, environmental protection and climate change;
10) a more detailed review of the inventory for key categories and for categories where revisions of calculation methods and/or activity data and/or emission factors have taken place;
11) review of the national inventory planning process, in order to achieve the quality objectives established in the QA/QC Plan, by considering the recommendations arising from implementation of activities provided for in points 9 and 10 above, as well as periodic evaluations of the national inventory preparation process.

At the national inventory management stage, the following activities are performed:

1) periodic archiving and storage of the national inventory and the information that served as basis for its development, including:
   a) all disaggregated emission factors, activity data, documentation, as well as the manner in which the data and factors were generated and processed for drawing up the national inventory;
   b) internal documentation on use of QA/QC procedures;
   c) documentation that served as basis for internal and/or external reviews, identification of annual key categories, as well as planning of ways to improve the national inventory;
2) ensuring access of the teams of technical experts responsible for international evaluation and analysis process to the information used for development of the national inventory, as well as to the information regarding the NMRS;
3) submission of responses, in the shortest possible time, to requests for clarification received, during the international evaluation and analysis process, from the Teams of Technical Experts on information contained in the national inventory, in accordance with UNFCCC provisions and adopted decisions under the reporting requirements of the Paris Agreement.

The competent authority submits to the central authority for natural resources and the environment, by December 15 of the year in which the report is made (year X), the following dates:

1) level of anthropogenic emissions of gases with a direct greenhouse effect – carbon dioxide [CO_2], methane [CH_4], nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], sulphur hexafluoride [SF_6], nitrogen trifluoride [[NF_3] – recorded 2 years before the reporting year (year X-2);
2) level of anthropogenic emissions of indirect greenhouse gases – carbon monoxide [CO], nitrogen oxides [NOx], non-methane volatile organic compounds [NMVOCs], sulphur dioxide [SO_2] – recorded 2 years before the year in which reporting is carried out (year X-2);
3) accounting of emissions and removals from land use, land use change and forestry - recorded 2 years prior to the year in which the reporting is carried out (year X-2);
4) any recalculations and/or changes in the information provided for in items 1-3 – about the period between the reference year (1990) and 3 years prior to the reporting year (year X-3), the reasons for the recalculation and how the consistency of the time series is maintained for all reporting years;
5) information on relevant inventory indicators, recorded 2 years prior to the reporting year (year X-2);
6) information on QA/QC Plan, general assessment of the degree of uncertainty and any other relevant elements of the National Inventory Report;
7) information on the assessment of the national inventory completeness, specifying in particular: categories that were reported as not being estimated (marked as "NE"), respectively geographical coverage of the national inventory of anthropogenic greenhouse gas emissions;
8) information on the outcomes of the narrative part verification, specifying the level of detail, the data sets and reports compared, the results of checks and explanations of the main inconsistencies, as well as the reasons why it was deemed that checks would not be relevant, if they were not performed;

9) information on the results of the narrative part verification, specifying the differences between the reference approach calculated on the basis of data included in the national inventory of anthropogenic greenhouse gas emissions and the reference approach calculated on the basis of national statistics in the field of energy; for differences greater than ±2% of the national total apparent consumption of fossil fuels at the aggregate level for all categories of fossil fuels for the year X-2, explanations and quantitative information are to be presented;
10) measures taken to improve inventory estimates, especially in inventory areas that have been the subject of changes or recommendations following external technical evaluations, to cover both the issues referred to for the first time in the latest external technical assessment report, as well as those taken from previous external technical evaluation reports;
11) actual or estimated allocation of emissions reported by operators of stationary installations pursuant to Law no. 227/2022 on industrial emissions to source categories from the national greenhouse gas inventory and the ratio between such verified emissions and the total greenhouse gas emissions reported within the respective source categories, for the year X-2; where relevant, the results of checks carried out on consistency of emissions reported in the national greenhouse gas inventory, for the year X-2, with the verified reported emissions;
12) a description of the changes made to the national inventory system, if any.

The central authority for natural resources and the environment submits to the UNFCCC Secretariat, based on the data provided by the competent authority, by December 31 of the year in which the report is made (year X), a complete national greenhouse gas inventory, for the period between reference year (1990) and year X-2.

The competent authority makes the greenhouse gas emissions data available to the public, in accordance with provisions of GD no. 1277 as of 26.12.2018 on establishment and operation of the National System for monitoring and reporting greenhouse gas emissions and other information relevant to climate change.

1.2.2. Institutional arrangements

The list of competent authorities and institutions that are part of the NMRS for greenhouse gas emissions, as well as reporting other information relevant to climate change, according to Annex 2 to GD no. 1277 as of 26.12.2018, includes:

1. Central specialized public authorities:
   1) Ministry of Environment;
   2) Ministry of Agriculture and Food Industry;
   3) Ministry of Economic Development and Digitalization;
   4) Ministry of Infrastructure and Regional Development;
   5) Ministry of Finance;
   6) Ministry of Health,
   7) Ministry of Defense;
   8) Ministry of Foreign Affairs and European Integration;
   9) Ministry of Education and Research;
   10) Ministry of Energy.

2. Public entities subordinated to ministries:
   1) Environmental Agency;
   2) National Agency for Regulation of Nuclear and Radiological Activities;
   3) Environmental Protection Inspectorate;
   4) Public Institution "Environmental Projects National Implementation Office" (P.I. "EPNIO");
   5) Civil Aeronautical Authority;
   6) Naval Agency of the Republic of Moldova;

7) Customs Service;
8) Energy Efficiency Agency (reorganized in December 2023 into National Centre for Sustainable Energy);
9) National Public Health Agency;
10) "Moldsilva" (Forestry) Agency;
11) State Hydrometeorological Service;
12) "Apele Moldovei" (Water Management) Agency.

3. Central authorities:
1) National Bureau for Statistics;
2) Land and Cadaster Relations Agency;
3) Medicines and Medical Device Agency;
4) Public Services Agency;
5) National Food Safety Agency.

4. State enterprises and joint-stock companies subordinated to central authorities, as well as those with state-owned stock:
1) State Enterprise "State Roads Administration";
2) State Enterprise "Ungheni River Harbor";
3) State Enterprise "Bacul (Barge) Molovata";
4) State Enterprise "Forestry Research and Management Institute";
5) State Enterprise "Moldovan Railways";
6) State Enterprise "Chisinau Glass Factory";
7) State Enterprise "Moldelectrica", Chisinau;
8) "RED Nord" Joint Stock Company, Balti;
9) "TERMOELECTRICA" Joint Stock Company, Chisinau;
10) "CET-Nord" Joint Stock Company, Balti;
11) "Moldova Gaz" Joint Stock Company.

As competent authority responsible for the operation of the NSMR greenhouse gas emissions and other information relevant to climate change, the Environment Agency requested, based on Letter no. 3471 of 25.09.2019 of the Climate Change Office within P.I. "EPNIO" to consider and identify the possibility of providing the necessary support for implementing competences in the field of climate change by organizing the entire process of drawing up the Reports of the Republic of Moldova to UNFCCC, in accordance with the rules, procedures and decisions of the Conference of the Parties to UNFCCC. For this purpose, the Climate Change Office within the P.I. "EPNIO" was given the right to:

- request and receive, directly or through the Environment Agency, information from the central public authorities, local public authorities, organizations and institutions, economic entities that are active in fields that hold primary information necessary to complete these two national reports;
- collect, process and validate the data and information necessary for drawing up inventories and national reports on greenhouse gas emissions;
- train specialists of the Environment Agency in the process of working with data and information collected in order to develop their capacities in targeted fields.

It should be noted that, previously within the Ministry of Environment (between February 2004 and December 2018), and later also within the P.I. "EPNIO" (January 2019 – July 2020), the Climate Change Office was responsible for activities associated with the development of NCs, BURs, NIRs and National GHG Emissions Inventories.

Figure 1-1 shows as a diagram the institutional arrangements for the NMRS. Thus, starting from the second half of 2020, within the P.I. "EPNIO", the inventory team is responsible for assessment of emissions by source

categories and removals by sink categories, analysis of key emission sources, inventory verification and QC activities, uncertainty analysis, documentation and archiving of information associated with the inventory preparation process of the national inventory of GHG emissions, development of NIRs, BTRs and NCs.

- Inventory Coordinator is responsible for coordinating the process of preparing the national inventory of GHG emissions; it oversees the process of assessing emissions by individual source categories and removals by individual sink categories, performs the analysis of key categories, interprets the results of the uncertainty analysis, coordinates verification and QC activities, is responsible for the process of archiving of the materials used in the inventory preparation process, performs the synthesis of the sectoral reports on the basis of which the NIR is compiled, respectively the "National GHG Inventory" chapters of the BTRs and NCs;
- National Experts are responsible for the assessment process of emissions by individual source categories and removals by individual sink categories, as well as at sectoral level (1 "Energy", 2 "IPPU", 3 "Agriculture', 4 'LULUCF' and 5 'Waste'); national experts are also responsible for development of the sectoral chapters of the NIR; they also have responsibilities related to the activity data collection process, the application of decision trees in order to select the appropriate evaluation methods and emission factors, the evaluation of uncertainties of emissions from individual categories of sources, as well as those related to taking corrective action in response to verification, QA&QC activities.

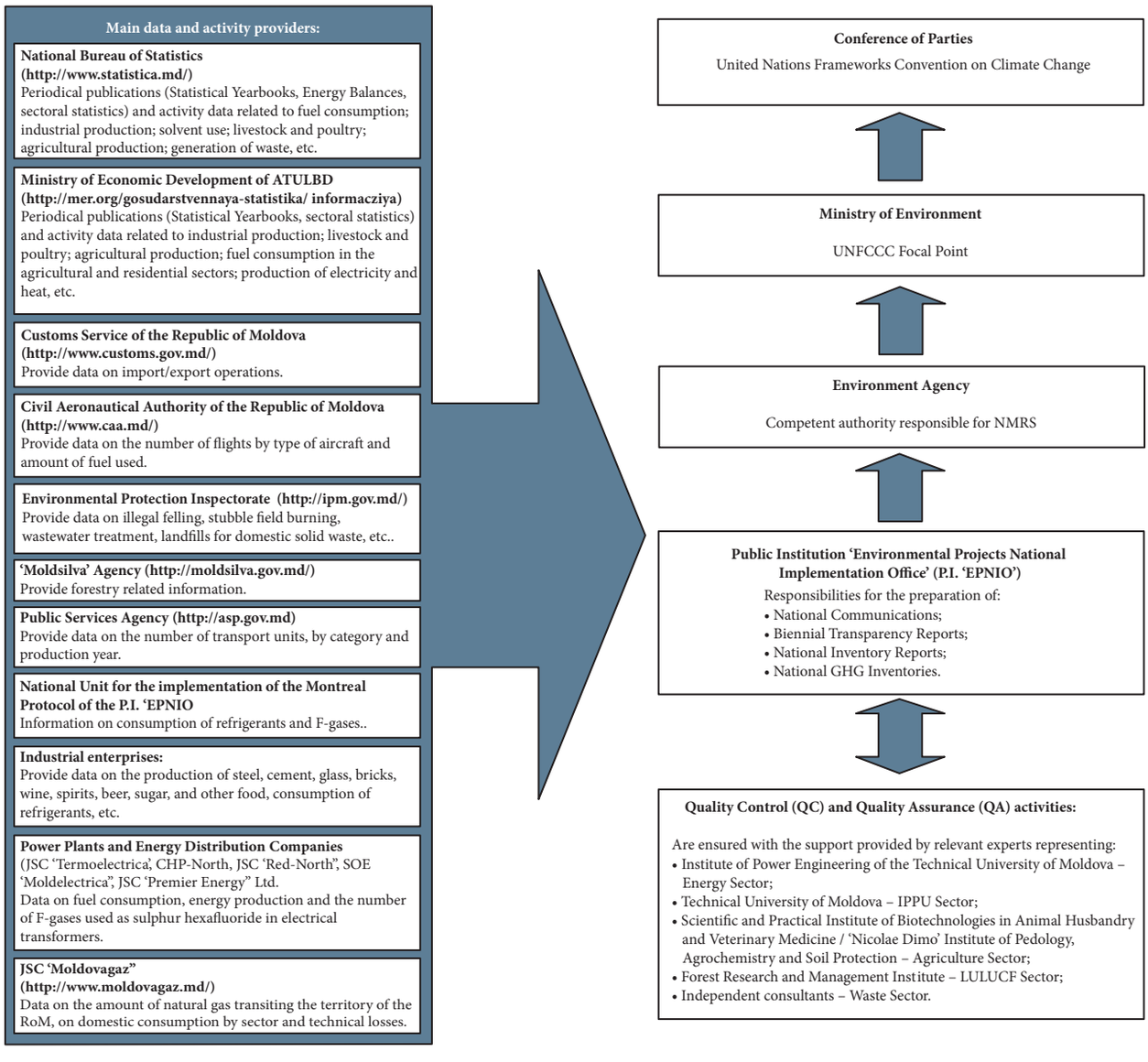


Figure 1-1: Institutional arrangements for the NMRS of the Republic of Moldova

The activity data required for compilation of the national inventory are available in the Statistical Yearbooks, Energy Balances, sectoral statistical publications, as well as in the "Statbank" database[30] managed by the National Bureau of Statistics (NBS) of the Republic of Moldova.

For the period up to 1992, the information is fully available for the entire territory of the country, while since 1993 and up-to-date - only for the territory on the right bank of the Dniester River, excluding the Transnistrian separatist region (administrative-territorial units on the left bank of the Dniester River or ATULBD). For the latter, the information is collected from the Statistical Yearbooks of the ATULBD[31] and the sectoral statistical publications available on the website of the Ministry of Economic Development of the ATULBD[32].

Additional statistical information (unpublished) can be obtained upon request from a number of partner institutions, with the status of information providers, in accordance with provisions of GD no. 1277 of 26.12.2018 on establishment and operation of the NSMR of greenhouse gas emissions and other information relevant to climate change, including:

- from the Ministry of Health and the Agency for Medicines and Medical Devices: information on the use of HFC-based dosed pressurized aerosols as propellants;
- from the Ministry of Defense: information on the amount of fuel consumed by military vehicles;
- from the Customs Service: information on import-export operations to/and from the Republic of Moldova;
- from the Public Services Agency: information on the number of vehicles, by vehicle category and production year;
- from the Naval Agency of the Republic of Moldova and the State Enterprises "Ungheni River Harbor" and "Bacul (Barge) Molovata": information on the amount of fuel consumed by naval transport;
- from the Civil Aviation Authority: information on the amount of fuel consumed by aircrafts (civil and international aviation) and the number of flights performed, by type of aircraft;
- from the Land and Cadaster Agency: information on land use, by categories of use;
- from "Moldsilva" (Forestry) Agency: statistical information associated with forestry;
- from the Environmental Protection Inspectorate: information on illegal forest cutting and stubble burning;
- from the National Unit for implementation of the Montreal Protocol of P.I. "EPNIO": information on the import and use of refrigerants in RAC equipment;
- from "Moldovan Railways" State Owned Enterprise: information on the amount of fuel consumed by railway transport, as well as on the rolling stock used at the enterprise;
- from the State Enterprise "State Roads Administration": information on the amount of asphalt produced and used in the Republic of Moldova;
- from "Moldova Gaz" JSC: information on transit of natural gas for third countries, on consumption of natural gas by sector, as well as technical losses;
- from enterprises in the energy industry ("TERMOELECTRICA" JSC and "CET-Nord" JSC): information on production of electricity and heat, as well as on fuel consumption;
- from companies specialized in transportation and distribution of electricity ("Moldelectrica" SOE, "Premier Energy" LTD with mixed capital, "RED Nord" JSC): information on the amount of PFCs and SF_6 used as elegas in electrical transformers;
- from industrial enterprises ("Lafarge Ciment Moldova" JSC, "Macon" JSC, "Fabrica de Sticlă din Chisinau (Chisinau Glass Factory)" SOE, "Vetropack Chisinau" JSC, etc.): information on the amount of fuel used, basic industrial production and mineral resources used.

1.2.3. Inventory preparation process

The national inventory team within PI "EPNIO" applies a centralized approach in the process of preparing the national inventory which consists of the NIR and common reporting tables (CRT). The process of preparing the national inventory is shown in diagram in Fig. 1-2.

[30] National Bureau for Statistics of the Republic of Moldova, on-line database: <https://statistica.gov.md/ro/banca-de-date-statistice-78.html>
[31] P. I. „ONIPM" has copies of Statistical Yearbooks for the territories of Transnistria regions (UATSN) for 2000-2020, comprising activity data for 1990 and 1995-2020.
[32] Ministry for Economic Development of Transnistria region (UATSN): <https://mer.gospmr.org/deyatelnost/gosudarstvennaya-sluzhba-statistiki-gosstat/informacziya.html>.

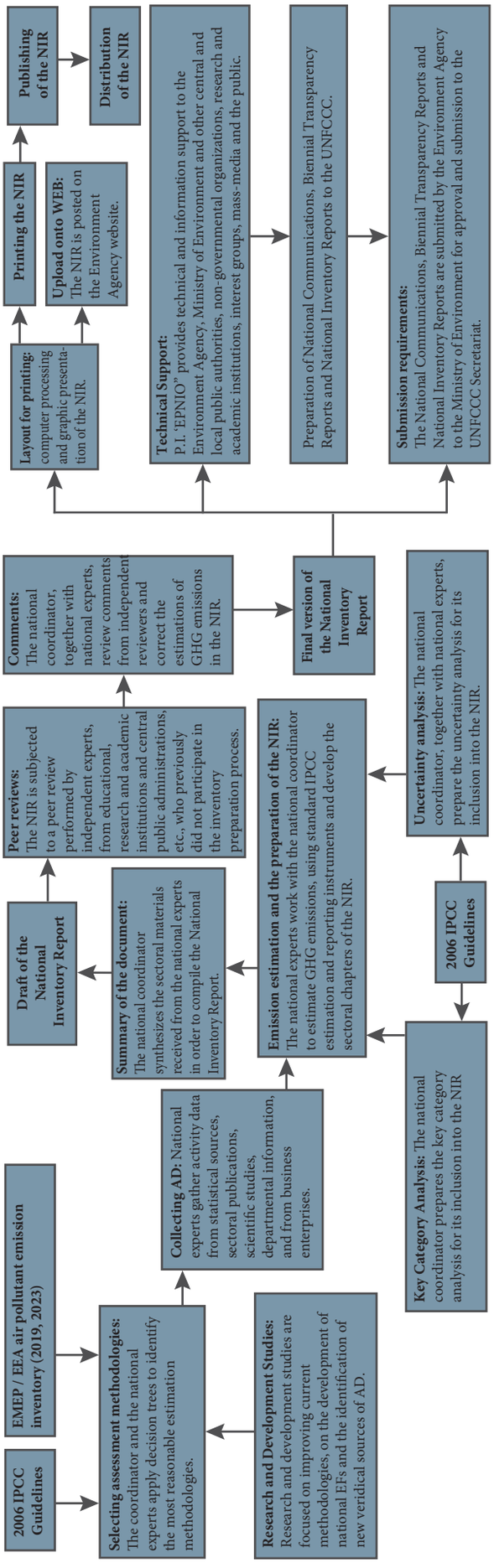


Figure 1-2: Inventory process in the Republic of Moldova

The National GHG Inventory Coordinator is responsible for compiling assessments and ensuring the consistency and quality of the inventory by producing the National Inventory Report and the "National GHG Inventory" chapters of the BTRs and NCs. Assessments of emissions for individual source categories and of removals by individual sink categories are the responsibility of national experts who are more familiar with the individual features of source and sink categories.

Under the direct coordination of the National GHG Inventory Coordinator, the national experts decide, through the application of decision trees, on the use of the most appropriate assessment methodology, and they also collect the activity data necessary to carry out assessments.

For most of the source categories, the methodologies used in the previous inventory cycle are applied. Under these conditions, it is necessary to collect only new activity data for the most recent evaluation period or for the entire study period, in case clarifications and recalculations of historical activity data have been made.

If the assessment is done for a new category of sources or sinks, or if a higher tier methodology approach is applied, the Coordinator, together with the National Experts, decide on the assessment methodology to be applied; they collect the most reasonable activity data and emission factors, calculate GHG emissions, analyze uncertainties and ensure verification, quality control and quality assurance procedures, including technical review of results obtained by relevant independent experts, representing educational, research entities, ministries and subordinated agencies, central public authorities and/or the private sector.

National experts produce explanatory texts related to the studies carried out for evaluation of emissions from individual categories of sources and removals by individual categories of sinks, appendices to them, presenting references to sources used.

The National Coordinator of the GHG inventory is responsible for collection and synthesis of these materials, in order to produce the sectoral chapters of the NIR (Chapter 3 "Energy", Chapter 4 "IPPU", Chapter 5 "Agriculture", Chapter 6 "LULUCF", Chapter 7 "Waste").

The Coordinator is also responsible for producing the other component parts of the NIR (Executive Summary, Chapter 1 "National circumstances,

institutional arrangements and cross-cutting information", Chapter 2 "Trends in national GHG emissions", Chapter 8 "Recalculations and improvements", Annexes and References), as well as the analysis of key emission sources, in line with the 2006 IPCC Guidelines.

The National Inventory Report (NIR) is produced in accordance with the structure established in Decision 5/CMA.3. Additionally, common reporting tables (CRT) are also compiled.

The Coordinator of the National GHG Inventory has the task of monitoring the compilation process of the standard common reporting tables to ensure consistency of results. Uncertainty analysis, as well as verification, quality control and quality assurance activities are carried out by National Experts in close cooperation with the National GHG Inventory Coordinator.

The first *Quality Assurance (QA) and Quality Control (QC) Plan* was produced for the first time in 2006 within the UNDP-GEF Regional Project *"Capacity building for improving the quality of national GHG inventories (Central Europe and CIS countries)";* it is consistent with the quality assurance procedures described in the 2006 IPCC Guidelines. Later, it was periodically updated in the process of drawing up national GHG emission inventories.

During the technical review procedure, the draft version of the NIR is sent to a selected group of experts (provided that they have not participated in the preparation stages of the national inventory of GHG emissions in the respective inventory cycle). The purpose of the technical review of the inventory is to receive from relevant experts, in areas of major interest, opinions on the quality of the work performed, especially as related to correctness of applying methodology approaches, emission factors and activity data. The comments received are analyzed and, if necessary, measures are taken to correct the evaluations and explanatory texts to them.

1.2.4. Processes for official consideration and approval of inventory

After the stage of considering the comments and proposals for improvement or revision received as a result of the technical review process, the national inventory team within the PI "EPNIO" prepares the final version of the NIR, which is then sent for consideration and approval to the Environment Agency. Afterwards, the Environment Agency submits the NIR, together with the BTR and/or the NC for approval to the Ministry of the Environment, which officially submits them to the UNFCCC Secretariat, in accordance with the international commitments of the Republic of Moldova within UNFCCC.

1.2.5. Archiving of information

The archiving of materials used in the process of developing the national inventory is done both in electronic format and in the traditional manner (on paper). The national inventory team of P.I. "EPNIO" owns the documentation used in its compilation.

1.3. Brief general description of methodologies and data sources used

The national inventory is structured to meet reporting requirements to the UNFCCC and is divided into 5 sectors: (1) Energy; (2) Industrial processes and product use; (3) Agriculture; (4) Land use, land use change and forestry; (5) Waste. Each sector is further disaggregated by source categories (Tab. 1-3).

Table 1-3: Summary of methods and emission factors used in compiling the national inventory of the Republic of Moldova

Categories of emissions and removals	CO_2		CH_4		N_2O		HFC		PFC		SF_6	
	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF
1. Energy												
A. Fuel combustion	T1	D, CS	T1	D	T1	D						
1. Energy industries	T1	D, CS	T1	D	T1	D						
2. Manufacturing industries and construction	T1	D, CS	T1	D	T1	D						
3. Transport	T1	D, CS	T1	D	T1	D						
4. Other sectors	T1	D, CS	T1	D	T1	D						
5. Other	T1	D, CS	T1	D	T1	D						

Categories of emissions and removals	CO_2		CH_4		N_2O		HFC		PFC		SF_6	
	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF
B. Fugitive emissions from fuels	T1	D, CS	T1	D	T1	D						
1. Solid fuels	NO	NO	NO	NO	NO	NO						
2. Oil and natural gas	T1	D, CS	T1	D	T1	D						
C. CO_2 transport and storage	NO	NO										
2. Industrial processes and product use												
A. Mineral industry	T2, T1	D, CS	NA	NA	NA	NA						
B. Chemical industry	NO	NO	NO	NO	NO	NO						
C. Metal industry	T2	CS, D	NO	NO	NO	NO						
D. Non energy products from fossil fuel use and solvents use	T2, T1	D	NA	NA	NO	NO						
E. Electronic industry	NA	NA	NA	NA	NA	NA	NA	NA	NO	NO	NO	NO
F. Product use as substitutes to ODS	NA	NA	NA	NA	NA	NA	T2, T1	CS, D	NA	NA	NA	NA
G. Other products manufacture and use	T2, T1	D	NA	NA	T1	D	NA	NA	T1	D	T1	D
H. Other production	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture												
A. Enteric fermentation			T2, T1	D, CS	NA	NA						
B. Manure management			T2, T1	D, CS	T2, T1	D, CS						
C. Rice cultivation			NO	NO	NA	NA						
D. Agricultural soils			NA	NA	T1, T3	D, CS						
E. Savanna burning			NO	NO	NA	NA						
F. Field burning of agricultural residues			IE	IE	IE	IE						
G. Lime application	NO	NO	NA	NA	NA	NA						
H. Urea application	T1	D	NA	NA	NA	NA						
I. Carbon fertilizer application	NO	NO	NA	NA	NA	NA						
J. Other	NO	NO	NO	NO	NO	NO						
4. LULUCF												
A. Forest land	T3, T2, T1	D, CS	T1	D	T1	D						
B. Cropland	T2, T1	D, CS	T1	D	T1	D						
C. Grassland	T2	CS	NE	NE	NE	NE						
D. Wetlands	T2, T1	D, CS	NE	NE	NE	NE						
E. Settlements	T2, T1	D, CS	NE	NE	T1	D						
F. Other land	T2, T1	D, CS	NE	NE	NE	NE						
G. Harvested wood products	T1	D	NA	NA	NA	NA						
H. Other	NO	NO	NO	NO	NO	NO						
5. Waste												
A. Solid waste disposal	NA	NA	T3	D, CS	NA	NA						
B. Biological treatment of solid waste	NA	NA	T1	D	T1	D						
C. Incineration and open burning of waste	T1	D	T1	D	T1	D						
D. Wastewater treatment and discharge	NA	NA	T1	D, CS	T1	D						
E. Other	NO	NO	NO	NO	NO	NO						
6. Other	NO	NO	NO	NO	NO	NO						
Memo Items												
International bunkers	T2, T1	D, CS	T1	D	T1	D						
Multilateral operations	NO	NO	NO	NO	NO	NO						
CO_2 emissions from biomass burning	T1	D, CS	IE	IE	IE	IE						

Abbreviations: T1 – Tier 1 method); T2 – Tier 2 method); C – EEA/EMEP; CS – Country Specific; D –Default; IE – Included Elsewhere; NA – Not Applicable) NE – Not Estimates; NO – Not Occurring.

Direct greenhouse gases (CO_2, CH_4, N_2O, HFC, PFC and SF_6) (so far, no NF_3 emissions have been recorded in the Republic of Moldova) were estimated by applying methodologies in line with the 2006 IPCC Guidelines for inventory of national greenhouse gas emissions. Indirect greenhouse gas emissions (NOx, CO, COVNM and SO_2) were estimated by applying methodologies in line with the EEA/EMEP Air Pollutant Emission Inventory Guidebook (2019, 2023).

If we were to define it as a concept, a GHG inventory would represent *"a complex register of anthropogenic sources of emissions by source categories, respectively of removals by sink categories, originating from a certain territory over a fixed period"*.

The inventory can be carried out by a "top-down", a "bottom-up" or a combined approach.

The national inventory of the Republic of Moldova was compiled by applying the "top-down" approach, through provision of GHG emissions assessment at the national level. Ideally, a GHG inventory should be developed using direct measurements of emissions from separate source categories and removals by individual sink categories within the country, by using a bottom-up methodology approach.

The national inventory team continues to work to increase the accuracy, completeness and transparency of the national inventory, but for now the application of the "bottom-up" approach has not been possible, even if for some sectors the emission assessment is drawn up from individual sources known from the point of view of geographic positioning.

As far as possible, the activity data used in this report are based on officially published information: national statistical publications (Statistical Yearbooks of the Republic of Moldova, respectively of the administrative-territorial units on the left of the Dniester River, Energy Balances, etc.) and international publications (database of the UN Food and Agriculture Organization), publications of academic and research and development institutions (Institute of Pedology and Agro-chemistry "Nicolae Dimo", Institute of Ecology and Geography of the State University of Moldova, Energy Institute of the Technical University of Moldova, the Forestry Research and Management Institute of the "Moldsilva" Agency, etc.), activity data provided by ministries and subordinated agencies (Ministry of Defense, Ministry of Health), activity data provided by public authorities subordinated to the ministries (Environmental Agency, Environmental Protection Inspectorate, Customs Service, "Moldsilva" Agency, State Hydrometeorological Service), activity data provided by central public agencies (National Bureau for Statistics, Land and Cadaster Agency, Public Services Agency, Naval Agency, Civil Aeronautical Authority, Agency for Medicines and Medical Devices, National Food Safety Agency), data obtained from economic operators ("Railways of Moldova" SOE, "Moldova Gaz" JSC, "Lafarge Ciment Moldova" JSC, "Macon" JSC, "Fabrica de Sticla from Chisinau" (Chisinau Glass factory) SOE, "Vetropack Chisinau" JSC, etc.).

1.4. Brief description of key categories

According to the 2006 IPCC Guidelines, identifying key categories, including in order to prioritize efforts to improve the quality of the inventory is believed to be good practice.

A key category is defined as "a priority category within the national inventory system, as the estimates derived from it significantly influence the total national direct greenhouse gas emissions, both in terms of the absolute level of annual emissions and as trend over a period, or both".

In Tab. 1-4, respectively in Annex 1, the results are shown of the key category analysis of the national inventory of the Republic of Moldova for the years 1990 and 2022, without the contribution of the "LULUCF" sector, by applying a Tier 1 methodology approach - 20 key level (L) categories and 19 key trend (T) categories, by applying a Tier 2 methodology approach – 18 key level (L) categories and 16 key trend (T) categories; with the contribution of the "LULUCF" sector, by applying a Tier 1 methodology approach - 27 key level (L) categories and 23 key trend (T) categories, respectively, a Tier 2 methodology approach - 22 key level (L) categories and 18 key trend (T) categories.

Key category analysis was performed using the key category calculation tool developed by the US Environmental Protection Agency[33].

In line with the recommendations set out in the 2006 IPCC Guidelines, the inventory was first disaggregated by source categories, from which the key categories were then identified.

The source categories were defined according to the following recommendations:

(1) emissions/removals from individual source/sink categories, identified according to the standard classification, were expressed in CO_2 equivalent units, calculated using the "100-year global warming potential";

(2) source/sink categories were identified for each gas separately, since for different direct greenhouse gases the methodology approaches, emission factors and uncertainties used differ significantly;

[33] US EPA's Key Category Analysis Tool v2.8, <https://www.epa.gov/ghgemissions/toolkit-building-national-ghg-inventory-systems>

(3) source/sink categories, which use identical emission factors, based on common methodology approaches, were aggregated prior to the analysis.

The key categories were identified from two perspectives:

(1) Based on the level contribution of each category in the structure of total national emissions; and

(2) Based on the trend contribution of each category in the structure of total national emissions during the analyzed period (in order to identify the absolute changes recorded: decrease or increase).

Table 1-4: Results of the key category analysis of the national inventory for the years 1990 and 2022, evaluated according to Tier 1 and Tier 2 methodology approaches

IPCC categories	Key categories	Gas	Without LULUCF				With LULUCF			
			T1		T2		T1		T2	
			L	T	L	T	L	T	L	T
1A1	Energy industries – liquid fuels	CO_2	X	X	X	X	X	X	X	X
1A1	Energy industries – gaseous fuels	CO_2	X	X	X	X	X	X	X	X
1A1	Energy industries – solid fuels	CO_2	X	X	X	X	X	X	X	X
1A2	Manufacturing industries and construction	CO_2	X	X	X	X	X	X	X	X
1A3b	Motor transport	CO_2	X	X	X	X	X	X	X	X
1A3c	Railway transport	CO_2	X	X			X	X		
1A4	Other sectors	CO_2	X	X	X		X	X	X	
1A4	Other sectors	CH_4	X	X	X	X	X	X	X	X
1B2	Fugitive emission from oil and natural gas	CH_4	X	X	X	X	X		X	
2A1	Cement production	CO_2	X	X			X	X		
2D	Non-energy products from fuels and solvent use	CO_2	X	X		X	X			
2F1	Product use as substitutes to ODS – Refrigerating and air conditioning equipment	HFC	X	X	X	X	X	X	X	X
2F2	Product use as substitutes to ODS – Expanded foams	HFC		X	X	X			X	
3A	Enteric fermentation	CH_4	X	X	X	X	X	X	X	X
3B	Manure management	CH_4	X	X	X	X	X	X		
3B1	Direct N_2O emissions from manure management	N_2O	X		X		X		X	
3B5	Indirect N_2O emissions from manure management	N_2O	X		X		X		X	
3Da	Direct N_2O emissions from agricultural soil management	N_2O	X	X	X	X	X	X	X	X
3Db	Indirect N_2O emissions from agricultural soil management	N_2O	X	X	X	X	X		X	X
4A1	Forest land remaining as forest land	CO_2					X	X	X	X
4A2	Land converted to forest land	CO_2					X	X	X	X
4B1	Cropland remaining as cropland	CO_2					X	X	X	X
4C2	Land converted to grassland	CO_2					X	X	X	X
4D2	Land converted to wetlands	CO_2					X	X		X
4E2	Land converted to settlements	N_2O					X	X		
4F2	Land converted to other land	CO_2					X	X	X	
4G	Harvested wood products	CO_2						X		X
5A	Solid waste disposal	CH_4	X	X	X	X	X	X	X	X
5D	Wastewater treatment and discharge	CH_4	X	X	X	X	X	X	X	X

Abbreviations: L – Level Assessment; T – Trend Assessment; T1 – Tier 1; T2 – Tier 2.

The percentage contribution, both level (L) and trend (T), was calculated and sorted from the highest to the lowest. In the case of the Tier 1 methodology approach, a cumulative contribution threshold of 95% was used in the analysis to define the maximum threshold for identifying key categories, respectively in case of the Tier 2 methodology approach (taking into account the uncertainties of the activity data and emission factors used in the assessment of GHG emissions for individual source/sink categories), a cumulative contribution threshold of 90% was used in the analysis to define the maximum threshold for identifying key categories.

1.5. Brief general description of QA/QC activities and their implementation

In line with the 2006 IPCC Guidelines recommendations, national inventories should be transparent, well documented, consistent over time, complete, comparable, with evaluated uncertainties, subject to verification, quality assurance and quality control activities.

The 2006 IPCC Guidelines define the concepts of quality control and quality assurance as follows:

- Quality control is a system of routine technical activities to assess and maintain the quality of the inventory as it is being compiled. A robust quality control system should ensure, through systemic checks, the integrity of data, their correctness and completeness; identify and address errors and omissions; and document and archive inventory material and record quality control activities.
- Quality assurance is a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process.

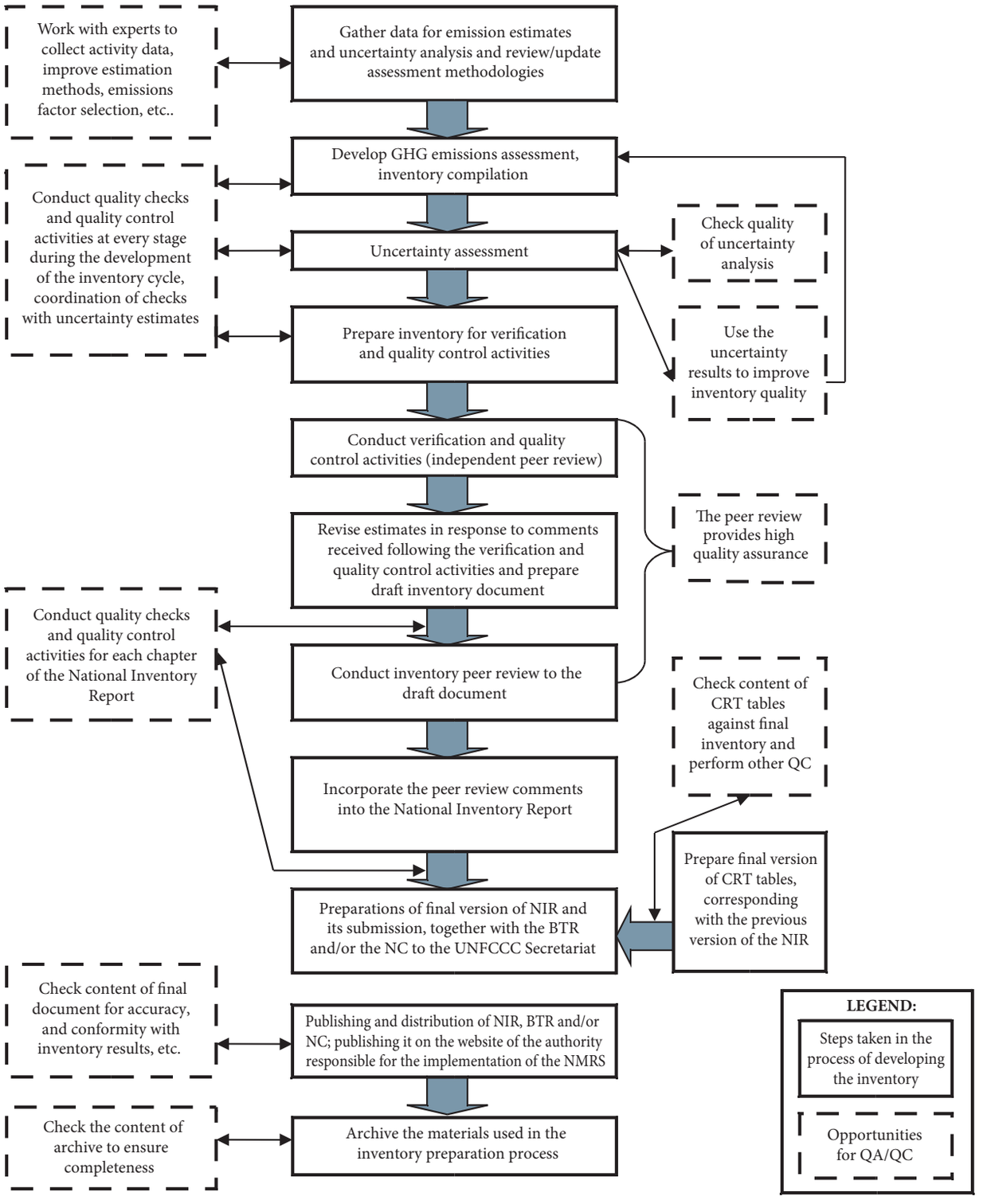


Figure 1-3: Role of verification, quality control and quality assurance activities in the national inventory preparation process.

As part of the continuous effort to achieve a qualitative, transparent and credible inventory, the Republic of Moldova has developed a *"Quality Assurance (QA) and Quality Control (QC) Plan"*. The key features of the *"QA/QC Plan"* include detailed specific procedures (Fig. 1-3) and typical verification and quality control forms, by applying Tier 1 (general procedures) and Tier 2 (specific procedures for individual source categories) methodology approaches, in order to standardize the process of implementing the quality assurance (QA) and quality control (QC) activities of the national inventory; also, the technical review (audit) performed by personnel not directly involved in the process of drawing up and developing the national inventory; checking the quality of activity data, including by comparing data sets obtained from different sources; planning and coordination of the inventory process at inter-institutional level; as well as continuous documentation of the development process of the national inventory.

It is well known that the compilation of a national inventory requires collection, manipulation and storage of large amounts of information. The sustainability of the process is ensured by good management and archiving of the materials used in the inventory process.

In the Republic of Moldova, the national inventory team has sufficiently transparent documentation to fully reproduce the GHG emission assessments. A standard system of documentation and archiving of numerical and qualitative information is used, compatible with the recommendations of the 2006 IPCC Guidelines.

Sources of activity data are documented by including references to them in the text. The evaluation methods, the sources of the emission factors and the reasoning behind their selection are documented in the respective chapters of the National Inventory Report.

The recalculations made are documented and justified both in the sector chapters (3-7) and in Chapter 8 "Recalculations and improvements" of the NIR.

The documentation associated with individual source categories includes: (1) the list of personnel responsible for carrying out the evaluations and the individual responsibilities according to the specifications; (2) the reference sources for the activity data used; (3) justification of the selection of evaluation methods and applied emission factors; (4) samples of the greenhouse gas emission calculation process (in Excel format); (5) the results of the uncertainty analysis for individual source categories; (6) appendices; (7) list of references.

To summarize, we can state that the transparency and credibility of the national inventory are ensured by: (1) the ability to prove through adequate documentation the transparency of the inventory development process; (2) making continuous improvements to the inventory process and basic products; and (3) ensuring that in the inventory process quantifiable approaches were used that allowed for comparable results for all source categories.

It is obvious that compared to previous inventory cycles, through the continuous integration of quality assurance and quality control activities, the RoM provides a higher quality of inventory.

1.6. Recalculations

The working group responsible for compilation of the national greenhouse gas inventory carried out the review and recalculation of GHG emissions and removals for each calendar year included in the national GHG inventory for the 1990-2020 period, a component of the NC5 of the RoM to the UNFCCC (2023).

These activities were carried out within the continuous process of improving the quality of the national GHG inventory (including by considering updated activity data, methodology approaches available in the 2006 IPCC Guidelines, consideration for the first time in the inventory of new source categories, update of values of nationally specific emission factors and correction of errors identified, but also taking into account the change of the global warming potential values for the 100-year horizon (GWP) available in Assessment Report 5 (IPCC AR5, 2014), to replace those available in Assessment Report 4 (IPCC AR4, 2007).

In the current inventory cycle, improvements were made for all sectors, i.e. there was a need to recalculate the national GHG emissions for the period 1990-2020, as reflected in NC5 of the RoM to the UNFCCC (Chapter 2 "National greenhouse gas inventory").

As compared to the results recorded in NC5 of the RoM to the UNFCCC (2023), the changes undertaken in the process of compiling this inventory resulted in a slight increase in the total direct GHG emissions during the 1990-2018 period, ranging from a minimum increase of +0.3% in the year 2014, up to a maximum increase of +2.3% in the year 2000, respectively in a slight reduction trend of the total direct GHG emissions in the years 2019 and 2020, ranging from a minimal decrease by -1.1% in 2019, up to a maximum decrease of -2.0% in 2020 (Tab. 1-5).

Table 1-5: Recalculation results of total direct national greenhouse gas emissions included in NC5 of the RoM to UNFCCC, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
NC5	45.25	38.97	31.14	24.41	21.06	17.66	17.44	15.83	14.15	11.89	10.97
BTR1	45.48	39.21	31.44	24.70	21.38	17.94	17.59	16.04	14.39	12.12	11.22
Difference, %	0.5	0.6	1.0	1.2	1.5	1.6	0.8	1.3	1.7	1.9	2.3
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
NC5	11.66	11.56	12.00	12.56	12.95	12.13	12.17	12.64	12.61	13.36	13.70
BTR1	11.90	11.80	12.25	12.80	13.18	12.37	12.39	12.84	12.77	13.50	13.82
Difference, %	2.0	2.1	2.1	1.9	1.8	1.9	1.8	1.6	1.3	1.0	0.9
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
NC5	13.29	12.98	13.23	13.01	13.28	13.13	13.76	13.75	13.66		
BTR1	13.40	13.06	13.27	13.16	13.40	13.27	13.90	13.60	13.39	14.61	12.95
Difference, %	0.9	0.7	0.3	1.2	0.9	1.1	1.0	-1.1	-2.0		

Abbreviations: NC5 – Fifth National Communication of the Republic of Moldova to UNFCCC; BTR1 – First Biennial Transparency Report of the Republic of Moldova to UNFCCC.

With reference to the net direct GHG emissions included in NC5 of the RoM to the UNFCCC (2023), we will specify that the changes undertaken in the process of compiling this inventory resulted in a slight upward trend in net direct GHG emissions during the 1990-2018 period, this varying from a minimum increase of +0.1% in 2014, up to a maximum increase of +2.5% in 2000, respectively, in a slight decreasing trend of net GHG direct emissions in the years 2019 and 2020, this ranging from a minimum decrease of -1.2% in 2019, up to a maximum decrease of -2.1% in 2020 (Tab. 1-6).

Table 1-6: Recalculation results of total net direct greenhouse gas emissions included in NC5 of the RoM to UNFCCC, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
NC5	43.59	36.25	29.02	22.27	18.99	15.63	14.97	13.71	12.02	10.04	8.84
BTR1	43.81	36.47	29.30	22.53	19.28	15.88	15.08	13.90	12.22	10.24	9.06
Difference, %	0.5	0.6	1.0	1.2	1.6	1.6	0.8	1.3	1.7	2.0	2.5
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
NC5	9.90	9.70	10.22	10.61	11.28	10.34	10.18	10.96	11.31	12.13	12.53
BTR1	10.10	9.91	10.44	10.81	11.49	10.54	10.37	11.13	11.45	12.24	12.62
Difference, %	2.1	2.1	2.1	2.0	1.8	2.0	1.9	1.6	1.2	0.9	0.7
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
NC5	12.09	11.91	12.50	11.83	12.34	12.13	12.92	13.77	13.66		
BTR1	12.18	11.97	12.52	11.96	12.44	12.26	13.04	13.60	13.37	14.66	13.37
Difference, %	0.8	0.5	0.1	1.1	0.8	1.0	0.9	-1.2	-2.1		

Abbreviations: NC5 – Fifth National Communication of the Republic of Moldova to UNFCCC; BTR1 – First Biennial Transparency Report of the Republic of Moldova to UNFCCC.

1.7. General uncertainty assessment, including data pertaining to the overall uncertainty of inventory totals

The evaluation of uncertainties is an essential element for a complete and transparent inventory. Information on uncertainties is not presented to discuss the validity of the national inventory GHG emissions assessment, but to prioritize efforts to improve the accuracy of future inventories, as well as to guide future decisions on selection of the most appropriate assessment methods.

In the Republic of Moldova, the national inventory team assessed greenhouse gas emissions with the maximum possible accuracy, however, the results obtained still have a certain degree of uncertainty.

Some emissions estimates, such as, for example, CO_2 emissions from burning of fossil fuels, or CO_2 emissions from cement production, are considered to have minimal uncertainty. For other categories of sources, however, due to the relatively low quality of activity data, the use of default emission factors, as well as the use of an insufficiently clear view of the emission generation process, the uncertainty of emissions is high.

Additional studies in the following areas could reduce the uncertainty of emissions in the national inventory of the Republic of Moldova:

- *Incorporation of excluded emission sources*. Quantitative assessments for some source and sink categories are not currently available.
- *Improving the emission factors accuracy.* In some cases, research is needed to improve the quality of the emission factors used to assess emissions from specific source categories (for example, the accuracy of emission factors applied to the assessment of fugitive CH_4 emissions from oil and natural gas, CO_2 emissions from use of solvents and other products, indirect N_2O emissions from manure management, indirect N_2O emissions from agricultural soils, etc.).
- *Collection of more detailed activity data*. Although there are methodologies intended for evaluation of emissions from some categories of sources, their use is limited due to lack of activity data, especially those related to the evaluation of fluorinated gas emissions within sector 2 "Industrial processes and product use".

The uncertainty assessment of greenhouse gas emissions in the national inventory was carried out by applying methodology approach 1 of the 2006 IPCC Guidelines (the results are presented in Annex 2, in accordance with the format of Table 3.2 of Chapter 3, Volume 1 of the 2006 IPCC Guidelines).

The quantitative assessment of the general uncertainty of the inventory is also briefly presented in Tab. 1-7.

Table 1-7: Quantitative assessment of general uncertainties and by main direct greenhouse gases, within the national inventory of the Republic of Moldova, calculated according to methodology approach 1 of the 2006 IPCC Guidelines

	CO_2	CH_4	N_2O	Total
Level uncertainty	±4.68	±26.33	±22.61	±6.02
Trend uncertainty	±1.45	±9.83	±9.52	±1.89

The greenhouse gas emissions assessed in the national inventory of the Republic of Moldova reflect the best currently available inventory practices; however, in some cases, emission estimates are based on rough assessment methods and incomplete activity data.

When more complete and substantiated information is obtained, the national inventory team will ensure the improvement of the inventory quality, including by revising and recalculating current greenhouse gas emissions.

1.8. General assessment of completeness

The national inventory of the Republic of Moldova, for the most part, represents a complete register of the following direct greenhouse gases – CO_2, CH_4, N_2O, HFC, PFC and SF_6. Emissions from the precursor gases of ozone and aerosols were also included in the national inventory: CO, NO_x, COVNM and SO_2.

Despite the effort to include in the inventory all the existing categories of sources and sinks, certain gaps still persist in it, most of which being caused by lack of activity data for assessment of respective emissions (for example, HFC emissions from source categories 2F5 'Solvents' and 2F6 'Other applications'). In the following inventory cycles, the national team will continue the activity of identifying the information necessary for the assessment of GHG emissions/removals from the respective source categories.

1.9. Metrics

The radiative forcing effect of a gas in the atmosphere is a reflection of its ability to cause atmospheric heating. We refer to direct radiative forcing when the gas is a GHG and to indirect radiative forcing when the chemical

transformation of the original gas produces one or more greenhouse gases, or when a gas influences the atmospheric lifetime of other gases.

The "global warming potential" (GWP) concept was developed to allow scientists and policymakers to compare the ability of each GHG to trap heat in the atmosphere. By definition, GWP is the change over time of the radiant force due to the emission of one kg of gas expressed in the radiant force originating from the emission of one kg of CO_2. In other words, GWP is a relative measurement of the warming effect that a radiative (GHG) gas can have on the surface of the troposphere. "Global warming potential" takes into account both the instant radiative forcing due to cumulative increase in concentration of greenhouse gases in the atmosphere and the lifetime of such gases in the atmosphere.

In this report, the "GWP" values for a period of 100 years from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (**IPCC AR5, 2014**) are used (Tab. 1-8).

Table 1-8: 100-year global warming potential and atmospheric lifetime of direct greenhouse gases[34].

GHG	Chemical formula	Lifetime according to, AR6	SAR	TAR	AR4	AR5	AR6
Carbon dioxide	CO_2	50-200	1	1	1	1	1
Methane	CH_4	11.8	21	23	25	28	27.9
Nitrous oxide	N_2O	109	310	296	298	265	273
Nitrogen trifluoride	NF_3	569	NA	10800	17200	16100	17400
Sulphur hexafluoride	SF_6	1000	23900	22200	22800	23500	25200
Hydrofluorocarbons (HFCs)							
HFC-23	CHF_3	228	11700	12000	14800	12140	14600
HFC-32	CH_2F_3	5.4	650	550	675	677	771
HFC-125	C_2HF_5	30	2800	3400	3500	3170	3740
HFC-134a	$C_2H_2F_2$ (CH_2FCF_3)	14	1300	1300	1430	1300	1526
HFC-143a	$C_2H_3F_3$ (CF_3CH_3)	51	3800	4300	4470	4800	5810
HFC-152a	C_2H4F_2 (CH_3CHF_2)	1.6	140	120	124	138	164
HFC-227ea	CF_3CHFCF_3	36	2900	3500	3220	3350	3600
HFC-236fa	$CF_3CH_2CF_3$	213	6300	9400	9810	8060	8690
HFC-245fa	$CHF_2CH_2CF_3$	7.9	NA	950	1030	858	962
HFC-365mfc	$CH_3CF_2CH_2CF_3$	8.9	NA	890	794	804	914
HFC-43-10mee	$CF_3CHFCHFCF_2CF_3$	17	1300	1500	1640	1650	1600
Perfluorocarbons (PFCs)							
Perfluormethane	CF_4	50000	6500	5700	7390	6630	7380
Perfluorethane	C_2F_6	10000	9200	11900	12200	11100	12400
Perfluorpropane	C_3F_8	2600	7000	8600	8830	8900	9290
Perfluorbutane	C_4F_{10}	2600	7000	8600	8860	9200	1000
Perfluorpentane	C_5F_{12}	4100	7500	8900	9160	8550	9220
Perfluorhexane	C_6F_{14}	3100	7400	9000	9300	7910	8620

Sources: SAR - IPCC Second Assessment Report (1996), TAR – IPCC Third Assessment Report (2001), AR4 – IPCC Fourth Assessment Report (2007), AR5 – IPCC Fifth Assessment Report (2014) and AR6 – IPCC Sixth Assessment Report (2021).

1.10. Summary of any flexibility applied

In the current inventory cycle, there was no need to apply any flexibility clause in the light of our national capacities, as per paras. 4–6 of the MPGs.

1.11. Trends in direct greenhouse gas emissions and removals

Over the 1990-2022 period, the dynamics of total direct greenhouse gas emissions, expressed in CO_2 equivalent, revealed a decreasing trend in the Republic of Moldova, decreasing by about 71.5%: from 45.48 Mt CO_2 equivalent in 1990 to 12.95 Mt CO_2 equivalent in 2022, net direct greenhouse gas emissions have decreased over the same period by about 69.5%: from 43.81 Mt CO_2 equivalent in 1990 to 13.37 Mt CO_2 equivalent in 2022 (Fig. 1-4).

[34] <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Annex-6-Additional-Information.pdf>

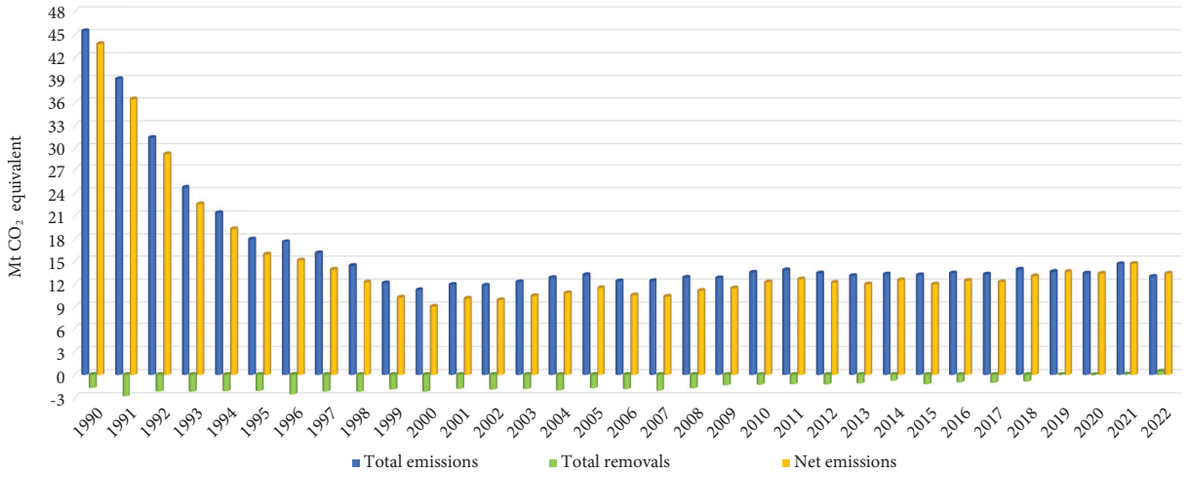


Figure 1-4: Dynamics of total national direct greenhouse gas emissions, removals and net GHG emissions in the Republic of Moldova over the 1990-2022 period.

The most significant decrease in direct GHG emissions by source category were recorded for the period 1990-2022 in the following categories: 1A5 "Other" (-97.7%), 4G "Harvested wood products" (- 96.9%), 4C "Grasslands" (-89.8%), 3B "Manure management" (-86.3%), 4D "Wetlands" (-84.8%), 1A1 "Energy industries" (-84.3%), 3A "Enteric fermentation" (-83.1%), 1B2 "Fugitive emissions from oil and natural gas" (-77.0%), 1A4 "Other sectors" (-71.8%), 1A2 "Manufacturing industries and construction" (-64.7%), 2A "Mineral industry" (-63.3%), 2C "Metal industry" (-57.2%), 3D "Agricultural soils" (-44.3%), 1A3 "Transport" (-42.5%), 4A "Forest lands" (-37.9%), 2D "Non-energy products from fuels and solvent use" (-32.1%), 5D "Wastewater treatment and discharge" (-31.9%), 2G "Production and use of other products" (-27.8 %), 4B "Cropland" (-27.4%) and 4E "Settlements" (-20.3%).

During the 2021-2022 period, an increase in emissions from the following source categories was recorded: 1A5 "Other" (+69.2%), 3H "Urea application" (+21.8%), 2F "Product use as substitutes to ODS" (+10.1%), 4F "Other land" (+6.7%), 5B "Biological treatment of solid waste" (+4.0%), 4E "Settlements" (+2.2%), 4D "Wetlands" (+1.4%) and 4B "Cropland" (+1.0%).

1.12. Description of emission and removal trends by gas

Over the 1990-2022 period, total carbon dioxide emissions (without LULUCF) decreased by about 74.6% (from about 37.00 Mt in 1990 to 9.40 Mt in 2022). CH_4 emissions (without LULUCF) decreased by about 61.8% (from about 6.00 Mt CO_2 equivalent in 1990 to 2.29 Mt CO_2 equivalent in 2022), respectively N_2O emissions (without LULUCF) decreased by 58.7% (from about 2.48 Mt CO_2 equivalent in 1990 to 1.02 Mt CO_2 equivalent in 2022) (Tab. 1-9).

Table 1-9: Dynamics of direct greenhouse gas emissions in the Republic of Moldova for the 1990-2022 period, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
CO_2 (without LULUCF)	37.00	31.31	24.14	18.09	15.06	11.94	11.81	10.73	9.27	7.26	6.51
CO_2 (with LULUCF)	35.17	28.40	21.82	15.72	12.75	9.66	9.07	8.34	6.84	5.12	4.09
CH_4 (without LULUCF)	6.00	5.61	5.36	4.98	4.89	4.64	4.58	4.14	3.99	3.84	3.74
CH_4 (with LULUCF)	6.00	5.61	5.37	4.99	4.90	4.64	4.58	4.14	3.99	3.84	3.74
N_2O (without LULUCF)	2.48	2.30	1.93	1.63	1.43	1.35	1.20	1.17	1.13	1.02	0.96
N_2O (with LULUCF)	2.63	2.46	2.12	1.83	1.64	1.58	1.44	1.41	1.38	1.28	1.22
HFCs	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00
PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
SF_6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (without LULUCF)	**45.48**	**39.21**	**31.44**	**24.70**	**21.38**	**17.94**	**17.59**	**16.04**	**14.39**	**12.12**	**11.22**
Total (with LULUCF)	**43.81**	**36.47**	**29.30**	**22.53**	**19.28**	**15.88**	**15.08**	**13.90**	**12.22**	**10.24**	**9.06**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
CO_2 (without LULUCF)	7.15	6.91	7.58	8.10	8.44	7.77	8.16	8.53	8.57	9.22	9.52
CO_2 (with LULUCF)	5.08	4.76	5.50	5.85	6.48	5.70	5.89	6.57	7.01	7.73	8.09
CH_4 (without LULUCF)	3.72	3.80	3.70	3.67	3.68	3.53	3.33	3.30	3.19	3.19	3.22
CH_4 (with LULUCF)	3.73	3.80	3.70	3.67	3.68	3.53	3.33	3.30	3.19	3.19	3.22
N_2O (without LULUCF)	1.03	1.08	0.96	1.02	1.04	1.03	0.86	0.96	0.95	1.02	1.00
N_2O (with LULUCF)	1.29	1.34	1.22	1.28	1.30	1.28	1.11	1.20	1.18	1.25	1.22
HFCs	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08
PFCs	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00
SF_6	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (without LULUCF)	**11.90**	**11.80**	**12.25**	**12.80**	**13.18**	**12.37**	**12.39**	**12.84**	**12.77**	**13.50**	**13.82**
Total (with LULUCF)	**10.10**	**9.91**	**10.44**	**10.81**	**11.49**	**10.54**	**10.37**	**11.13**	**11.45**	**12.24**	**12.62**
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
CO_2 (without LULUCF)	9.21	8.86	8.85	9.02	9.09	8.69	9.29	9.36	9.66	10.63	9.40
CO_2 (with LULUCF)	7.78	7.58	7.92	7.65	7.97	7.53	8.29	9.22	9.49	10.52	9.66
CH_4 (without LULUCF)	3.15	3.03	3.08	3.01	3.05	3.19	3.16	2.77	2.42	2.42	2.29
CH_4 (with LULUCF)	3.15	3.04	3.08	3.01	3.05	3.19	3.16	2.77	2.42	2.42	2.29
N_2O (without LULUCF)	0.95	1.07	1.23	0.99	1.11	1.23	1.27	1.27	1.10	1.35	1.02
N_2O (with LULUCF)	1.16	1.26	1.41	1.16	1.27	1.38	1.42	1.42	1.25	1.50	1.18
HFCs	0.09	0.10	0.11	0.14	0.15	0.16	0.17	0.20	0.21	0.21	0.23
PFCs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SF_6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (without LULUCF)	**13.40**	**13.06**	**13.27**	**13.16**	**13.40**	**13.27**	**13.90**	**13.60**	**13.39**	**14.61**	**12.95**
Total (with LULUCF)	**12.18**	**11.97**	**12.52**	**11.96**	**12.44**	**12.26**	**13.04**	**13.60**	**13.37**	**14.66**	**13.37**

Abbreviations: NA – Not Applicable; NO – Not Occurring.

The monitoring of halocarbons (HFCs, PFCs) and sulphur hexafluoride (SF_6) emissions has been done since 1995, considered in the RoM as the reference year for F-gases (HFCs, PFCs and SF_6) (so far, no NF_3 emissions have been recorded). The dynamics of these emissions show a stable upward trend over recent years, even if their share in total national GHG emissions is currently insignificant. Carbon dioxide contributes the most to total direct greenhouse gas emissions in the RoM. Figure 1-5 shows how the share of direct greenhouse gases in total national GHG emissions varied between 1990 and 2022.

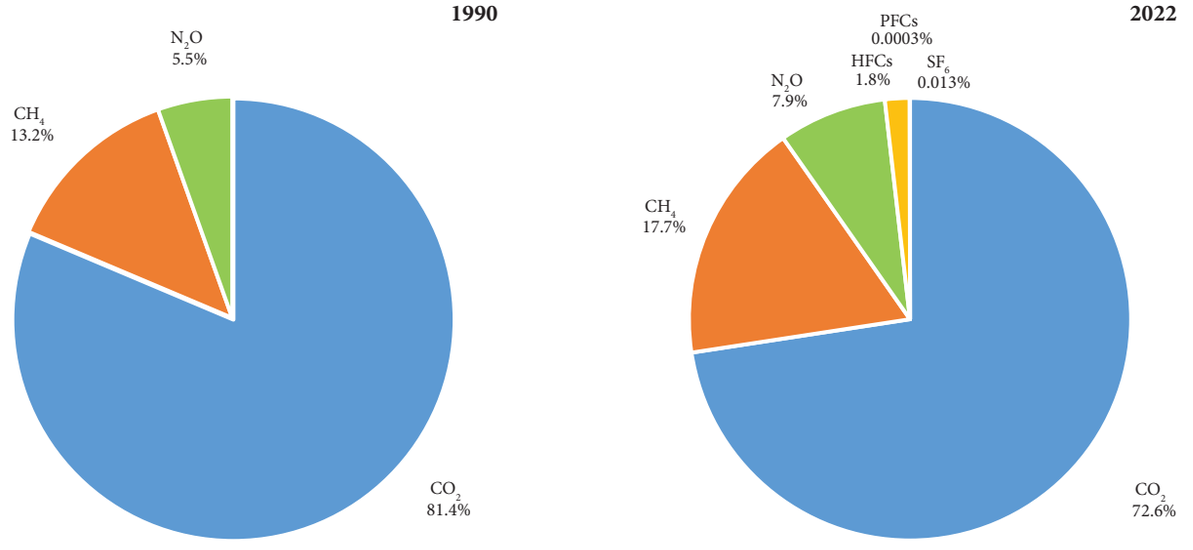


Figure 1-5: Share of direct greenhouse gases in total GHG emissions in the Republic of Moldova in 1990 and 2022.

In 2022, the source categories with the largest share in total carbon dioxide emissions were: 1A1 "Energy industries" (34.6% of the total), 1A3 "Transport" (28.2% of the total), 1A4 "Other sectors" (20.3% of the total), 4B "Croplands" (17.9% of the total), 4A "Forest lands" (-16.5% of the total), 1A2 "Manufacturing industries and construction" (6.9% of the total), 2A "Mineral industry" (5.1% of the total), 4F "Other land" (3.1% of the total),

2D "Non-energy products from fuels and solvent use" (1.6% of the total), 4C "Grassland" (- 1.3% of the total), and 4D "Wetlands" (-0.9% of the total) (Fig. 1-6).

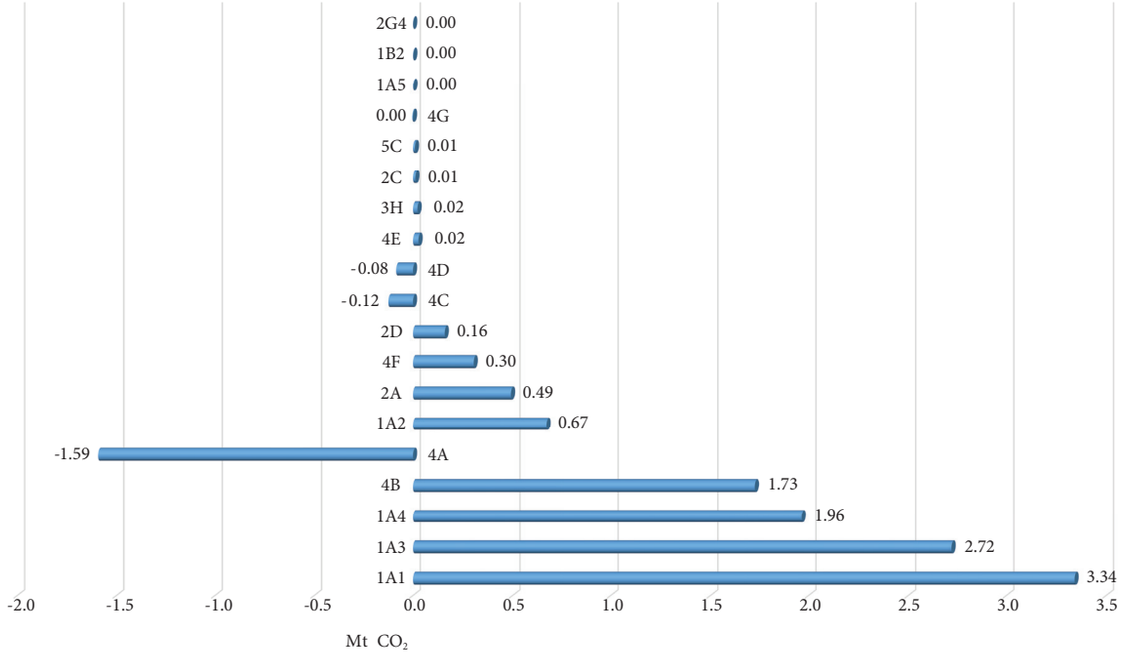


Figure 1-6: The share of source categories in total CO_2 emissions in 2022.

The source categories with the largest share in total methane emissions in 2022 were: 5A "Solid waste disposal" (49.3% of the total), 3A "Enteric fermentation" (18.1% of the total), 5D "Wastewater treatment and discharge" (10.8% of the total), 1B2 "Fugitive emissions from oil and natural gas" (10.2% of the total), 1A4 "Other sectors" (8.5% of the total), 3B "Manure management" (2.0% of the total) and 1A3 "Transport" (0.6% of the total) (Fig. 1-7).

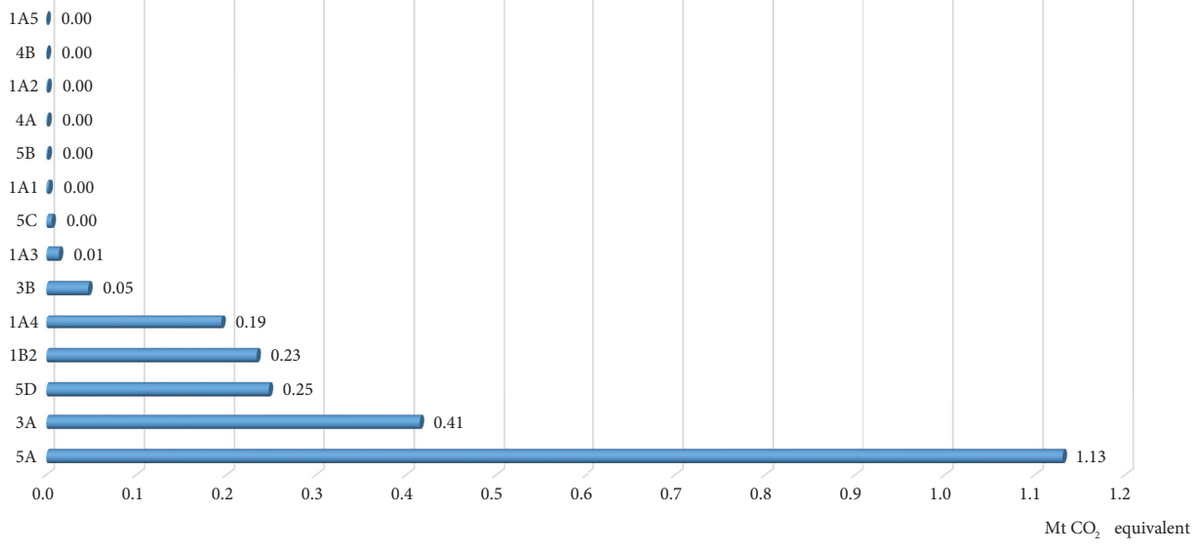


Figure 1-7: Share of source categories in total CH_4 emissions in 2022.

In 2022, the source categories with the largest share in the structure of total N_2O emissions were: 3D "Cropland" (62.3% of the total), 4E "Settlements" (13.5% of the total), 3B "Manure management" (11.4% of the total), 1A4 "Other sectors" (4.9% of the total), 5D "Wastewater treatment and discharge" (4.2% of the total) and 1A3 "Transport" (3.2% of the total) (Fig. 1-8).

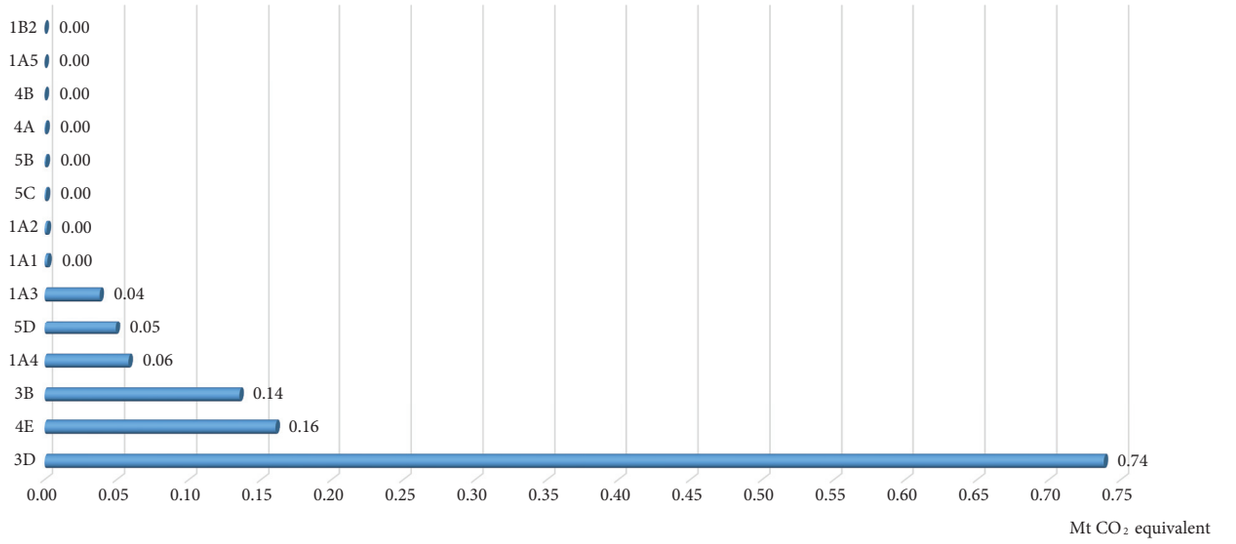


Figure 1-8: Share of source categories in total N_2O emissions in 2022.

1.13. Description of emission and removal trends by sector

The assessment of greenhouse gas emissions was carried out for five sectors: (1) "Energy", (2) "Industrial processes and product use", (3) "Agriculture", (4) "Land use, land use change and forestry' (LULUCF) and (5) 'Waste'. The interpretation of the GHG emission inventory results within the "LULUCF" sector is somewhat different from the others: positive numbers show that the sector is a net source of emissions, while negative numbers show that the sector is a net source of carbon removal.

Over the 1990-2022 period, total GHG emissions have shown a decreasing trend; thus, emissions from the "Energy" sector decreased by about 75.1%, those from the "Industrial processes and product use" sector - by about 43.9%, from the "Agriculture" sector - by 73.4%, from the "LULUCF" sector – by 125.1%, and those from the "Waste" sector - by 14.5% (Tab. 1-10).

Table 1-10: Dynamics of direct greenhouse gas emissions by sector during the 1990-2022 period, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Energy	37.09	31.35	24.50	18.32	15.45	12.47	12.46	11.18	9.71	7.70	7.02
2. Industrial processes and product use	1.61	1.41	0.82	0.74	0.56	0.46	0.42	0.45	0.38	0.34	0.32
3. Agriculture	5.10	4.73	4.36	3.84	3.58	3.22	2.92	2.63	2.55	2.34	2.18
4. LULUCF	-1.68	-2.74	-2.14	-2.16	-2.10	-2.06	-2.51	-2.15	-2.17	-1.88	-2.16
5. Waste	1.69	1.72	1.75	1.80	1.79	1.79	1.79	1.78	1.76	1.74	1.71
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
1. Energy	7.65	7.44	8.13	8.64	8.94	8.07	8.25	8.54	8.96	9.57	9.88
2. Industrial processes and product use	0.32	0.37	0.40	0.47	0.57	0.68	0.93	1.02	0.52	0.55	0.65
3. Agriculture	2.26	2.33	2.10	2.08	2.07	2.03	1.65	1.71	1.74	1.80	1.73
4. LULUCF	-1.80	-1.89	-1.82	-1.99	-1.70	-1.82	-2.02	-1.71	-1.32	-1.26	-1.20
5. Waste	1.68	1.66	1.63	1.61	1.61	1.59	1.56	1.56	1.56	1.56	1.55
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1. Energy	9.55	9.12	9.13	9.32	9.48	9.16	9.64	9.45	9.47	10.46	9.25
2. Industrial processes and product use	0.67	0.72	0.75	0.75	0.73	0.75	0.93	0.95	0.97	1.00	0.90
3. Agriculture	1.64	1.76	1.94	1.66	1.74	1.83	1.81	1.71	1.48	1.68	1.36
4. LULUCF	-1.22	-1.09	-0.75	-1.20	-0.96	-1.01	-0.86	0.00	-0.02	0.05	0.42
5. Waste	1.54	1.47	1.45	1.44	1.45	1.53	1.52	1.50	1.48	1.47	1.45

The "Energy" sector is the most important source of net direct greenhouse gas emissions, its share varying during the 1990-2022 period between 84.7% and 69.2%. Other relevant sources of direct greenhouse gas emissions are represented by the sectors "Agriculture", "Waste" and "IPPU" (Fig. 1-9).

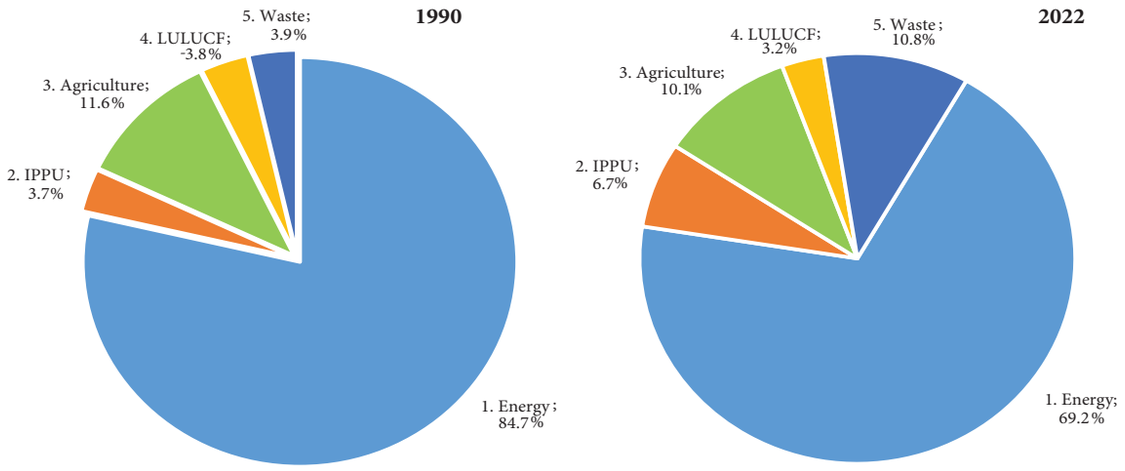


Figure 1-9: Sectoral breakdown in the structure of net national GHG emissions in the Republic of Moldova in 1990 and 2022.

During the entire study period, except for 2021 and 2022, the "LULUCF" sector was a net source of carbon removal. Along with the reduction of direct greenhouse gas emissions at national level, the relevance of this sector in the structure of net greenhouse gas emissions at national level showed a similar trend: in 1990, about 3.8% of net GHG emissions were removed at the national level, while in 2022 this sector contributed about 3.2% of net GHG emissions at national level.

1.13.1. Sector 1 "Energy"

In the Republic of Moldova, sector 1 "Energy" is the most important source of greenhouse gas emissions. The sector includes emissions from stationary and mobile fuel combustion for energy production (97.5% of total emissions per sector, in 2022), as well as fugitive emissions from production, processing, transport, storage, delivery and distribution of crude oil and natural gas (2.5% of total emissions per sector, in 2022) (Fig. 1-10, Tab. 1-11).

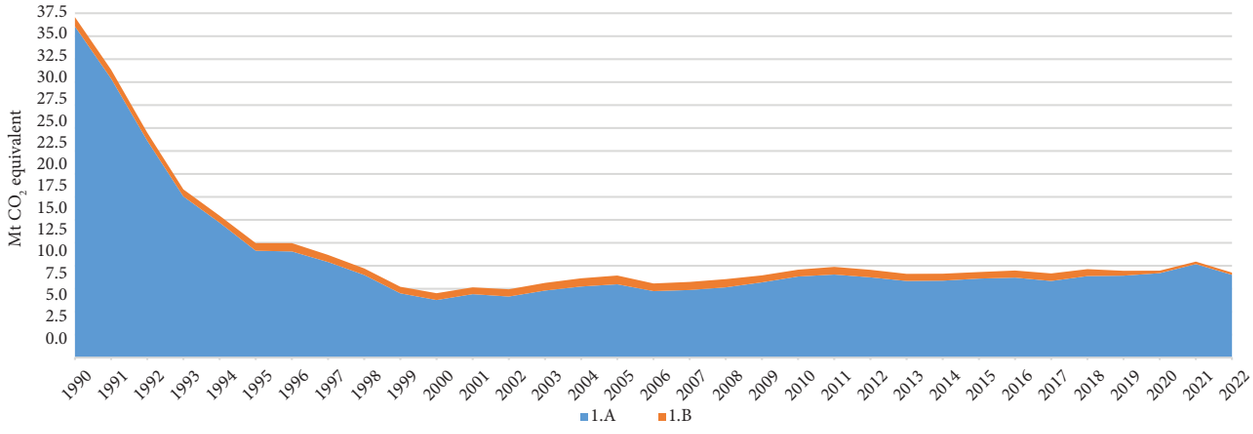


Figure 1-10: Dynamics of total GHG emissions generated within sector 1 "Energy", 1990-2022.

Together, these emissions, in 2022, accounted for 69.2% of the national net direct GHG emissions. Over the 1990-2022 period, total direct GHG emissions from the "Energy" sector decreased by about 75.1%: from 37.09 Mt CO_2 equivalent in 1990 to 9.25 Mt CO_2 equivalent in 2022.

Table 1-11: Direct GHG emissions from sector 1, "Energy", for the 1990-2022 period, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2021	2022
1. Energy	**37.09**	**12.47**	**7.02**	**8.94**	**9.57**	**9.32**	**9.47**	**10.46**	**9.25**
1A. Fuel combustion	**36.07**	**11.64**	**6.27**	**7.98**	**8.83**	**8.60**	**9.19**	**10.18**	**9.01**
1A.1. Energy industries	21.36	7.19	3.16	3.23	4.05	3.69	3.64	3.94	3.35
1A.2. Manufacturing industries and construction	1.90	0.38	0.52	0.58	0.52	0.65	0.69	0.76	0.67

	1990	1995	2000	2005	2010	2015	2020	2021	2022
1A.3. Transport	4.83	1.66	1.00	1.86	2.19	2.31	2.51	2.78	2.78
1A.4. Other sectors	7.86	2.28	1.55	2.29	2.05	1.95	2.35	2.71	2.22
1A.5. Other	0.12	0.13	0.04	0.03	0.03	0.00	0.00	0.00	0.00
1B. Fugitive emissions from fuels	**1.02**	**0.83**	**0.74**	**0.95**	**0.74**	**0.72**	**0.27**	**0.28**	**0.23**
1B.1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO
1B.2. Oil and natural gas	1.02	0.83	0.74	0.95	0.74	0.72	0.27	0.28	0.23
1C. CO_2 transport and storage	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Abbreviations: NO – Not Occurring.

Within sector 1 "Energy", the most important source category is 1A1 "Energy industries", with a share of about 36.2% of the total per sector for 2022 (57.6% in 1990). Other relevant sources are source category 1A3 "Transport" with a share of 30.0% of the total by sector (13.0% in 1990), source category 1A4 "Other sectors" with a share of about 24.0% of the total (21.2% in 1990) and source category 1A2 "Manufacturing industries and construction" with a share of about 7.3% of the total (5.1% in 1990) (Fig. 1-11).

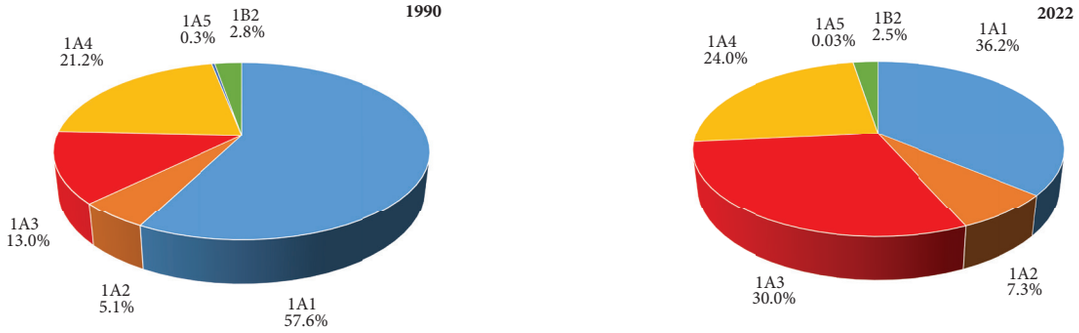


Figure 1-11: Share of different source categories in the structure of total direct GHG emissions within sector 1 "Energy" in 1990 and 2022.

1.13.2. Sector 2 „Industrial processes and product use"

Sector 2 "Industrial processes and product use" is a relevant source of GHG emissions and covers emissions generated by non-energy industrial activities. In 2022, this sector accounted for about 6.7% of total national GHG emissions (3.7% in 1990). Over the 1990-2022 period, total GHG emissions from the sector decreased by about 43.9%: from 1.61 Mt CO_2 equivalent in 1990 to 0.90 Mt CO_2 equivalent in 2022 (Tab. 1-11).

Between 2008 and 2009, the respective emissions decreased by 48% following the economic crisis that significantly affected the industrial sector of the Republic of Moldova. Afterwards, over the 2010-2022 period, direct GHG emissions from the sector showed a slight upward trend, especially as a result of increased production of cement, lime, glass, steel, as well as due to increased halocarbons consumption. Between 2021 and 2022, total GHG emissions from the sector decreased by 9.7% (Fig. 1-12).

Table 1-11: Direct GHG emissions from sector 2, "Industrial processes and product use", over the 1990-2022 period, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2021	2022
2. Industrial processes and product use	**1.61**	**0.46**	**0.32**	**0.57**	**0.55**	**0.75**	**0.97**	**1.00**	**0.90**
A. Mineral industry	1.34	0.35	0.24	0.44	0.41	0.51	0.54	0.58	0.49
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	0.03	0.03	0.04	0.04	0.01	0.02	0.02	0.02	0.01
D. Non energy products from fuels and solvent use	0.23	0.08	0.03	0.07	0.07	0.08	0.20	0.18	0.16
E. Electronic industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Product use as substitutes for ODS	NO	0.00	0.00	0.02	0.07	0.14	0.21	0.21	0.23
G. Other product manufacture and use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA

Abbreviations: NA – Not Applicable; NO – Not Occurring.

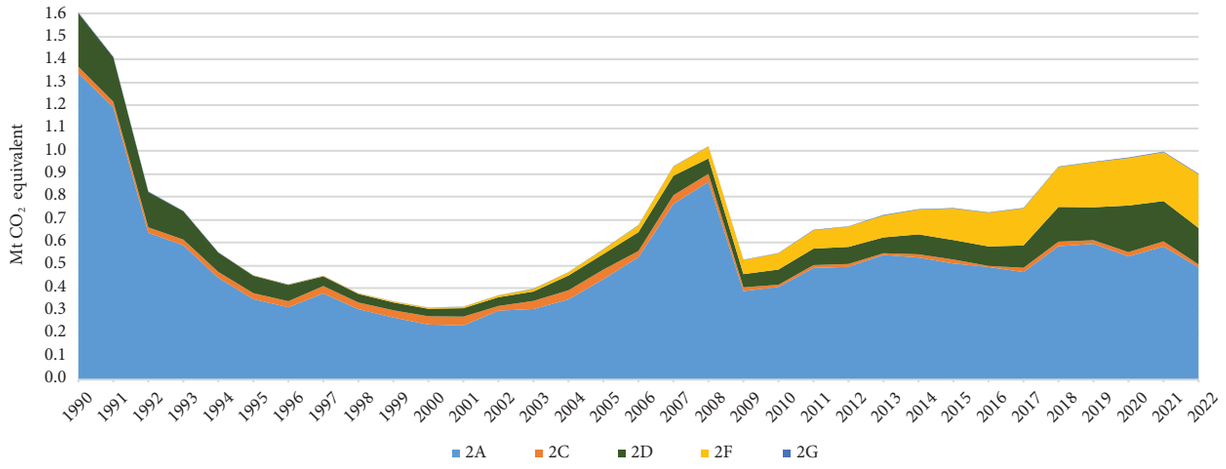


Figure 1-12: Dynamics of total GHG emissions generated within sector 2 "IPPU" over the 1990-2022 period.

Within sector 2 "Industrial processes and product use", the most important source category is 2A1 "Cement production", with a share of about 45.4% of the total per sector for 2022 (60.5% in 1990). Other relevant source categories in 2022 were represented by 2D3 "Solvent use" with a share of 16.7% of the total (12.7% in 1990), 2F1 "Refrigerating and air conditioning equipment" with a share of about 17.3% of the total , 2F2 "Foam Blowing Agents" with a share of 8.3% of the total, 2A3 "Glass production" with a share of 4.1% of the total (1.7% in 1990), 2A2 "Lime production" with a share of 3.1% of the total (16.5 % in 1990), 2C1 "Iron and steel" with a share of 1.4% of the total (1.8% in 1990) and 2A4 "Other process uses of carbonates" with a share of 2.0% of the total (4.7% in 1990) (Fig. 1-13).

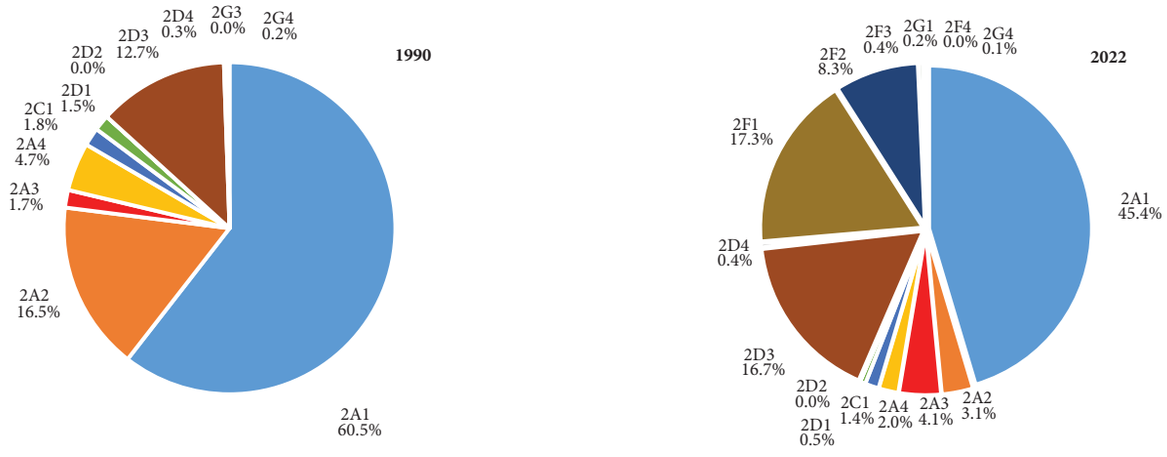


Figure 1-13: Share of different source categories in the structure of total GHG emissions within sector 2 "IPPU" for 1990 and 2022.

1.13.3. Sector 3 „Agriculture"

Sector 3 'Agriculture' is an important contributor of direct GHG emissions: CH_4 emissions from 'Enteric fermentation' (category 3A) and 'Manure management' (category 3B), N_2O emissions from 'Manure management' (category 3B) and 'Agricultural soils' (category 3D), and CO_2 emissions from 'Urea application' (category 3H), respectively. In the RoM there are no emissions recorded from source categories 3C 'Rice cultivation', 3E 'Prescribed burning of savannas', 3G 'Liming', 3I 'Other carbon-containing fertilizers' and 3J 'Other'. As for the emissions from 3F 'Field burning of agricultural residues', these are monitored in the LULUCF sector, under category 4B 'Cropland'.

In 2022, the agriculture sector had a share of about 10.1% of total national direct GHG emissions (11.6% in 1990). Over the period 1990-2022, total direct GHG emissions from the respective sector decreased by circa 73.4%: from 5.10 Mt CO_2 equivalent in 1990 to 1.36 Mt CO_2 equivalent in 2022 (Table 1-11, Figure 1-14), mainly due to the decrease in such indicators as: livestock and poultry populations, the amount of synthetic

nitrogen and organic fertilizers applied to soils, the amount of agricultural crop residues returned to soils and the increase in carbon losses from mineral soils and changes of tillage practices.

Table 1-11: Direct GHG emissions from sector 3 'Agriculture' over the 1990-2022 period, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2021	2022
3. Agriculture	**5.10**	**3.22**	**2.18**	**2.07**	**1.80**	**1.66**	**1.48**	**1.68**	**1.36**
A. Enteric Fermentation	2.45	1.81	1.22	1.03	0.80	0.69	0.43	0.43	0.41
B. Manure Management	1.32	0.69	0.40	0.39	0.36	0.29	0.20	0.19	0.18
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	1.32	0.72	0.56	0.64	0.64	0.66	0.80	1.04	0.74
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	IE	IE	IE	IE	IE	IE	IE	IE	IE
G. Liming	NO	NO	NO	NO	NO	NO	NO	NO	NO
H. Urea Application	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.02	0.02
I. Other Carbon-Containing Fertilizers	NO	NO	NO	NO	NO	NO	NO	NO	NO
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO

Abbreviations: IE – Included Elsewhere; NO – Not Occurring.

Between 2021 and 2022, direct greenhouse gas emissions from sector 3 'Agriculture' decreased by about 19.2% (Fig. 1-14), mainly as a result of unfavorable agrometeorological conditions caused by a drought which affected the Republic of Moldova, the reduction of livestock numbers and the amounts of nitrogenous chemical fertilizers applied to the soil.

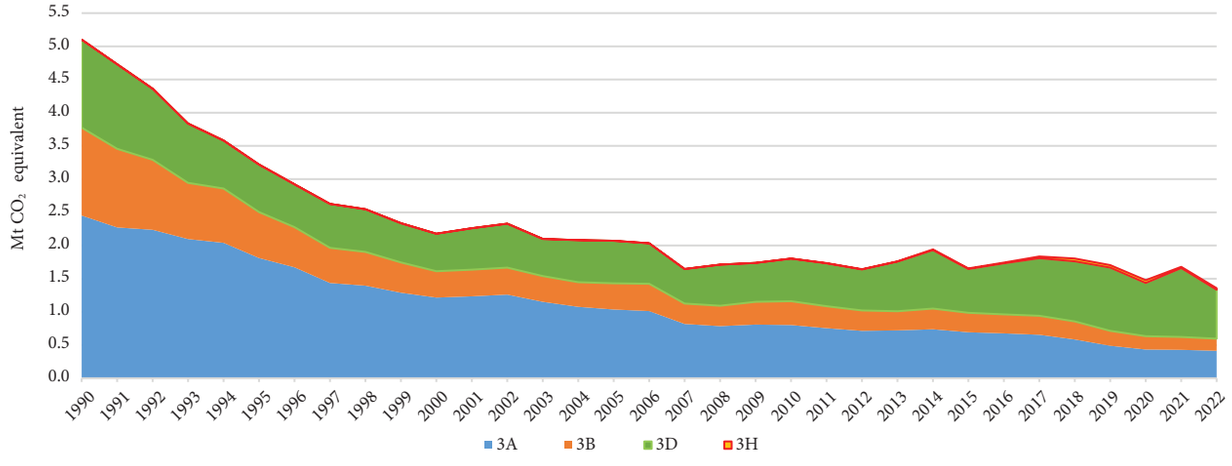


Figure 1-14: Dynamics of total direct GHG emissions generated from sector 3 'Agriculture', 1990-2022.

In 2022, the most important source category was 3D 'Agricultural soils', with a share of about 54.4% of the total from this sector (26.0% in 1990). Other relevant source categories are 3A 'Enteric fermentation' – with a share of 30.6% of the total (48.1% in 1990), and 3B 'Manure management' – with a share of about 13.4% of the total (26.0% in 1990) (Figure 1-15). The share of category 3H 'Urea application' is currently insignificant at sectoral level, however, it shows a continuous upward trend.

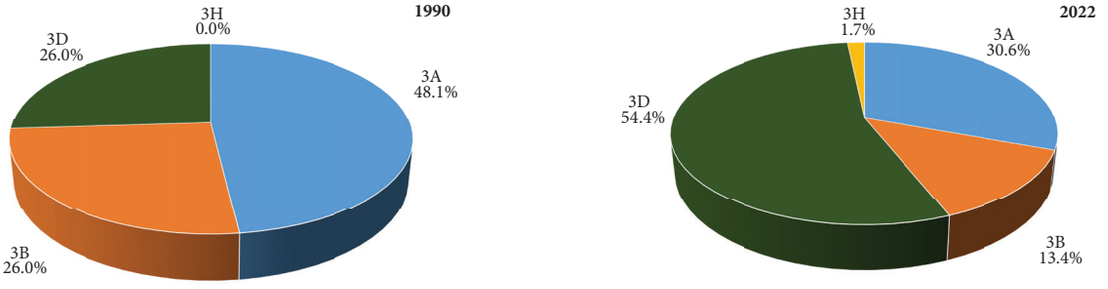


Figure 1-15: Share of different source categories in the structure of total GHG emissions in sector 3 'Agriculture' in 1990 and 2022.

1.13.4. Sector 4 „Land use, land use change and forestry"

Except for the years 2021 and 2022, during the 1990-2022 period, sector 4 "Land use, land use change and forestry" (LULUCF) represented a source of net carbon removal in the Republic of Moldova. In 2021, this sector became a net source of emissions at national level.

Over the 1990-2022 period, the dynamics of net CO_2 removals/emissions recorded a decreasing trend, reducing by about 125.1%, from -1.68 Mt CO_2 equivalent in 1990, to +0.42 Mt CO_2 equivalent in 2022 (Tab. 1-12, Fig. 1-16).

Table 1-12: Net emissions and removals within sector 4 "LULUCF" during 1990-2022 period, Mt CO_2 equivalent

Source categories	1990	1995	2000	2005	2010	2015	2020	2021	2022
4. LULUCF	**-1.68**	**-2.06**	**-2.16**	**-1.70**	**-1.26**	**-1.20**	**-0.02**	**0.05**	**0.42**
A. Forest land	-2.56	-2.05	-2.31	-2.41	-2.48	-2.16	-1.89	-1.92	-1.59
B. Cropland	2.38	1.32	1.22	1.27	1.27	1.11	1.63	1.71	1.73
C. Grassland	-1.21	-1.60	-1.29	-1.06	-0.69	-0.42	-0.22	-0.14	-0.12
D. Wetlands	-0.56	-0.47	-0.33	-0.19	-0.05	-0.08	-0.08	-0.08	-0.08
E. Settlements	0.24	0.33	0.36	0.31	0.28	0.21	0.18	0.18	0.19
F. Other land	0.15	0.40	0.18	0.42	0.44	0.09	0.33	0.29	0.30
G. Harvested wood products	-0.12	0.01	0.01	-0.04	-0.02	0.05	0.03	0.01	0.00
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO

Abbreviations: NE – Not Estimated; NO – Not Occurring

This is mainly due to the change in the use and management practices of cropland (category 4B), the consequence being a considerable decrease of organic carbon deposits in the soils included in the agricultural circuit[35], thus changing the humus balance from a positive one to a negative one and /or to a deeply negative one. The process was also influenced by some changes in the management and use of forests (category 4A), such as an increase in the volume of authorized wood harvesting, substantial increase in the volume of illegal cutting, enhancing of the process of conversion of cropland to forest land, etc.

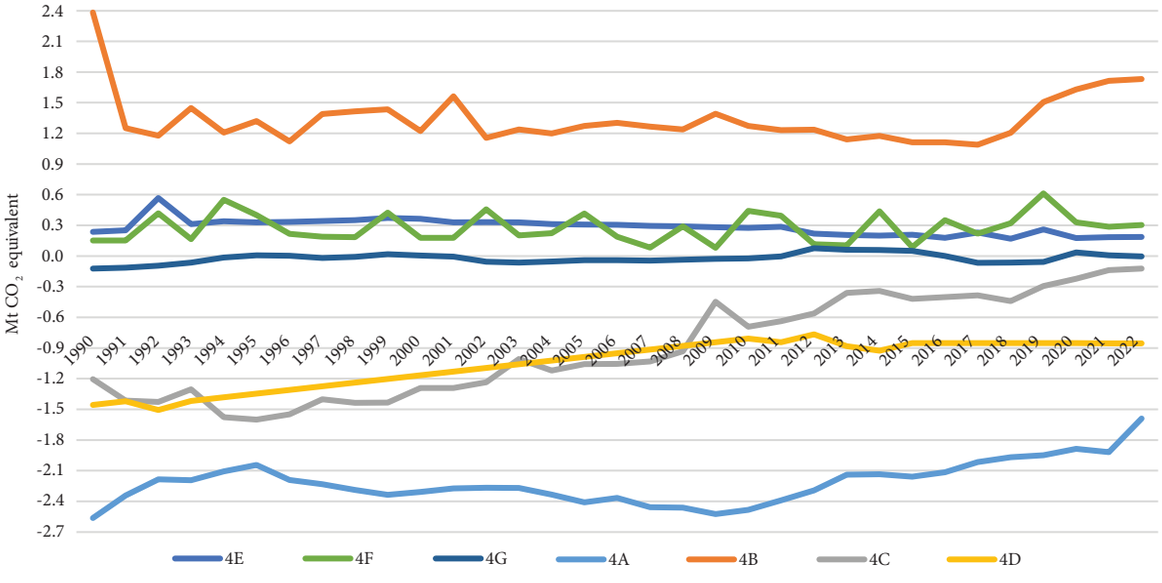


Figure 1-16: Evolution of direct GHG removals/emissions by subcategory within sector 4, "LULUCF" over the 1990-2022 period.

In 2022, the main source of CO_2 emissions removal within sector 4 "LULUCF" was source category 4A "Forest land" (forest vegetation - forests, protective forest belts, etc.) with a share of 39.5 percent of the total (35.5 percent in 1990), followed by category 4C "Grassland" with a share of about 3.1 percent (16.7 percent in 1990) and category 4D "Wetlands" with a share of about 2.1 percent (7.7 percent in 1990). Category 4B "Cropland" is a net source of emissions within sector 4 "LULUCF", accounting for 43.0 percent (33.0 percent in 1990),

[35] Carbon of organic origin and nitrogen in the soil are closely dependent on the humus content of the soil; losses of carbon through the process of oxidation as a result of changes in agricultural land use and soil management practices are accompanied by simultaneous mineralization (biochemical decomposition) of nitrogen.

followed by category 4F "Other land", which accounts for about 7.6 percent (2.1 percent in 1990) and category 4E "Settlements", which accounts for about 4.7 percent (3.3 percent in 1990), (Fig. 1-17).

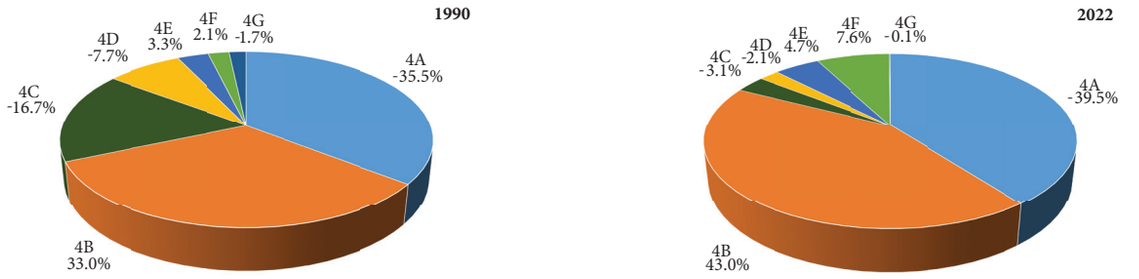


Figure 1-17: Share of different source categories and removals in the structure of net CO_2 emissions within sector 4 "LULUCF" in 1990 and 2022.

1.13.5. Sector 5 „Waste"

Sector 5 'Waste' is an important source of national GHG emissions: CO_2 emissions from 5C 'Incineration and open burning of waste', methane emissions from 5A 'Solid waste disposal', 5B 'Biological treatment of solid waste', 5C 'Incineration and open burning of waste' and 5D 'Wastewater treatment and discharge', respectively N_2O emissions from 5B 'Biological treatment of solid waste', 5C 'Incineration and open burning of waste' and 5D 'Wastewater treatment and discharge'. There are no emissions recorded from category 5E 'Other'.

In 2022, waste sector had a share of about 10.8% of the total national direct GHG emissions (3.9% in 1990). In the period 1990-2022, total direct GHG emissions from this sector decreased by about 14.5%: from 1.69 Mt CO_2 equivalent in 1990 to 1.45 Mt CO_2 equivalent in 2022 (Table 1-13). Between 2021 and 2022, direct GHG emissions generated by waste sector decreased by about 1.8%.

Table 1-13: Direct GHG emissions from sector 5 "Waste" over the 1990-2022 period, Mt CO_2 equivalent

Source categories	1990	1995	2000	2005	2010	2015	2020	2021	2022
5. Waste	**1.69**	**1.79**	**1.71**	**1.61**	**1.56**	**1.44**	**1.48**	**1.47**	**1.45**
A. Solid Waste Disposal	1.23	1.39	1.32	1.20	1.20	1.10	1.16	1.14	1.13
B. Biological Treatment of Solid Waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Incineration and Open Burning of Waste	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02
D. Wastewater Treatment and Discharge	0.43	0.38	0.36	0.39	0.34	0.32	0.30	0.31	0.30
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO

Abbreviations: NE –Not Estimated; NO – Not Occurring.

The decreasing trend of total direct GHG emissions from Sector 5 'Waste', could be explained by the economic decline recorded in the Republic of Moldova during the transition to the market economy, by a significant drop in the population number, well-being of the population, and by the capacity to generate household waste, respectively (Figure 1-18).

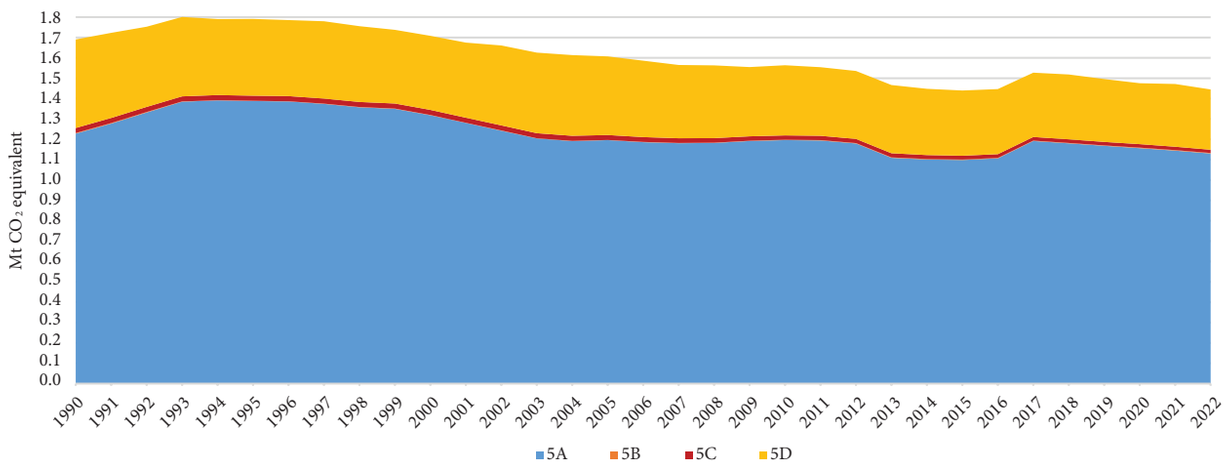


Figure 1-18: Dynamics of total direct GHG emissions within sector 5 "Waste" over 1990-2022.

In 2022, the most important source category in this sector was category 5A 'Solid waste disposal', with a share of circa 78.2% of the total sectoral emissions (72.7% in 1990), followed by category 5D 'Wastewater treatment and discharge' – with a share of circa 20.5% of the total (25.7% in 1990), and category 5C 'Incineration and open burning of waste', respectively – with a share of circa 1.1% of the total (1.5% in 1990) (Fig. 1-19).

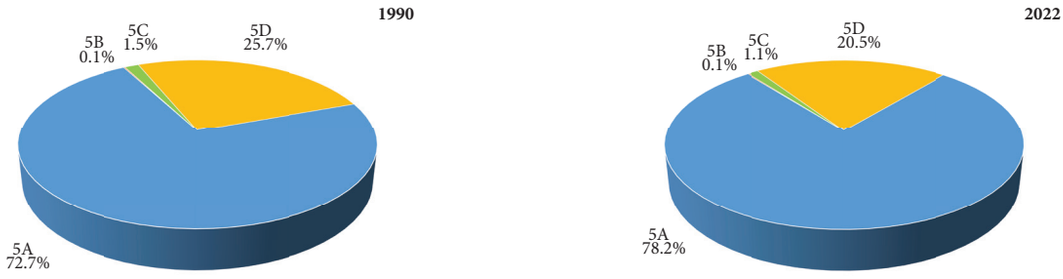


Figure 1-19: Share of different source categories in the structure of total direct GHG emissions within sector 5 "Waste" in 1990 and 2022.

1.14. Trends in indirect greenhouse gas emissions

Though not considered greenhouse gases, photochemically active gases such as carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOC) contribute indirectly to the greenhouse effect in the atmosphere. These gases are considered as ozone precursors, influencing the formation and destruction of the ozone in the atmosphere. They are mainly emitted from exhaust fumes in transportation, fossil fuel combustion in stationary sources, solvent use and other household products, etc. Thus, the national GHG inventory of the Republic of Moldova includes emissions of the following ozone and aerosol precursors: NO_x, CO, NMVOC and SO_2.

Over the period 1990-2022, total nitrogen oxide emissions had decreased by circa 72.7%: from 95.63 kt in 1990 to 26.12 kt in 2022, total carbon monoxide emissions had decreased by circa 57.0%: from 278.81 kt in 1990, to 119.88 kt in 2022, total NMVOC emissions had decreased by circa 35.3%: from 141.54 kt in 1990 to 91.56 kt in 2022, and sulphur dioxide emissions had decreased by circa 96.7%: from 150.86 kt in 1990 to 4.96 kt in 2022 (Tab. 1-14).

Table 1-14: Evolution of total indirect GHG (NO_x, CO and NMVOC) and SO_2 emissions (without LULUCF) in the RoM between 1990-2022, kt

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
NO_x	95.63	78.54	58.60	46.57	36.79	31.01	29.12	26.07	21.87	16.05	14.86
CO	278.81	203.73	130.67	66.77	74.00	63.41	76.60	70.43	54.26	42.25	39.97
NMVOCs	141.54	114.31	90.34	71.40	52.56	48.15	46.45	31.76	27.72	23.39	22.90
SO_2	150.86	124.99	92.19	72.68	57.58	32.01	32.16	16.90	12.65	5.99	4.61
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
NO_x	15.94	16.99	17.96	19.27	20.00	18.99	19.92	20.75	19.38	21.32	21.95
CO	38.90	45.37	55.17	52.20	54.35	54.82	49.46	52.08	50.32	52.72	55.41
NMVOCs	24.47	26.79	27.72	39.33	42.06	47.45	47.26	40.85	35.51	40.31	43.15
SO_2	4.09	4.98	6.51	5.63	5.33	5.48	4.16	5.75	5.32	5.46	5.59
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
NO_x	20.77	21.03	20.93	22.18	23.09	23.34	25.06	25.27	25.44	28.65	26.12
CO	54.08	54.80	82.02	86.48	89.76	112.30	161.70	145.93	140.68	142.94	119.88
NMVOCs	44.45	43.55	55.96	53.88	55.23	64.68	95.67	89.49	114.76	104.17	91.58
SO_2	5.67	13.26	5.22	4.87	4.08	4.95	4.34	5.05	4.16	6.73	4.96

In 2022, the source categories with the highest share in the structure of total nitrogen oxides emissions were: 1A3 'Transport' (41.4% of the total), 1A4 'Other sectors' (24.6% of the total), 1A1 'Energy industries' (20.6% of the total), 2A 'Mineral industry' (6.6% of the total), and 1A2 'Manufacturing industries and construction' (6.0% of the total) (Fig. 1-20).

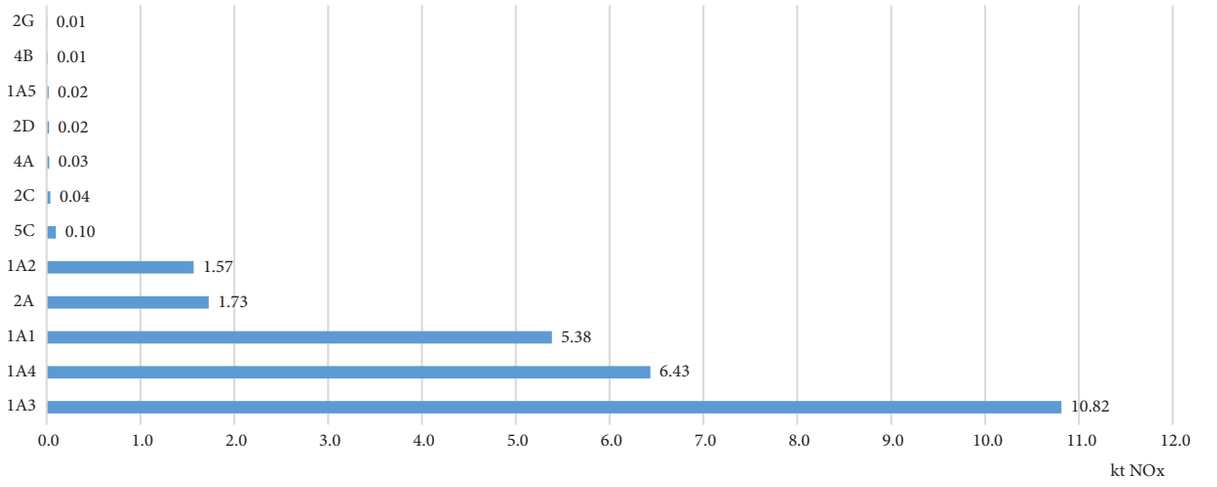


Figure 1-20: Total NO_x emissions by source category in 2022.

The source categories with the highest share in the structure of CO emissions in 2022 were: 1A4 'Other sectors' (76.0% of the total), 1A3 'Transport' (16.7% of the total), 1A1 'Energy industries' (2.0% of the total), 5C 'Incineration and open burning of waste' (1.4% of the total), 1A2 'Manufacturing industries and construction' (1.0% of the total), and 2A 'Mineral industry' (1.0% of the total) (Fig. 1-21).

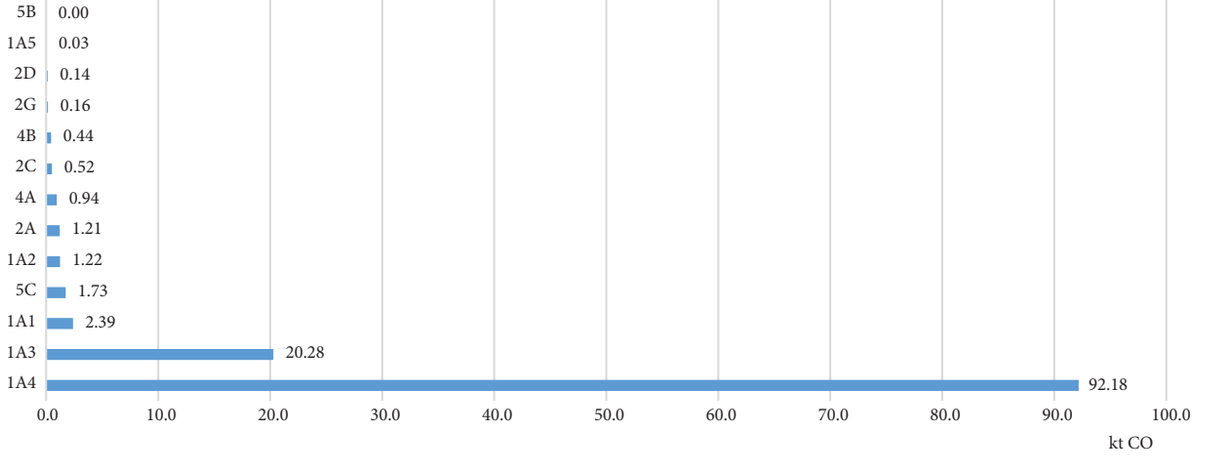


Figure 1-21: Total CO emissions by source category in 2022.

In 2022, the source categories with the highest share in the structure of non-methane volatile organic compounds emissions were: 2D 'Non-energy products from fuels and solvent use' (74.7% of the total), 1A4 'Other sectors; (15.1% of the total), 2H 'Other' (food and alcoholic beverages) (4.1% of the total), 1A3 'Transport' (2.9% of the total), and 5A 'Solid waste disposal' (1.6% of the total) (Fig. 1-22).

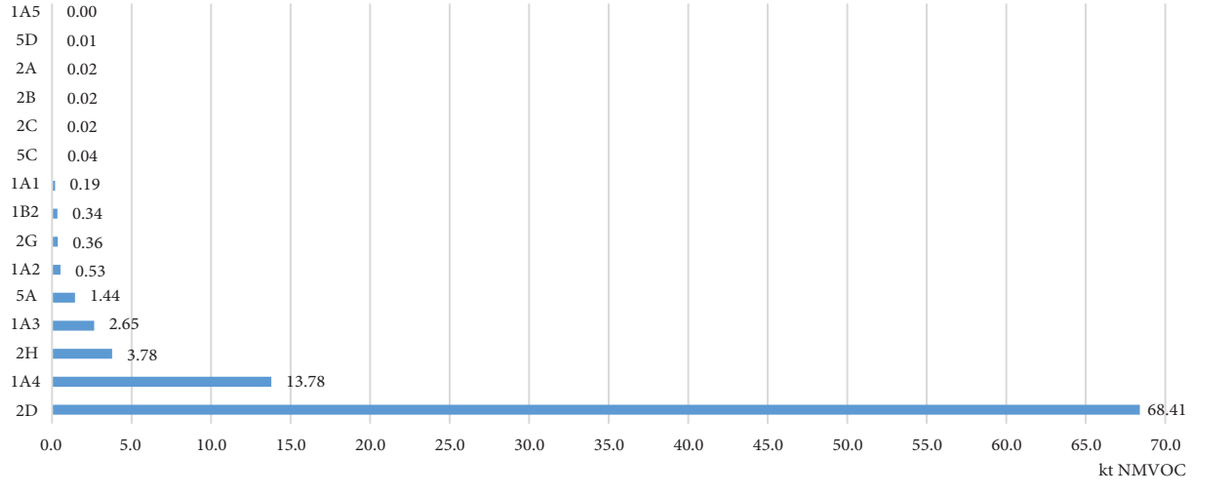


Figure 1-22: Total NMVOC emissions by source category in 2022.

The source categories with the highest share in the structure of sulphur dioxide emissions in 2022 were: 1A4 'Other sectors' (46.5% of the total), 1A1 'Energy Industries (27.8% of the total)', 2A 'Mineral industry' (15.6% of the total) and 1A2 'Manufacturing industries and construction' (9.3% of the total) (Fig. 1-23).

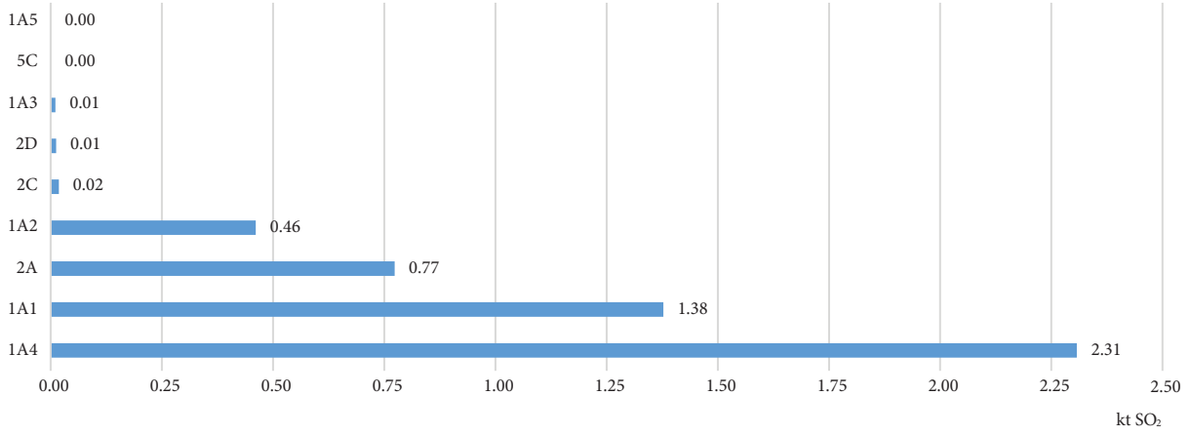


Figure 1-23: Total SO_2 emissions by source category in 2022.

CHAPTER 2. INFORMATION NECESSARY TO TRACK PROGRESS MADE IN IMPLEMENTING AND ACHIEVING THE NATIONALLY DETERMINED CONTRIBUTION UNDER ARTICLE 4 OF THE PARIS AGREEMENT

2.1. National circumstances and institutional arrangements

2.1.1. Government structure and institutions

The Republic of Moldova declared its independence on August 27, 1991, although it continued to be part of the Soviet Union until the official dissolution of the USSR in December 1991. The new Constitution was adopted by the Parliament on July 28, 1994. According to the Constitution, Moldova is a neutral country. The Constitution guarantees the right to vote to all citizens over the age of 18 and provides for various civil rights and freedoms.

The President is the head of the state and is directly elected for a term of four years (they may hold this office for a maximum of two consecutive terms). The President may dissolve the Parliament. The Constitution stipulates that the President may be charged with criminal or constitutional offenses. The President appoints the Prime Minister and, on their recommendation, the Cabinet of Ministers. The Prime Minister and the Cabinet of Ministers must be endorsed by the Parliament. The current government was sworn in on August 6, 2021.

The structure of the Executive consists of 14 ministries, including:

1. Ministry of Infrastructure and Regional Development;
2. Ministry for Foreign Affairs;
3. Ministry of Justice;
4. Ministry of Finance;
5. Ministry of Economic Development and Digitalization;
6. Ministry of Agriculture and Food Industry;
7. Ministry of Defense;
8. Ministry of Internal Affairs;
9. Ministry of Education and Research;
10. Ministry of Culture;
11. Ministry of Health;
12. Ministry of Labor and Social Protection;
13. Ministry of Environment;
14. Ministry of Energy.

The supreme legislative body is the unicameral Parliament. It is composed of 101 deputies directly elected for a term of four years. The Parliament meets in two ordinary sessions per year, but may also convene extraordinary sessions. In addition to passing laws and performing other basic legislative functions, the Parliament may declare a state of emergency or state of war, as well as impose martial law.

The judicial system includes: the Supreme Court of Justice, the Courts of Appeal (Chisinau, Balti, Cahul and Comrat) and the district and sector courts of the municipality of Chisinau[36].

[36] Parliament of the Republic of Moldova, Law no. 514 of 06-07-1995 on Judicial Organization, Published on 19-10-1995 in the Official Gazette no. 58, art. 641. 302/2004 amended by Law no. 103 of 24-08-2022 on amend-

In Moldova, the Constitutional Court – the supreme authority for constitutional issues whose decisions cannot be appealed, does not belong to the judiciary, but represents an independent entity of power in the state, entitled with constitutional review of the normative acts issued by the Parliament, the Government and the President of the country. Courts and tribunals exercise justice at the local level.

The President appoints the judges of the Supreme Court of Justice and the Court of Appeal on the recommendation of the Superior Council of Magistracy.

The Superior Council of Magistracy consists of 12 members[37]. It comprises judges and titular professors of law, as well as the Chairman of the Supreme Court of Justice, the Minister of Justice and the Prosecutor General, who are lawful members. Three members of the Superior Council of Magistracy from among the titular professors of law are appointed by the Parliament, with the vote of the majority of the elected deputies, based on the proposals of the Parliament's Legal, Appointments and Immunities Committee. Six members of the Superior Council of Magistracy from among the judges are elected by secret vote by the General Assembly of Judges, as follows: four – from the courts, one – from the courts of appeal and one – from the Supreme Court of Justice. The specialized bodies within the Superior Council of Magistracy are: the Judges Selection and Career Collegium, the Judges' Performance Evaluation Collegium, the Disciplinary Collegium and the Judicial Inspection.

2.1.2. Institutional arrangements

On behalf of the Government, the Ministry of Environment (MoEnv) is responsible for the implementation of international environmental treaties to which the Moldova is a Party (including the UNFCCC). MoEnv representatives also hold the function of UNFCCC Focal Point. The Public Institution "Environmental Projects Implementation Unit" (P.I. "EPIU")[38], reorganized in 2022 in the Public Institution "Environmental Projects National Implementation Office" (P.I. "EPNIO"), has full responsibility for the activities associated with the preparation of national communications, biennial transparency reports, national inventory reports and national GHG inventories.

The *National Commission on Climate Change* was established in the Republic of Moldova by the Government Decision no. 425 of 12.06.2024[39].

The Commission is an interinstitutional body at Government level, without legal personality, entitled with coordinating climate change policies, public capital investment projects in the context of climate change mitigation and adaptation and natural disaster risk management. Actions in the field of climate change also include the management of climate-related risks and natural disasters.

The Commission's main goals are as follows:

1. promoting dialogue, cooperation, coordination and coherence between sectors of the economy in the process of planning, developing, coordinating, implementing and monitoring climate change policies and actions;
2. stimulating the integration of climate change measures in socio-economic development policy documents at national and sectoral level and facilitating the implementation of climate actions;
3. participating in the coordination and monitoring of the allocation of national and international financial resources for the implementation of climate action in different sectors, including by informing about climate change needs;
4. ensuring transparency in the delivery of climate change policy documents and actions.

The composition of the Commission is as follows: Minister of Environment, Minister of Finance, Minister of Energy, Minister of Infrastructure and Regional Development, Minister of Agriculture and Food Industry, Minister of Health, Minister of Labor and Social Protection, Minister of Education and Research, Minister of Internal Affairs, under the aegis of the Prime Minister.

ment of some normative acts. Published on September 17, 2021 in the Official Gazette no. 219-225, Article 240.

[37] Parliament of the Republic of Moldova, Law no. 947 of July 19, 1996 on the Superior Council of Magistracy, published on January 22, 2013 in the Official Gazette no. 17, art. 65302/2004 amended by Law no. 26 of 10-03-2022 on some measures related to the selection of candidates for membership in the self-administration bodies of judges and prosecutors. Published on March 16, 2022 in the Official Gazette no. 72, Article 103.

[38] <https://www.legis.md/cautare/getResults?doc_id=113696&lang=ro>

[39] Government Decision no. 425 of June 12, 2024 on the organization and functioning of the National Commission on Climate Change. Published: 20-06-2024 in the Official Gazette no. 260-263 Art. 531.

The Commission shall have the following tasks:

1. coordinates the process of developing climate change mitigation and adaptation policies and general management of risk caused by natural disasters;
2. coordinates the streamlining of climate change mitigation and adaptation aspects into national and sectoral policy documents;
3. ensures the correlation of sectoral commitments on climate change to contribute to the achievement of internationally committed national goals;
4. plans and facilitates the budgeting of climate change actions and natural disaster risks reduction at national and local level, by adopting the climate tagging of the budget or any other accounting framework;
5. approves methodologies, operational manuals, guidelines on climate change adaptation and mitigation and criteria for investment projects' climate compliance;
6. ensures information sharing in the climate risk assessment process;
7. participates in coordinating the financing of projects and investment programs by development partners and international funds, in accordance with climate priorities, but does not substitute the powers and competences of the Ministry of Finance for this purpose;
8. requests central government authorities to ensure the promotion of appropriate climate change mitigation and adaptation measures at national, sectoral and local levels;
9. presents proposals to improve government policies on climate change in line with UNFCCC decisions and commitments under the Association Agreement between the Republic of Moldova and the European Union.

The National Commission has the following working bodies:

1. the Executive Office, represented by Ministers;
2. the Secretariat, represented by the Climate Change Policy Division of the MoEnv;
3. Sectoral working groups.

In its work, the Commission is supported by sectoral working groups, created by representatives of the relevant entities, at the level of Head of Directorate within the Authority, who have sectoral technical knowledge, being also familiar with the impact of climate change on the respective sectors, as well as representatives of the associative sector and academia.

The sectoral working groups are in the field of agriculture; water resources; forestry; health; energy; transport; industry; waste; respectively in the field of natural disaster risk management.

The sectoral working groups ensure the execution of Commission decisions at sector level and have the following tasks:

1. participate in the development of policy documents, project proposals, guidelines and methodologies on climate change related to the representative sectors;
2. review and endorse progress reports on climate change mitigation and adaptation in the sector;
3. examine and approve methodologies, operations manuals, guidelines on climate change adaptation and climate change mitigation, and climate compliance criteria for investment projects;
4. prepare proposals and recommendations to be included in relevant strategies and programs to prevent and overcome the negative effects related to climate change;
5. provide technical advice to the Commission and the Secretariat of the Commission and ensure integration of the latest scientific achievements on climate change into national and local socio-economic development planning;
6. interacts with a wide range of stakeholders to raise awareness about climate change and its impacts, to share evidence and opinions on international climate change policies and initiatives;
7. identify knowledge gaps and submits proposals that could be addressed by national or international research programmes and specific evaluation needs that could be addressed through current assessments.

Each sectoral working group is chaired by the Secretary of State of the branch ministry and is co-chaired by the Secretary of State of the Ministry of Environment responsible for climate change. The nominal composition of the sectoral working groups is approved by Commission's decision.

In accordance with the Government Decision no. 549 as of 13.06.2018 on the establishment, organization and functioning of the Environmental Agency[40], it was assigned the following tasks in the field of protection of atmospheric air and climate change: implementation of the provisions of policy documents and international environmental treaties to which Moldova is a party in the field of quality and protection of atmospheric air and ozone layer, reduction of greenhouse gas emissions and adaptation to climate change, preparation and presentation to the Ministry of Environment of information on their achievement; participation in the work of the *National Commission for Climate Change*; ensuring the implementation of the *GHG emissions monitoring, reporting and verification system*; carrying out the *process of collection, centralization, validation and processing of data and information necessary for preparation of inventories and reports of emissions of atmospheric pollutants and greenhouse gases*; providing technical support to the Ministry of Environment for the development of *national communications and biennial transparency reports, according to the provisions of the UNFCCC*.

At the same time, in accordance with the Government Decision no. 1277 as of 26.12.2018 on the establishment and operation of the National Monitoring and Reporting System (NMRS) on greenhouse gas emissions and other climate change related information, the Environmental Agency was designated as the *competent authority* responsible for ensuring the functioning of the NMRS on greenhouse gas emissions and other climate change related information, provided that the NMRS is operated on the account and within the limits of the means approved in the state budget for the institutions that make part of the system, as well as from other sources provided by the legislation, including from external funding (*activities carried out on the basis of technical assistance and capacity building projects*).

In the above context, it is important to mention that, in accordance with Government Decision no. 1249 as of 19.12.2018 on the organization and functioning of the Public Institution "Environmental Projects Implementation Unit" (P.I. "EPIU")[41], reorganized in 2022 in the Public Institution "Environmental Projects National Implementation Office" (P.I. "EPNIO"), the latter has the mission to provide support to MoEnv and the organizational structures within its scope of competence, in order to effectively implement external and internal financial and technical assistance projects in the field of environmental protection and use of natural resources (protection of atmospheric air, of the ozone layer and climate change; waste and chemicals management; environmental pollution prevention; water resources management; biosecurity; biodiversity conservation and management of natural areas protected by the state), in accordance with the provisions of the normative acts, regarding the implementation of the requirements of the international conventions to which the Republic of Moldova is a party, and alignment with the international standards in the field of environmental protection, given that the basic functions of the P.I. "EPNIO" consist of: effective implementation of projects within the scope of competence in accordance with the established objectives; supervision and quality verification of services, works and goods provided within the set deadlines; managing the financial means allocated to the projects within the scope of competence, in accordance with the assistance agreements and the approved budget; providing support to the founder in developing project proposals within the scope of competence; drafting and presentation of progress reports on projects implementation and use of the financial means intended for the projects.

The management bodies of the P.I. "EPNIO" are: the Director of the institution (executive body), respectively the Supervisory Committee as a higher collegial body, which manages and supervises the activity of the institution. The Committee consists of 5 members and is appointed for a period of 4 years. The nominal composition of the Committee membership is established by the order of the MoEnv, with the mandatory inclusion, of at least, one representative of the State Chancellery, the Ministry of Finance, the Ministry of Environment and civil society in the areas relevant for the PI "EPNIO". The function of the Chairman of the Committee is exercised by the Minister for the Environment, who chairs the meetings of the Committee and performs other established duties. In the absence of the Chairman of the Committee, the meeting shall be chaired by one of the members, elected by the members attending the meeting.

[40] <https://www.legis.md/cautare/getResults?doc_id=119162&lang=ro>
[41] <https://www.legis.md/cautare/getResults?doc_id=113696&lang=ro>

The National Monitoring and Reporting System (NMRS) of greenhouse gas emissions and other information relevant to climate change to the UNFCCC, approved by GD no. 1277 as of 26.12.2018, includes two subsystems as its integral parts:

1. The national inventory system, which provides the institutional, legal and procedural framework established to estimate anthropogenic emissions from sources and removals by sinks of all greenhouse gases, compiled in the national inventory of GHG emissions, as well as to report and archive inventory information, in accordance with the decisions adopted under the UNFCCC and the Paris Agreement;
2. The national system for policies, measures and projections, which provides the institutional, legal and procedural framework for assessing progress in implementing climate change mitigation policies, for developing projections of anthropogenic GHG emissions and removals.

The implementation of the NMRS ensures the appropriate collection, processing of data and information necessary for: (1) the development and reporting of the national inventory and projections of anthropogenic GHG emissions and removals, and (2) the assessment and reporting of: progress in the implementation of mitigation policies; vulnerability to climate change, the impact of climate change and progress in the implementation of adaptation actions; and aggregated financial and technological support, provided by developed industrial countries, referred to in Annex I to the UNFCCC, for the implementation of climate change mitigation and adaptation actions, technical assistance projects and capacity building in the field of climate change.

In the context of GD no. 1277 as of 26.12.2018, NMRS has the objective to ensure the transparent, accurate, coherent and full monitoring and reporting of greenhouse gases to the UNFCCC Secretariat, through the provided reporting tools, including the actions undertaken to adapt to the consequences of climate change, respectively to ensure the assessment, reporting and verification of information on the progress made at national level regarding the observance of the commitments undertaken under the UNFCCC, the Paris Agreement and the decisions adopted on the basis thereof.

With reference to the National Inventory System (NIS), it is designed and managed in such a way as to ensure the principles of transparency, consistency, comparability, completeness in developing the greenhouse gas emissions national inventory, in accordance with the provisions of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

The Environmental Agency, as the competent authority, in direct collaboration with the responsible authorities and institutions that are part of the NMRS and with the support of the central authority for natural resources and environment (MoEnv), ensures the organization and functioning of the NIS, by periodically improving the institutional, legal and procedural framework, in accordance with the national and international legal framework.

Within the NIS, the competent authority (the Environmental Agency) prepares, every two years, the national inventory of greenhouse gas emissions. The national inventory data are set out according to the format provided in Table 1 of Annex 1 to the GD no. 1277 as of 26.12.2018.

For direct greenhouse gas emissions, the national inventory is developed in accordance with the 2006 IPCC Guidelines, by using the reporting software recommended by the UNFCCC, and for indirect greenhouse gas emissions, the national inventory is developed in accordance with the updated editions of the Air Pollutant Emissions Inventory Guidebook, Technical Guidance for Inventory of National Emissions, published and regularly updated by the European Environment Agency (EEA) under the European Monitoring and Evaluation Programme (EMEP).

Based on the National Greenhouse Gas Emission Inventory, the Competent Authority is responsible for preparing the National Inventory Report (NIR) every two years, using the structure set out in the relevant decisions of the Conferences of the Parties to the UNFCCC.

Every two years the competent authority (the Environmental Agency) publishes the National Inventory Report (NIR), as well as the National Greenhouse Gas Emission Inventory in common reporting tables (CRT) on its own official website (< http://am.gov.md/ >). CRT tables show greenhouse gas emission trends by gases and by sectors.

The competent authority shall ensure the quality of the national inventories by following the planning, preparation and management steps, which include the collection of activity data, the appropriate selection of estimation

methods and emission factors, the estimation of the level of anthropogenic greenhouse gas emissions, the implementation of uncertainty analysis, quality assurance and quality control activities, as well as the procedures for verifying the data included in the national inventory.

The central authority for natural resources and environment (the Ministry of Environment), through the competent authority (the Environmental Agency):

1. continuously monitors and improves the National Reporting System on policies, measures and projections regarding anthropogenic emissions from sources and removals by sinks;
2. ensures the timeliness, transparency, accuracy, consistency, comparability and completeness of reported information on policies and measures, as well as projections of anthropogenic emissions of greenhouse gases from sources or removals by sinks, and if necessary, the use and application of data, methods and models, as well as the implementation of quality assurance and control activities and sensitivity analysis.
3. establishes the structure, format and procedure for reporting the information provided for in the National System for Policies, Measures and Projections to the UNFCCC.

The competent authority (the Environmental Agency) shall communicate to the central authority for natural resources and environment (the Ministry of Environment), by December 15 of the reporting year (year X), and thereafter every two years, the following:

1) description of the national reporting system on policies, measures/groups of measures and projections regarding anthropogenic emissions from sources and removals by sinks;
2) progress made in implementing the LT-LEDS and the NDC;
3) information on policies and measures/groups of measures that limit/reduce greenhouse gases emissions from sources or increase removals by sinks, structured by sectors and by gas or gas groups (HFCs and PFCs), provided in Annex no. 3 to the GD no. 1277 as of 26.12.2018. The information includes:
    a) the name of the mitigation policy or measure;
    b) the objectives of the policy or measure and a short description of the policy or measure;
    c) type of policy instrument (economic, fiscal, voluntary, regulatory, other);
    d) the implementation status of the policy and measure/group of measures (planned, adopted, under implementation, achieved);
    e) the start year of implementation of the policy and the measure/group of measures;
    f) implementing entity/entities responsible for the policy and measure/group of measures;
    g) indicators for monitoring and evaluating progress over time, when used;
    h) sectors affected (Energy; Transport; Industry/IPPU; Agriculture; LULUCF; Waste/Waste Management, other sectors and sub-sectors, as appropriate);
    i) gases affected (CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3);
    j) mitigation impact or quantitative estimation of the effects on greenhouse gases emissions from sources and removals by sinks, where available, broken down into: results of ex-ante assessments of the effects of each policy and measure/groups of policies and measures on climate change mitigation (provided for a succession of four future years ending with 0 or 5, following immediately after the reporting year) and results of ex-post assessments of the effects of each policy and measure/groups of policies and measures on climate change mitigation;
    k) estimation of expected costs and benefits, including non-GHG mitigation benefits (reductions in other pollutants or human health benefits) for policies and measures, and assessment of costs and benefits resulting from the implementation of policies and measures, when available;
    l) all references to the assessments and related technical reports referred to in item 26 of Annex no. 1 to the GD no. 1277 as of 26.12.2018, when available;
4) contribution to achieving the objective of the Convention following the implementation of the CDM projects.

The information on policies and measures is part of the BTRs and NCs and shall be submitted by the central authority for natural resources and the environment (the Ministry of Environment) to the UNFCCC Secretariat by 31 December of the reporting year.

The competent authority (the Environmental Agency) shall communicate to the central authority for natural resources and environment (MoEnv), by 15 December of the reporting year (year X), and every two years thereafter, national projections of anthropogenic emissions from sources and removals by sinks, by gas or group of gases (HFCs and PFCs) and by sectors of activity. Those projections shall include quantitative estimates for a sequence of four future years ending with 0 or 5 immediately following the reporting year.

National projections encompass any policies and measures adopted at national level and include:

1. projections with existing measures (WEM) and projections with additional measures (WAM), when available;
2. total greenhouse gas projections and estimates for individual gases;
3. the impact of policies and measures as set out in paragraph 24 of Annex no. 1 to the GD no. 1277 as of 26.12.2018;
4. results of the sensitivity analysis achieved for the projections;
5. the relevant references to evaluations and technical reports underlying the projections set out in paragraph 24 of Annex no. 1 to the GD no. 1277 as of 26.12.2018.

The competent authority (the Environmental Agency) shall make publicly available, in electronic format, national projections of greenhouse gas emissions from sources and removals by sinks, including the relevant technical reports underlying such projections. Projections shall include the description of the models and methodological approaches used, definitions and related assumptions.

In order to ensure transparency of reporting information on the models or methodological approaches used in the forecasting process, the competent authority (the Environmental Agency) shall indicate:

1. the model used for each type of greenhouse gas and sector;
2. the type and basic characteristics of the model used (top-down, bottom-up approach, calculation or expert reasoning approach);
3. a brief characteristic of the model, the purpose of its development, its adaptation to the needs of the study, the strengths and weaknesses of that model.

In order to ensure transparency in reporting of information on the key underlying assumptions and basic variables used in projections, the competent authority (the Environmental Agency) shall indicate:

1. the anticipated rate of GDP growth or decline rate/leval;
2. projections on the population growth rate/level;
3. anticipated rate of increase or decrease in taxes and duties;
4. projections on the international fuel price;
5. other relevant data.

The information on national projections is part of the BTRs and NCs, and shall be submitted by the central authority for natural resources and environment (MoEnv) to the UNFCCC Secretariat by December 31 of the reporting year.

The competent authority (the Environmental Agency) shall communicate to the central authority for natural resources and environment (MoEnv), by 15 December of the reporting year (year X), and subsequently every four years, in accordance with the UNFCCC reporting schedule, the updated information on:

1. climate models, projections and climate scenarios, considered to be relevant for assessing vulnerability to climate change and the climate change impact categories addressed, such as extreme temperatures, droughts, floods and extreme weather events;

2. key economic, social and/or environmental vulnerabilities or risks associated with the current or anticipated impacts of climate change;
3. the actual observed impact, i.e. the potential or future climate change impacts;
4. the institutional framework for adaptation to climate change, the national and sectoral strategies and action plans implemented or planned to facilitate adaptation to climate change and which would illustrate the medium- and long-term approaches associated with the assessment and consideration of risks and vulnerabilities at national and sectoral level;
5. approaches used in monitoring and evaluation progress, associated with the implementation of national and sectoral policies, strategies and action plans on climate change adaptation, as well as the effectiveness of adaptation measures already implemented.

The information on vulnerability to climate change, the impact of climate change and adaptation actions is part of the NC and/or BTR and shall be submitted by the central authority for natural resources and environment (MoEnv) to the UNFCCC Secretariat by December 31 of the reporting year.

The competent authority (the Environmental Agency) shall communicate to the central authority for natural resources and environment (MoEnv), by 15 December of the reporting year (year X), and every two years thereafter, summarized information on the support provided by the developed industrial countries, mentioned in Annex I to the UNFCCC, for the fulfillment of the obligations towards the UNFCCC, including information on the financial resources received through:

1. Global Environment Facility, the Climate Change Special Fund, the Adaptation Fund, the Green Climate Fund and the UNFCCC Trust Fund;
2. other multilateral funds in the field of climate change;
3. multilateral financial institutions, including regional development banks;
4. UN specialized structures;
5. contributions received through bilateral, regional or other channels.

Summarized information on the support provided by the developed countries is presented in textual and tabular form for the last two calendar or financial years, and includes:

1. the amount of financial resources received from developed countries (in national currency and the equivalent in US dollars);
2. type of support received (for mitigation, adaptation, intersectoral activities);
3. status (planned or actually disbursed);
4. sources of financing (official development assistance, other official financial flows);
5. financial instrument (grant, concessional loan, non-concessional loan, capital financing);
6. sector (energy, industry, transport, buildings, agriculture, forestry, waste management, water and sanitation, intersectoral).

The competent authority (the Environmental Agency) shall submit to the central authority for natural resources and environment (MoEnv) the "Rio Markers" based information on financial flows provided by developed countries to support climate change mitigation and adaptation, and the information on implementation of the "Rio Markers" methodology on climate change, when relevant or applicable under the UNFCCC.

This will include:

1. definitions and methodologies used to determine the provided support;
2. data on the amount of mitigated greenhouse gas emissions, implemented climate change adaptation measures, strengthened capacities and technology transferred in accordance with decisions adopted by the bodies established by the UNFCCC, the Kyoto Protocol, the Paris Agreement or on the basis of agreements resulting therefrom or succeeding them.

The information on financial and technological support provided by the developed industrial countries is part of the BTRs and NCs and shall be submitted by the central authority for natural resources and environment (MoEnv) to the UNFCCC Secretariat by December 31 of the reporting year.

The competent authority (the Environmental Agency) prepares the BTR every two years and the NC – every four years. BTRs and NCs are prepared in accordance with the UNFCCC requirements.

The competent authority (the Environmental Agency) publishes the NCs and BTRs of the Republic of Moldova to the UNFCCC on its own official page.

The competent authority (the Environmental Agency) provides the format of the reporting questionnaires to the responsible authorities and institutions that are part of the NMRS, as well as the identified respondents who hold the information, emission factors and activity data needed to estimate anthropogenic greenhouse gas emissions, as set out in Tables 2-6 of Annex no. 1 to the GD no. 1277 as of 26.12.2018. The obligation for collecting and processing of data needed for preparation of the national inventory, as set out in Tables 2-6 of Annex no. 1 to the GD no. 1277 as of 26.12.2018, lies with the responsible authorities and institutions, once these are included in the Statistical Work Program, annually approved by the Government.

In case of discrepancy between the information and data for the same indicator, the competent authority (the Environmental Agency) uses official data and information at national level, provided by the central statistical body. For the data and information needed to assess and estimate the level of greenhouse gas emissions not provided for in the Statistical Work Program, the competent authority (the Environmental Agency) shall carry out consultations with the responsible authorities and institutions that are part of the NMRS. The results of the consultations shall be recorded in a protocol, through which the procedures for drawing up the specific studies and the responsibilities for them shall be established.

The competent authority (the Environmental Agency) requests the public administration body that ensures the economic security of the state, implements the customs policy and directly manages the customs activity in the Republic of Moldova, the data needed for preparation of the national inventory, according to Tables 2-6 of Annex no. 1 to the GD no. 1277 as of 26.12.2018, according to the tariff headings of the Combined Nomenclature of Goods (NCM), approved by Law no. 172 as of 25 July 2014 on the approval of the Combined Nomenclature of Goods.

The data exchange between the competent authority (the Environmental Agency) and the authorities and institutions that are part of the NMRS shall be carried out free of charge and within the deadlines provided by the corresponding Regulation (Annex no. 1 to the GD no. 1277 as of 26.12.2018), subject to the provisions of Chapter VII of Law no. 93/2017 on Official Statistics.

In order to ensure the accuracy and proper identification of the uncertainty degree for the activity data and for the processed emission factors, as necessary, the competent authority (the Environmental Agency) outsources consultancy services, studies for the development of emission factors, development of software programs, as well as any other studies, analyses and research necessary to ensure the proper functioning of NMRS.

The data provided in Tables 2-6 of Annex no. 1 to the GD no. 1277 as of 26.12.2018 is updated by Government Decision, at the proposal of the central authority for natural resources and environment (MoEnv), according to the dynamics and evolution of data and information, as well as changes in the institutional framework or of any other nature.

The environmental control body shall exercise the supervisory and control function regarding compliance with the provisions of the Regulation on the establishment and operation of the NMRS on GHG Emissions and other information relevant to climate change, in accordance with Article 26 of the Law no. 1515/1993 on environmental protection and Law no. 131/2012 on state control over entrepreneurial activity. Failure to comply with the provisions of the Regulation entails disciplinary, contravention or criminal liability according to the legislation in force.

As the competent authority responsible for the operation of the NSMR of GHG emissions and other information relevant to climate change, the Environmental Agency requested the P.I. "EPNIO", by Letter no. 3471 of

September 25, 2019, to examine and identify the possibility of providing the necessary support to carry out the tasks in the field of climate change by organizing the entire process of preparing reports to the UNFCCC, in accordance with the rules, procedures and decisions of the Conference of the Parties to the UNFCCC.

To this end, the P.I. "EPNIO" was granted the right: to request and receive, directly or through the Environmental Agency, information from central public authorities, local public administration authorities, organizations and institutions, businesses operating in areas holding primary information needed for the completion of the two national reports; to collect, process and validate the data and information needed for development of national inventories and greenhouse gas emissions reports; to train specialists from the Environmental Agency on working with the data and information collected, for the purpose to build their capacities in the areas concerned.

There are three working groups within the climate change projects implementing units of the P.I. "EPNIO": "National GHGs Inventory", "Mitigation of Greenhouse Gas Emissions, Monitoring, Reporting and Verification of Greenhouse Gas Emission Reductions" and "Vulnerability Assessment, Impact and Climate Change Adaptation Measures" (Fig. 2-1).

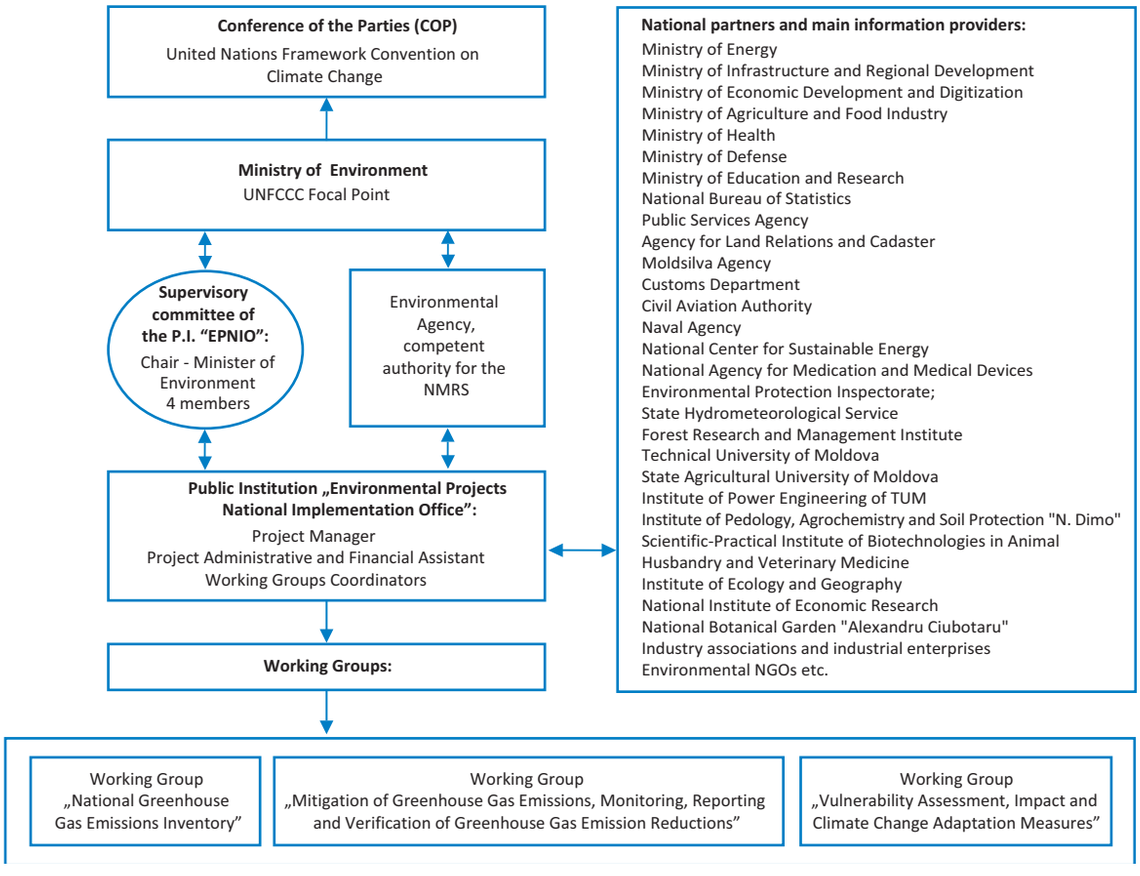


Figure 2-1: Institutional arrangements on reporting to the UNFCCC.

The functional responsibilities of the participants in the process are briefly described as follows:

- National experts (outsourced on a contract basis) are responsible for the process of collecting activity data, selecting evaluation methods, evaluation at sectoral level, taking adjustment measures in response to verification, quality control and quality assurance activities, as well as developing component parts of key chapters of the NCs, BTRs and NIRs.
- The coordinators of the working groups are responsible for coordinating the compilation process of the key chapters of the NCs, BTRs and NIRs. They supervise the evaluation process at sectoral level, are responsible for the interpretation of the results obtained by the national experts, coordination of the quality verification and control activities, the process of documenting and archiving the materials used and synthesis of reports submitted by the national experts.

2.1.3. Administrative-territorial organization, population profile and demographic situation

Administrative-territorial organization. According to the Law no. 764 as of 27.12.2001[42], the territory of Moldova is administratively organized in 32 districts, 13 municipalities and two administrative-territorial units (ATU). In most districts (Anenii Noi, Basarabeasca, Briceni, Cahul, Cantemir, Calarasi, Causeni, Cimislia, Criuleni, Donduseni, Drochia, Edinet, Falesti, Floresti, Glodeni, Hancesti, Ialoveni, Leova, Nisporeni, Ocnita, Orhei, Rezina, Riscani, Sangerei, Soroca, Straseni, Soldanesti, Stefan Voda, Taraclia, Telenesti, Ungheni) the administrative center is situated in the cities and only the administrative center of Dubasari district is situated in Cocieri commune. On January 1, 2024, the number of population within the districts ranged from a minimum of 16,000 inhabitants (Basarabeasca district) to a maximum of 75,000 inhabitants (Orhei district).

In the Republic of Moldova, municipalities are urban-type localities with a special role in the economic, social-cultural, scientific, political and administrative life of the country, with important industrial, commercial structures and institutions in the field of education, health care and culture. In most cases municipalities are made up of several localities. For example, the municipality of Chisinau, which is also the capital of the country, has 35 localities, including five sectors, six cities and 12 communes (which include 26 localities). The other four municipalities are: Balti, Comrat, Tiraspol and Bender (Tighina).

The division of the country's territory into administrative-territorial units is intended to ensure the principles of local autonomy, decentralization of public services, eligibility of local public administration authorities, ensuring citizens' access to power bodies and their consultation on local issues of particular interest. All local issues are the responsibility of the elected local councils.

In the Republic of Moldova there are two autonomous territorial units: ATU Gagauzia and the administrative-territorial units on the left bank of the Dniester River (ATULBD), to which special forms and conditions of autonomy may be assigned (according to Art. 16 of Annex no. 5 of the Law no. 764 as of 27.12.2001 on the administrative-territorial organization of the Republic of Moldova). These two include: 1 municipality, 9 cities, 2 urban localities, 69 communes and 135 localities included in those communes.

ATU Gagauzia has an area of about 3,000 km^2 (115 thousand inhabitants)[43], and ATULBD has an area of about 4,163 km^2 (453 thousand inhabitants)[44]. With the start of the breakup of the USSR, the administrative-territorial units on the left bank of the Dniester river promoted a separatist policy towards the central public administration. Currently, this area is only partially controlled by the constitutional authorities of the Republic of Moldova.

Population. On January 1, 2024, the population of the Republic of Moldova was about 2.9 million inhabitants (together with ATULBD), its density being about 85 inhabitants/km^2. Between 1990 and 2023, the number of inhabitants decreased by about 34% or by 1.48 million inhabitants. This decrease is determined by the negative natural balance, respectively by the negative balance of external migration. Within the gender structure, women predominate – 53.6%, compared to only 46.4% of the male population.

The population is mainly concentrated in rural areas, the 1,614 rural settlements accounting for 52% of the total, on average about 930 inhabitants in one locality. The urban population accounts for 48%, an average 26.5 thousand inhabitants in one locality. According to the data of the latest population censuses (2014) (carried out separately for the territories on the left and right banks of the Dniester river), Moldovans/Romanians accounted for 73.1%, Ukrainians – 8.8%, Russians – 7.6%, Gagauz – 4.0%, Bulgarians – 1.9%, Roma – 0.3%, other ethnicities – 0.7% and the population that did not declare their ethnicity – 3.5%.

Demographic situation. Between 1990 and 2023, demographic processes were marked by negative dynamics, manifested by the instability of demographic indicators and phenomena, such as reduced birth rates, increased mortality, depopulation, demographic ageing and other. In 2023, the birth rate of 9.8‰ showed a sharp decrease compared to 1990 (17.7‰), well below the mortality rate – 13.7‰, which was increasing compared to 1990 (9.7‰); infant mortality was 10.0‰ (19.0‰ in 1990); the indicator "life expectancy at birth" was about 71.9 (68.0 years in 1990), of which 67.5 years for men (63.9 years in 1990) and 76.4 years for women (71.9 years in 1990).

[42]|Parliament of the Republic of Moldova, Law no. 764 of 27.12.2001 on the administrative-territorial organization of the Republic of Moldova. Published on 29.01.2002 in the Official Gazette no. 16, art. 53. 302/2004 amended by Law no. 233 of 16-12-2020 amending Law 764/2001 on the administrative-territorial organization of the Republic of Moldova. Published on December 22, 2020 in the Official Gazette no. 353-357, Article 272.
[43]<https://statbank.statistica.md/PxWeb/pxweb/ro/20%20Population%20si%20processes%20demographics/20%20Population%20si%20processes%20demographics__POP010__POPro/POP010400rclreg.px/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>
[44] <https://mer.gospmr.org/deyatelnost/gosudarstvennaya-sluzhba-statistiki-gosstat.html>

2.1.4. Geographical profile and natural resources

Geographical position. The Republic of Moldova is situated in the central part of Europe, in the northwestern Balkans, on a territory of 33,849 thousand km^2. To the north, east and south it is surrounded by Ukraine, and to the west – separated from Romania by the Prut river. The Republic of Moldova is part of the group of countries in the Black Sea basin – its southern border extends almost to the Black Sea, the sea exit opening through the Dniester river and the Danube river.

Relief. The relief of the Republic of Moldova is represented by hills and plains, the plateaus generally occupy the central part of the country. The absolute altitudes are between 429 m (Balanesti Hill) and 4 m in the Dniester River meadow (Palanca commune).

Land resources. Moldova has unique land resources, which are distinguished by the predominance of chernozem soils (~75%) with high productivity potential, a very high degree of capitalization (>75%) and a rugged relief (over 80% of agricultural land is located on slopes). On January 1, 2024, the total land area was 3,384.9 thousand ha (NBS, 2024), including 2,467.0 thousand ha (72.9%) – agricultural land; of which 1,870.5 thousand ha (55.3%) – arable land, 265.7 thousand ha (7.8%) – perennial plantations; 310.9 thousand ha (9.2%) – meadows and pastures; 19.9 thousand ha (0.6%) – fallow land; 435.1 thousand ha (12.9%) – forests and lands with forest vegetation; 92.1 thousand ha (2.7%) – rivers, lakes, basins and ponds and 390.7 thousand ha (11.5%) – other land.

Water resources. The hydrographic network covers about 2.7% of the country's territory and has a total length of about 16 thousand km. The main rivers are the Dniester and the Pruth, on a small portion to the south the country has an outlet to the Danube. The density of the hydrographical network on average per country is 0.48 km/km^2, ranging from 0.84 km/km^2 in the north of the country up to 0.12 km/km^2 on the left side of the Dniester river. On the territory of the country there are about 60 natural lakes and over 4,475 thousand artificial water accumulations. There are also about 5,000 wells, about 179,000 waterworks and about 3,000 springs on the territory of the Republic of Moldova, which ensures 1.8 million m^3/day of confirmed reserves.

Biological resources. The vegetation is varied and rich in species – the flora currently comprising about 5,513 plant species: 1,989 superior species and 3,524 inferior species[45]. By floristic composition forest ecosystems (over 850 species), steppe ecosystems (over 600 species), meadow ecosystems (about 650 species), petrophilic ecosystems (about 250 species), aquatic ecosystems and palustra ecosystems (about 160 species), are the richest. In the Republic of Moldova there are about 1,200 species of fungi, including 836 species of macromycetes. The fauna is relatively rich and varied. There are over 15.0 thousand animal species in the country, including 461 vertebrate species and over 14,000 invertebrate species. Among vertebrates there are 70 species of mammals, 281 species of birds, 14 species of reptiles, 14 species of amphibians and 82 species of fish. Of the vertebrate animals, the most numerous is the class of birds – 281 species and subspecies, and of invertebrates are the insects - over 12,000 species.

Mineral resources. The underground minerals mostly used on the territory of the Republic of Moldova are: (1) the carbonate rocks of the lower Sarmatian and of the Badenian – are used in construction industry for housing and industrial buildings, in cement production, sugar refining, road construction, as fodder additive, etc.; (2) the siliceous rocks (siliceous limestone, diatomite, tripoli) – are used in food industry, production of mock leather, paper, thermal and electrothermal materials, etc.; (3) the clay rocks (clay shales, bentonite clays, ordinary clays) – are used for cement, keramite, bricks, tiles and roofing tiles production; (4) the sands and gravels (pebbles) – are used for production of glass, concrete, in various branches of construction, including roads; (5) the sulphatic rocks (gypsum) – are used in construction, medicine, pharmaceutical industry; (6) the crystalline rocks (gabrites, gabrites, gorabrites) – are used for production of reinforced concrete, in road construction; (7) caustobioliths (petrol, gas, brown coal, in insignificant quantities) (Valeni, Victorovca, Vladiceni). At present, the prospecting bodies registered over 400 deposits of useful mineral substances (limestone, clays, sands, sandstone, gypsum, granite, tripoli, diatomite) on the territory of the country. About 40% of the total number are used, of which about 130 deposits are in current exploitation, and about 50 deposits are in underground exploitation.

[45] <http://ipm.gov.md/sites/default/files/2021-09/IPM_ANUAR_2020.pdf>

2.1.5. Climate profile

The climate of Moldova is temperate continental, characterized by relatively mild winters and little snow, with long, hot summers and low humidity. The country is situated in the region of the Atlantic air masses interference in Western Europe, the continental-excessive in the northeast and the Mediterranean in the southwest.

The territorial distribution of climate elements during 1991-2023 showed several distinct regularities: (i) the increase of the temperature in the southern direction, from an annual average value of 8.1°C in the north to 10.9°C in the south; (ii) the zonal distribution of the annual average rainfall with decrease of values from the north to the south: from the annual average of 613-618 mm in the north, to 550-516 mm in the south; and (iii) the increase by about 100 mm of the multiannual average rainfall values in the plateau regions, in relation to the neighboring plains.

Over the past 135 years, the country has experienced changes in average temperature and precipitation values. The country became warmer, with an average temperature increase of more than 1.2°C, while the increase in rainfall was only 51.3 mm.

2.1.6. Economic profile

Gross Domestic Product. The secession of the industrialized ATULBD in 1992 left the Republic of Moldova with an undiversified economic base, practically completely dependent on agricultural and food production. In 1995, the agricultural sector accounted for 29.3% of GDP, and the extractive and processing industry – 22.5% of GDP. In 2023, the share of agriculture decreased to 7.4% of GDP, and that of the extractive and processing industry decreased to 9.2% of GDP (Table 2-1).

Table 2-1: Structure of GDP (in current prices) in the Republic of Moldova during 1995-2023, %

	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023*
Structure, in %	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Gross added value	88.6	87.5	84.0	86.1	87.3	87.5	86.3	86.2	86.8	86.6	85.9	86.1	84.7
Goods, total	54.2	41.9	32.2	24.9	26.5	26.1	25.8	23.7	23.3	22.5	23.2	19.6	18.5
Agriculture	29.3	25.4	16.4	11.2	12.8	12.5	12.2	10.2	10.2	9.4	10.6	8.1	7.4
Extractive and processing industry	22.5	14.1	13.5	10.2	10.3	10.3	10.2	10.4	10.3	10.5	10.0	9.5	9.2
Production and supply of energy, gas, hot water	2.0	1.8	2.0	2.9	2.8	2.8	2.7	2.6	2.3	2.0	2.1	1.5	1.5
Water supply; sanitation	0.5	0.5	0.4	0.7	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5
Services – total	36.7	48.0	53.8	61.2	60.8	61.4	60.6	62.5	63.5	64.1	62.6	66.5	66.2
Wholesale and retail trade	8.0	12.5	10.4	12.6	14.8	15.5	15.5	15.9	15.6	15.1	15.5	16.6	17.7
Transport and storage	2.9	4.5	5.0	4.1	4.4	4.7	4.9	4.2	4.1	3.5	4.0	4.6	5.1
Constructions	3.5	2.7	3.3	6.7	7.5	7.6	7.5	8.6	8.8	10.0	8.0	7.6	6.9
Other branches	22.3	28.4	35.0	37.9	34.2	33.7	32.7	33.8	35.0	35.6	35.2	37.7	36.6
Net taxes on product and import	11.4	12.5	16.0	13.9	12.7	12.5	13.7	13.8	13.2	13.4	14.1	13.9	15.3

Note: * preliminary data.

Since 2000, there has been considerable steady GDP growth, which was interrupted by the regional economic crisis of 2009. In the following years, GDP developed unevenly (Table 2-2), because in 2012, 2015, 2020 and 2022, Moldova faced severe droughts.

Table 2-2: Gross domestic product (in current prices) in the Republic of Moldova during 1990-2023, billion MDL

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023*
GDP, billion MDL	**13.0**	**6.5**	**16.0**	**37.7**	**86.3**	**146.7**	**159.0**	**176.0**	**189.1**	**206.3**	**199.7**	**242.1**	**274.5**	**307.2**
in % compared to previous year	97.6	98.6	102.1	107.5	107.1	99.3	104.6	104.2	104.1	103.6	91.7	113.9	95.4	100.7
in % compared to 1990	100.0	39.4	34.8	49.0	57.4	68.7	71.8	74.8	77.9	80.7	74.0	84.3	80.4	80.9

Note: * provisional data.

Trade balance deficit. The expenses of the Republic of Moldova for imports far exceed the country's earnings from exports, a very serious problem related to the trade balance deficit (Table 2–3). This deficit increased from 6.6% of GDP in 1995 to 27.9% of GDP in 2023.

Table 2-3: Trade balance deficit of the of the Republic of Moldova during 1995-2023

	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023*
Billion, $US	**1.441**	**1.288**	**2.988**	**6.977**	**7.799**	**7.981**	**9.519**	**11.252**	**11.736**	**11.532**	**13.691**	**14.521**	**16.916**
Export (C.I.F.), billion $US	0.746	0.471	1.091	1.541	1.967	2.045	2.425	2.706	2.779	2.467	3.145	4.332	4.169
in % compared to the previous year	131.9	101.7	110.7	120.1	84.1	104.0	118.6	111.6	102.7	88.8	127.5	137.8	96.2
Import (F.O.B.), billion $US	0.841	0.776	2.292	3.855	3.987	4.020	4.831	5.760	5.842	5.416	7.177	9.219	8.886
in % compared to the previous year	127.5	132.4	129.6	117.6	75.0	100.8	120.2	119.2	101.4	92.7	132.5	128.5	96.4
Trade balance deficit, billion $US	-0.095	-0.305	-1.201	-2.314	-2.020	-1.976	-2.406	-3.054	-3.063	-2.949	-4.032	-4.887	-4.717
EXP coverage of IMP, %	88.7	60.7	47.6	40.0	49.3	50.9	50.2	47.0	47.6	45.6	43.8	47.0	46.9
% of GDP: Export	51.7	36.6	36.5	22.1	25.2	25.6	25.5	24.1	23.7	21.4	23.0	29.8	24.6
Import	58.3	60.3	76.7	55.3	51.1	50.4	50.8	51.2	49.8	47.0	52.4	63.5	52.5
Balance	-6.6	-23.7	-40.2	-33.2	-25.9	-24.8	-25.3	-27.1	-26.1	-25.6	-29.5	-33.7	-27.9

Note: * preliminary data.

This reflects the country's dependence on imports of energy resources and increased demand for imported products (Table 2-4). The increase in imports is boosted by massive inflows of remittances from abroad, which are channeled into household consumption.

Table 2-4: Imports structure by groups of goods during 1997-2023, %

	1997	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023*
Import total, of which:	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Live animals; animal products	1.9	1.4	2.5	2.5	2.5	2.7	2.7	2.5	2.8	3.2	3.1	2.9	3.4
Vegetable products	3.2	3.3	2.8	4.4	4.9	4.3	4.0	4.5	4.5	5.3	4.2	4.8	4.7
Animal or vegetable fats and oils and their cleavage products; processed edible fats; animal or vegetable waxes	0.4	0.3	0.4	0.5	0.5	0.6	0.5	0.4	0.3	0.4	0.4	0.9	0.4
Foodstuffs; alcoholic and non-alcoholic beverages, vinegar; tobacco	7.5	9.2	6.4	8.0	6.8	7.6	7.3	6.1	6.3	6.8	6.3	5.4	6.3
Mineral products	35.3	33.0	22.0	20.9	18.4	15.7	16.0	17.5	16.1	11.3	15.3	28.3	23.0
Products of the chemical and related industries	9.6	9.6	10.1	10.5	12.4	12.5	11.9	11.3	11.8	12.1	11.3	9.3	10.1
Plastics and articles thereof; rubber and articles thereof	3.1	3.1	6.1	5.9	6.4	6.4	6.0	6.0	6.0	6.5	6.4	5.1	5.0
Raw hides and skins [raw material], tanned hides and skins, natural fur and products thereof	0.3	0.3	3.0	0.7	1.0	1.2	1.3	1.2	1.2	1.1	1.0	0.8	0.7
Wood and articles of wood; wood charcoal; cork and articles of cork; manufactures of straw; vegetal fibers braiding and wickerwork	1.7	1.3	1.9	1.9	2.1	2.1	2.2	2.1	2.2	2.4	2.4	1.8	1.8
Pulp of wood or other fibrous cellulosic materials; paper and cardboard, recycled from waste and scrap; paper, cardboard (waste and scrap) and articles thereof	4.1	3.6	3.6	2.7	1.9	2.0	1.8	1.8	1.9	1.9	1.7	1.6	1.5
Textiles and textile articles	5.3	10.0	7.8	7.3	7.2	8.6	8.2	7.4	6.9	7.1	6.9	5.4	5.6
Footwear, headgear, umbrellas, sun umbrellas, walking sticks, whips, riding crops and parts thereof; processed feathers and down and articles thereof; artificial flowers; articles of human hair	0.3	0.3	0.5	0.6	0.5	0.7	0.9	0.8	0.9	0.8	0.8	0.7	0.8
Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	3.9	2.1	2.9	2.6	2.6	2.6	2.5	2.4	2.4	2.7	2.5	2.0	2.1
Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, and articles thereof; imitation jewelry; coins	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Base metals and articles of base metal	4.4	4.1	7.0	6.3	7.2	6.8	7.1	7.3	7.2	7.1	6.7	4.7	4.6
Machinery and apparatus, electrical equipment and parts thereof; sound and image recording or reproducing apparatus	12.9	12.7	13.7	15.0	15.8	16.0	16.6	17.7	18.1	19.4	18.4	15.3	17.2
Vehicles, aircraft, vessels and ancillary transport equipment	3.0	2.0	5.7	6.2	4.8	5.8	6.1	6.5	6.7	7.1	7.2	6.9	8.0
Optical, photographic or cinematographic instruments and apparatus, medical and surgical apparatus; clocks and watches; musical instruments; parts and accessories thereof	1.7	2.5	1.2	1.4	2.0	1.4	1.6	1.7	1.7	1.8	2.0	1.3	1.7
Miscellaneous manufactured articles	1.1	1.2	1.9	2.6	2.8	2.9	2.9	2.8	2.9	3.0	3.0	2.3	2.5
Works of art, collectors' pieces and antiques	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1

Note: * preliminary data.

The range of exported products is relatively small, which complicates the efforts to penetrate Western markets. Exports are dominated by food and alcoholic beverages, textiles and products thereof, plant products, common metals and products thereof, machinery and apparatus, electrical equipment, etc. In 2023, plant products, food

and beverages, chemicals and related industries, textiles and products thereof, along with electrical machinery, apparatus and equipment, other goods and miscellaneous products accounted for about 69.0% of total exports (Table 2-5).

Table 2-5: Exports structure by groups of goods during 1997-2023, %

	1997	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023*
Export total, of which:	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Live animals; animal products	8.6	4.8	1.6	1.7	1.9	2.0	1.9	1.7	1.4	1.4	1.2	0.7	0.7
Vegetable products	8.6	14.0	12.1	22.1	25.5	25.9	27.3	25.4	25.9	23.2	27.7	24.6	24.0
Animal or vegetable fats and oils and their cleavage products; processed edible fats; animal or vegetable waxes	1.0	0.8	3.5	3.1	3.7	2.7	2.2	2.5	2.5	4.2	3.9	8.7	6.1
Foodstuffs; alcoholic and non-alcoholic beverages, vinegar; tobacco	54.8	42.1	36.3	20.6	15.4	15.7	15.2	13.6	13.7	15.4	13.0	10.7	12.0
Mineral products	0.4	0.6	1.8	1.1	0.9	0.7	1.2	1.2	0.9	1.0	0.9	14.2	11.7
Products of the chemical and related industries	1.5	1.7	1.4	4.8	6.0	4.4	4.1	3.8	4.3	3.2	3.6	2.0	2.1
Plastics and articles thereof; rubber and articles thereof	0.6	0.4	1.1	1.7	2.0	1.7	1.4	1.5	1.7	1.6	1.5	1.6	1.9
Raw hides and skins [raw material], tanned hides and skins, natural fur and products thereof	1.4	2.8	6.6	1.6	1.3	1.2	0.9	0.8	0.7	0.6	0.6	0.5	0.5
Wood and articles of wood; wood charcoal; cork and articles of cork; manufactures of straw; vegetal fibers braiding and wickerwork	0.1	0.2	0.2	0.4	0.4	0.5	0.4	0.7	0.8	0.8	0.9	0.7	0.6
Pulp of wood or other fibrous cellulosic materials; paper and cardboard, recycled from waste and scrap; paper, cardboard (waste and scrap) and articles thereof	0.4	0.4	1.1	0.8	0.5	0.6	0.5	0.6	0.6	0.6	0.7	0.7	0.8
Textiles and textile articles	6.7	17.7	17.8	17.4	13.9	15.0	14.3	13.6	11.7	11.7	10.6	8.2	8.7
Footwear, headgear, umbrellas, sun umbrellas, walking sticks, whips, riding crops and parts thereof; processed feathers and down and articles thereof; artificial flowers; articles of human hair	0.7	0.8	2.4	2.0	1.2	1.4	1.4	1.3	1.3	1.4	1.2	1.0	0.7
Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	1.4	3.1	1.7	2.3	2.1	2.2	1.7	2.1	2.0	2.4	2.6	2.8	2.8
Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, and articles thereof; imitation jewelry; coins	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1
Base metals and articles of base metal	1.0	2.5	4.5	3.8	2.2	2.1	2.0	1.7	1.6	2.3	4.6	2.5	2.0
Machinery and apparatus, electrical equipment and parts thereof; sound and image recording or reproducing apparatus	5.2	5.1	4.2	11.1	15.0	14.6	16.1	20.9	22.4	21.1	18.2	13.7	17.9
Vehicles, aircraft, vessels and ancillary transport equipment	5.9	1.1	1.4	1.4	0.9	1.3	1.7	0.8	1.0	1.3	2.1	2.4	1.8
Optical, photographic or cinematographic instruments and apparatus, medical and surgical apparatus; clocks and watches; musical instruments; parts and accessories thereof	0.4	0.7	0.7	0.8	1.4	1.4	1.3	1.1	1.3	1.2	1.0	0.8	1.1
Miscellaneous manufactured articles	1.4	1.1	1.6	3.4	5.5	6.5	6.4	6.6	6.1	6.6	5.9	4.1	4.4
Works of art, collectors' pieces and antiques	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1

Note: * provisional data.

Money transfers and remittances. In 2023, net inflows of foreign currency from Moldovans working abroad amounted to about US$ 1.63 billion or about 9.6% of GDP (Table 2-6). Money transfers from abroad for individuals through banks in Moldova (net settlements) are of great importance for the country's economy.

Table 2-6: Money transfers from abroad for individuals through banks in the Republic of Moldova (net settlements), 2015-2023

	2015	2016	2017	2018	2019	2020	2021	2022	2023*
Gross Domestic Product, US$ billion	7.799	7.981	9.519	11.252	11.736	11.532	13.691	14.521	16.916
Money transfers from abroad to individuals through banks of the Republic of Moldova (net settlements), US$ million	**1129.4**	**1079.2**	**1200.0**	**1266.8**	**1222.9**	**1486.7**	**1611.8**	**1745.7**	**1627.8**
in % compared to the previous year	70.0	95.6	111.2	105.6	96.5	121.6	108.4	108.3	93.2
in % of GDP	14.5	13.5	12.6	11.3	10.4	12.9	11.8	12.0	9.6

Note: * preliminary data.

Investments. Investments are of major importance for the economic growth of the Republic of Moldova, which have increased in current prices compared to previous years. In 2022, about 37.1 billion MDL were invested in national economy in fixed assets, equivalent to about US$ 1,963 billion (13.5% relative to GDP) (Tab. 2-7).

Table 2-7: Investments in fixed assets, 2017-2022

	2017	2018	2019	2020	2021	2022
Investments in non-current assets (in current prices), MDL billion	**23.498**	**27.465**	**31.253**	**30.090**	**35.411**	**37.108**
Volume index of investments in non-current assets, %	103.5	112.9	110.2	96.9	109.8	88.1
Investments in non-current assets (in current prices), US$ million	**1,270.9**	**1,634.5**	**1,778.3**	**1,737.3**	**2,002.7**	**1,963.0**
in % of GDP	13.4	14.5	15.2	15.1	14.6	13.5

At the same time, foreign direct investment (FDI) attracted into the national economy (net inflows) in 2023 amounted to US$ 587.2 million (3.5% relative to GDP), well below the level of 2008, when foreign direct investment attracted into the national economy was US$ 726.6 million (12.0% relative to GDP).

The international investment position of Moldova, as of December 31, 2022, remained net debtors and amounted to - US$ 6,184 billion[46], the negative balance increasing compared to the end of 2021 by 18.5%. As of December 30, 2022, the official reserve assets amounted to US$ 4,474.17 million, increasing by US$ 199.72 million compared to November 30, 2022, when they totaled US$ 4,274.45 million. According to preliminary data, the gross external debt of the Republic of Moldova increased by 1.8% compared to the end of 2022 and as of September 30, 2023 totaled US$ 9,763.88 million. The ratio of gross external debt to GDP was 62.4%, by 3.7% lower than December 31, 2022.

2.1.7. Social sphere

In Moldova, the average gross nominal monthly earnings in the real sector entities, with 4 and more employees, and in all spending units, in 2023 amounted to MDL 12,354.7, increasing by 18.3% compared to 2022 (MDL 10,447.3) (Table 2.8).

Table 2-8: Average monthly wages and average monthly pension size during 1993-2023

	1993	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023*
Nominal wage, MDL	**31.2**	**143.2**	**407.9**	**1318.7**	**2971.7**	**4538.4**	**4997.8**	**5587.4**	**6268.0**	**7233.7**	**7943.0**	**8979.8**	**10447.3**	**12354.7**
Nominal wage, %	897.3	132.1	133.9	119.5	108.2	111.0	110.1	111.8	112.2	115.4	109.8	113.1	116.3	118.3
Real wage, %	69.9	101.6	102.1	106.8	100.7	101.2	103.5	104.9	108.9	110.1	105.8	107.6	90.4	104.3
Nominal wage, US$	**23.3**	**31.9**	**32.8**	**104.7**	**240.3**	**241.2**	**250.8**	**302.2**	**373.0**	**411.6**	**458.6**	**507.9**	**552.7**	**680.3**
In % compared to the previous year		119.5	113.4	117.0	97.2	82.8	104.0	120.5	123.4	110.3	111.4	110.7	108.8	123.1
Nominal wage, US$ (PPP)	**185.6**	**167.7**	**195.7**	**297.4**	**456.7**	**532.0**	**555.5**	**585.5**	**632.1**	**1246.6**	**1361.5**	**1557.9**	**1695.4**	**2086.9**
In % compared to the previous year		66.9	106.8	118.2	98.6	101.6	104.4	105.4	108.0	197.2	109.2	110.7	108.8	123.1
Pension, MDL	18.8	64.3	85.1	383.4	810.9	1165.2	1275.2	1527.9	1709.2	1901.1	2104.5	2578.5	3156.4	3676.7
Pension, US$	**14.0**	**14.3**	**6.9**	**30.4**	**65.6**	**61.9**	**64.0**	**82.6**	**101.7**	**108.2**	**121.5**	**145.8**	**167.0**	**202.5**

Note: * provisional data.

The index of the real salary earnings in 2023 compared to 2022 (calculated as the ratio between the gross salary index and the consumer price index) was 104.3%.

In 2023, the labor force (active population) of the Republic of Moldova, which includes both the employed and unemployed population, was 929.5 thousand people, increasing by 4.4% compared to 2022 (890.0 thousand) (Table 2-9). In the workforce structure the share of men (50.4%) was higher compared to that of women (49.6%), and the share of economically active population in rural areas was higher than the same in urban areas (53.4% and 46.6%, respectively).

Table 2-9: Evolution of population aged 15 years and more by involvement in economic activity in the Republic of Moldova during 2019-2023, thousands of people

	2019	2020	2021	2022	2023
Labor force (active population)	**919.3**	**867.3**	**871.6**	**890.0**	**929.5**
Occupied population	**872.4**	**834.2**	**843.4**	**862.3**	**886.9**
Underemployed people	34.1	41.2	25.1	22.9	29.3
Unemployed ILO	**46.9**	**33.1**	**28.2**	**27.7**	**42.6**
Population outside the workforce	**1255.9**	**1283.6**	**1248.9**	**1240.1**	**1129.9**

[46] https://www.bnm.md/ro/content/pozitia-investitionala-internationala-la-sfarsitul-trimestrului-iii-2022-date-provizorii

	2019	2020	2021	2022	2023
People who don't want to work	1126.3	1177.9	1158.7	1128.7	999.0
Retired	566.2	580.0	583.2	579.3	560.3
Students	163.2	171.4	168.7	164.0	154.0
Domestic work/family care	159.4	164.7	165.1	160.8	136.2
Other	237.5	261.9	241.7	224.6	148.5
People working abroad less than 1 year	105.9	90.4	79.0	93.0	82.9
Potential workforce	16.9	10.1	8.8	9.8	24.3
Young people in the NEET group (Persons Not in Employment, Education or Training) ((15-29 years)	**135.0**	**120.9**	**116.6**	**113.8**	**91.2**
Activity rate	**42.3**	**40.3**	**41.1**	**41.8**	**45.1**
Employment rate	**40.1**	**38.8**	**39.8**	**40.5**	**43.1**
Unemployment rate	**5.1**	**3.8**	**3.2**	**3.1**	**4.6**

Note: * preliminary data.

The participation rate in the workforce among the population aged 15 years and over (the proportion of the workforce aged 15 years and over in the total population of the same age category) was 45.1% in 2023, which is higher than the level in the previous year (in 2022 – 41.8%). This indicator reached higher values among the male population – 49.5%, compared to the female – 41.4%. The respective rates by areas showed the following values: 49.8% in urban areas and 41.7% in rural areas. In the 15-24 years old category, this indicator was 21.2%, and in the 45-54 years old category – 68.6%. The value of this indicator for the working age population according to national legislation (16-59 years for women and 16-63 years for men) was 50.7%. The participation rate in the workforce of persons with disabilities was 17.0%, including 16.0% in men, 18.2% in women, 21.1% in urban areas and 15.3% in rural areas.

The employed population accounted for 886.9 thousand people in 2023, 2.9% higher than in 2022 (862.3 thousand). As in the case of the economically active population, the share of men is higher than that of women (50.2% men and 49.8% women), and the share of employed persons in rural areas was higher than that of employed persons in urban areas (53.5% in rural areas and 46.5% in urban areas, respectively). The employment rate of the population aged 15 years and over (the proportion of employed persons aged 15 years and over compared to the total population in the same age category) was 43.1% in 2023, which is higher than the previous year's level (40.5% in 2022). The employment rate of men (47.1%) was higher compared to women (39.7%). In the distribution by residence area, this indicator was 47.4% in urban areas and 39.9% in rural areas.

Distribution of employed persons by economic activities shows that in 2023 the agricultural sector accounted for 185.3 thousand persons or 20.9% of the total number of employed persons (in 2022 – 179.3 thousand and 20.8%, respectively) (Table 2–10). 701.6 thousand people were employed in non-agricultural activities, which is by 2.7% higher compared to 2022 (683.0 thousand). The share of people employed in industry was 14.4% (in 2022 – 14.8%), including in manufacturing 12.2% (in 2022 – 12.4%), and in construction 7.1% (in 2022 – 7.7%). The services sector accounted for 573.8 thousand persons or 64.7% of the total employed population, which is by 3.3% higher compared to 2022 (555.5 thousand or 64.4% of the total employed population in 2022). Distribution by forms of ownership in 2023 showed that 61.7% of the employed population worked in the private sector and 28.7% – in the public sector (in 2022, 60.3% – the private sector and 28.8% – the public sector, respectively).

Table 2-10: Evolution of active population in Moldova during 2019-2023, thousand people

	2019	2020	2021	2022	2023*
Economic activities	**872.4**	**834.2**	**843.4**	**862.3**	**886.9**
Agriculture, forestry and fishing	182.8	175.9	181.2	179.3	185.3
Industry	128.0	121.4	121.6	127.6	127.8
Constructions	61.4	60.4	65.1	66.5	63.3
Wholesale and retail trades, transport, accommodation and food service activities	163.8	148.4	147.5	152.7	156.9
Transport and storage, information and communication	59.9	61.5	60.2	63.8	63.2
Public administration, defense, education, human health and social work activities	197.5	193.1	193.5	197.4	203.5
Other activities	78.9	73.5	74.3	75.1	86.9

	2019	2020	2021	2022	2023*
Professional status					
Employees	678.4	651.8	659.3	684.4	705.3
Self-employed	153.5	143.4	142.2	139.1	141.5
Unpaid family workers	36.9	35.9	37.8	34.7	36.3
Employers, members of production cooperatives	3.6	3.0	4.2	4.1	3.9
Job type					
Formal occupations	670.6	647.5	651.2	672.9	683.3
Informal occupations	201.8	186.7	192.2	189.5	203.6

Note: * preliminary data.

The number of underemployed persons (persons who had a job whose number of hours actually worked, in total, during the reference period, was less than 40 hours per week, who wanted and were available to work overtime) was 29.3 thousand, which represented 3.3% of the total number of employed persons, which is higher than the previous year's level (2.7% in 2022).

The number of unemployed, estimated according to the definition of the International Labor Office (ILO), was 42.6 thousand, which is higher than in 2022 (27.7 thousand). Unemployment affected men to a greater extent, who accounted for 54.7% of the total unemployed and people in rural areas – 51.2%. The unemployment rate (the share of unemployed ILO in the labor force) at country level was 4.6%, higher than in 2022 (3.1%). The unemployment rate for men was 5.0%, and for women – 4.2%; in urban areas – 4.8% and in rural areas – 4.4%.

According to the data of the National Social Insurance House as of January 1, 2023, the number of pensioners was 675.7 thousand people. About 77.9% of all pensioners were old-age pensioners (526.0 thousand). Due to the higher share in the elderly population and the difference in longevity between women and men, women accounted for 68.2% of the total number of old-age pensioners.

The average size of the old-age pension on January 1, 2023 was 3,156.4 lei which is by 22.4% more compared to the previous year. The average size of the old-age pension for men was 3,592.5 lei, compared to 2,966.0 lei for women. The average value of the minimum subsistence for pensioners in 2023 was 2,403.9 lei, increasing by 9.6% compared to the previous year. The minimum subsistence for pensioners differs depending on the residence area. Thus, for pensioners in large cities it was 2,723.3 lei, compared to 2,419.2 lei for those in other cities and 2,279.9 lei for pensioners in villages.

The number of economically active elderly population (aged 65 and over) in 2023 was 29.3 thousand, which is 3.2% of the total number of active persons.

2.2. Sector details

2.2.1. Industry

The volume of industrial production manufactured in 2022 amounted to about MDL 85.5 billion (in current prices). In January-December 2022, compared to the same period of the previous year, industrial production (gross series) was lower by 5.1% (Table 2-11) due to the decrease in extractive industry (-5.5%).

Table 2-11: Evolution of the industrial sector in the Republic of Moldova during 1990-2022

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Industry, billion MDL	**11.5**	**4.3**	**8.2**	**20.8**	**28.1**	**34.2**	**36.4**	**39.4**	**43.5**	**45.7**	**47.6**	**52.7**	**56.2**	**59.3**	**59.7**	**70.6**	**85.5**
in % compared to the previous year		-3.9	7.7	6.7	9.3	13.4	-2.4	8.6	7.3	0.6	0.9	3.4	3.7	2.0	-5.5	12.1	-5.1
in % compared to 1990		45.0	34.1	57.3	47.1	53.4	52.1	56.6	60.8	61.1	61.7	63.8	66.1	67.4	63.7	71.4	64.8
Industry, billion $US		0.949	0.657	1.648	2.276	2.913	3.002	3.130	3.102	2.426	2.389	2.851	3.345	3.375	3.444	3.990	4.523

During 1990-2022, the evolution of the industrial sector was accompanied by fluctuations, with the best results in 2001, 2003, 2011 and 2021, and negative results in 1992, 1994, 1998, 1999, 2006, 2007, 2009, 2012, 2020 and 2022 (Fig. 2-2).

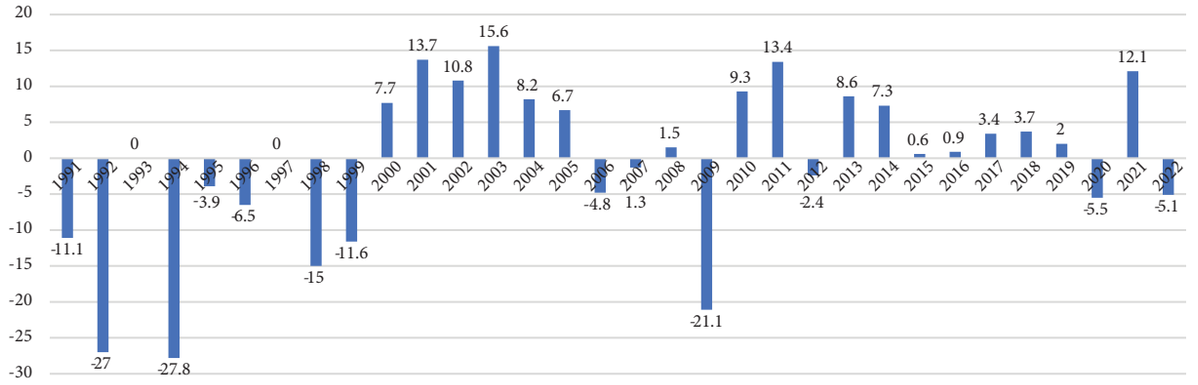


Figure 2-2: Evolution of the industrial sector in the Republic of Moldova during 1991-2022, in % compared to the previous year.

Manufacturing industry

The situation in the industrial sector of the country is mainly determined by the activity of the enterprises in the manufacturing industry, which in 2023 accounted for 86.0% of the total value of the output produced by the enterprises with main industrial activities, included in monthly statistical research. The level of production produced by these enterprises increased by 2.4% compared to 2022 (Table 2-12). Among the processing industry, the most representative activity is the food and beverage.

Table 2-12: Production of the main products in the manufacturing industry of the Republic of Moldova (right bank of the Dniester river) during 2005-2023

	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Meat, thousand tons	5.9	23.7	44.6	44.2	54.3	60.1	60.5	67.6	63.2	70.7	74.2
Poultry, thousand tons	2.3	12.5	28.5	29.6	36.2	40.5	40.8	40.6	37.6	45.8	46.1
Sausage, thousand tons	14.2	13.2	17.2	16.4	18.4	19.7	21.2	22.3	25.5	29.5	27.8
Canned meat, thousand tons	0.6	1.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.7	0.6
Fruit and vegetable juices, thousand liters	25624.9	27115.0	39242.5	49687.1	55689.1	63210.8	81812.1	42984.9	59464.0	57262.5	60669.1
Unconcentrated juices	7170.9	17460.6	21534.7	18755.3	20080.0	19000.3	22320.6	18919.5	9063.5	10823.4	9671.8
Concentrated juices	14641.6	9654.4	17707.8	30931.8	35609.1	44210.5	59491.5	24065.4	50400.5	46439.2	50997.3
Canned vegetables and fruits, thousand tons	33.0	29.9	15.7	16.7	19.6	25.6	17.9	19.0	19.9	17.4	18.5
Processed and canned fruits, thousand tons	18.3	8.0	7.9	9.4	8.2	12.5	9.4	5.1	13.1	9.3	9.8
Crude oils not chemically modified, thousand tons	83.2	80.7	109.5	79.9	86.8	106.2	124.6	154.8	104.5	230.2	247.1
Margarines, tons	3390.0	1274.0	c	c	c	c	c	c	c	c	c
Milk and cream with fat content <6%, thousand tons	20.8	65.1	80.0	86.0	80.0	69.1	61.3	56.5	55.4	48.0	44.4
Milk and cream in solid form, tons	4565.0	1217.0	1357.0	1674.6	2473.6	2276.1	864.9	953.6	617.8	629.4	388.3
Butter, tons	3393.0	4199.0	4787.0	5868.7	4771.9	3937.8	3921.9	3835.5	3667.7	3244.1	3001.9
Cheese and fatty cheese, tons	2380.0	1779.0	2469.0	2402.4	2868.9	2821.5	2582.4	2873.9	3010.7	2744.3	2887.3
Fermented milk, fermented milk cream, yogurt, kefir, cream and other fermented products, tons	21032.0	25615.0	32658.9	32743.6	31107.0	29527.1	29499.6	27826.8	27974.4	26968.8	26498.7
Ice cream and other forms of ice with or without cocoa, thousand liters	12225.0	12491.0	15969.0	16472.9	16962.6	17579.6	16926.4	13183.5	13183.8	15703.2	15679.3
Flour, thousand tons	144.0	108.0	113.2	103.8	112.0	105.8	120.9	108.9	100.4	116.1	118.2
Groats, cereal and agglomerates, thousand tons	3.0	5.6	5.7	5.3	6.7	6.2	6.6	6.0	5.9	5.6	4.9
Ready animal feed, thousand tons	48.8	71.6	79.0	95.4	87.5	85.6	70.8	80.6	84.4	95.9	81.5
Bread and bakery products, thousand tons	108.4	129.0	131.5	129.2	130.1	128.2	130.9	123.1	129.5	118.7	125.5
..Fresh bread	105.7	124.3	124.4	121.7	122.2	120.8	122.8	115.3	121.3	109.5	116.5
..Other baked products	2.7	4.8	7.2	7.5	7.8	7.5	8.1	7.8	8.2	9.3	8.9
Baked confectionery, thousand tons	19.8	26.9	33.6	34.4	35.4	36.8	39.1	38.4	38.7	37.7	36.0
Granulated sugar, thousand tons	133.5	103.2	84.5	100.0	129.0	73.9	86.9	50.5	102.5	74.0	60.2
Molasses, thousand tons	42.2	36.2	30.6	39.1	45.1	64.5	34.9	21.5	34.9	26.5	27.0
Sugary confectionery, thousand tons	12.3	12.9	14.0	14.2	13.8	13.3	12.9	11.4	12.8	12.2	11.4
Pasta, thousand tons	7.8	6.3	5.7	5.0	4.2	3.8	3.8	3.9	3.0	4.4	3.0

	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Mayonnaise and other emulsified sauces, tons	2578.0	540.0	509.0	606.5	702.8	621.2	634.3	554.7	574.4	882.6	727.2
Divine, thousand L 100% alcohol	4780.7	1765.9	2186.4	1433.4	2343.8	2583.5	2708.0	2355.9	3006.3	2820.6	3475.0
Spirits and liqueurs, thousands L 100% alcohol	8133.4	2661.5	3103.4	3074.5	2821.0	2795.5	2627.1	2555.4	2432.3	2197.6	2195.1
..Vodka, thousands L 100% alcohol	4905.9	1289.7	2736.8	2631.8	2516.9	2439.0	2330.6	2256.5	2047.4	1759.3	1952.9
Sparkling wine	1051.0	556.1	502.3	629.2	642.4	665.4	670.0	649.6	950.3	985.4	1022.9
Natural grape wines, mil. dal	36.3	12.7	13.4	13.3	16.3	17.0	17.6	17.2	15.6	14.4	13.3
Porto, Madeira, Sheary, Tokay and others wines, thousand dal	3237.9	1051.1	370.9	470.3	428.3	165.8	213.0	201.2	198.0	186.3	231.6
Mineral and sparkling waters, mil. dal	9.6	11.6	11.9	12.6	14.0	15.4	16.6	16.0	16.8	17.5	18.6
Non-alcoholic beverages	6.4	6.5	6.5	4.6	4.8	5.1	5.2	5.2	6.4	6.9	6.9
Cigarettes and tobacco cigarettes or mixtures with tobacco substitutes. million pcs.	c	c	1775.8	1838.7	1411.0	660.3	650.1	494.1	1381.1	529.7	556.3
Fermented tobacco, thousand tons	8.2	7.3	1.7	1.1	0.1	0.7	0.5	0.5	0.3	0.3	0.7
Fabrics, thousand m2	116.0	55.0	-	-	-	18.3	10.0	10.8	11.4	9.4	139.5
Bed linen, table linen, toilet linen and kitchen linen, tons	103.1	144.3	434.8	444.5	270.9	199.0	209.3	198.3	167.3	298.2	222.1
Hosiery, thousands of pairs	1082.0	1288.0	2046.0	1979.2	1728.2	1271.5	1293.4	955.6	1107.6	570.2	118.8
Knitted articles, mil. pcs.	17.0	20.2	15.2	16.6	23.0	23.6	20.1	18.8	19.9	16.3	12.8
Workwear, thousand psc.	3848.2	6190.7	4067.1	4368.4	5745.9	5514.3	4924.8	6228.1	5913.5	4291.9	4326.0
Coats, raincoats, Canadian coats, capes, anoraks, blouses and similar items (excluding knitted or crocheted), thousands pcs.	938.3	649.8	730.4	840.8	854.2	881.7	849.2	673.0	941.2	1088.0	660.7
Suits and ensembles (excluding knitted or crocheted), thousands pcs.	344.4	97.7	59.6	72.4	135.7	107.4	44.4	33.6	29.5	34.1	42.0
Suits, jackets and blazers (excluding knitted or crocheted), thousands pcs.	513.5	458.4	657.8	476.7	416.8	423.5	297.9	169.7	150.5	179.1	153.9
Long and short pants, overalls and aprons (excluding knitted or crocheted), thousands pcs.	2452.3	1775.5	1119.5	1406.5	1655.6	1964.5	1332.3	1179.9	1534.2	1638.2	1268.6
Dresses and saraphans (excluding knitted or crocheted), thousands pcs.	121.1	798.9	1124.5	1071.9	1191.5	1188.0	1460.3	910.9	1372.2	1473.8	790.8
Skirts and trousers skirts (excluding knitted or crocheted), thousands pcs.	733.2	250.4	530.3	471.7	240.7	274.4	132.6	161.6	135.1	281.8	88.5
Blouses, shirts and shirt blouses (excluding knitted and crocheted), thousands pcs.	2109.1	2656.2	2616.9	2886.8	3078.5	2914.7	3018.5	1865.0	1987.9	1397.2	812.3
..Women's and girls' blouses, shirts and shirt blouses (excluding knitted or crocheted), thousands pcs.	1983.8	1915.7	2169.9	2506.8	2722.7	2587.7	2637.4	1450.0	1562.3	1120.9	579.5
Chests, suitcases, suitcases and similar items of any material, thousands of pcs.	317.1	129.2	82.8	48.8	49.3	54.5	37.7	36.5	22.4	23.2	13.8
Bags for ladies, made of any material, thousands of pcs.	98.9	95.1	136.2	151.4	127.7	123.6	83.1	51.4	79.0	62.9	64.0
Shoes, thousands of pairs	3650.0	2717.0	1886.0	2078.1	1921.1	1794.0	1729.8	1476.3	1446.4	1075.3	955.9
Timber, thousand m^3	21.7	24.8	15.9	13.6	16.6	17.6	12.7	10.7	19.3	13.7	8.6
Wooden window and door frames, thousands of pcs.	16.4	19.1	11.8	10.1	7.0	8.0	12.1	6.1	5.9	7.7	9.0
Parquet panels, thousand m^2	98.4	26.3	10.6	20.0	12.6	9.8	29.9	20.8	23.1	24.1	23.3
Wood briquettes and pellets and other vegetable waste, thousand tons	-	-	20.1	16.0	18.0	26.3	24.3	30.6	21.8	49.5	58.2
Boxes and crates made of paper or corrugated cardboard, mil m^2	52.3	35.7	-	-	-	-	-	-	-	-	-
Boxes and crates made of paper or corrugated cardboard, thousand tons	-	-	11.7	12.0	13.7	14.4	14.4	14.6	19.3	15.6	12.1
Paper and household paper articles, tons	1230.0	4573.2	6739.9	5541.2	5239.2	5253.1	5449.8	5462.3	5652.1	6287.0	4119.6
Labels of paper or paperboard	3633.7	1526.4	2249.5	2843.4	2956.4	3151.2	2981.7	3257.3	3619.4	2225.9	2264.6
Printing of newspapers and periodicals appearing at least 4 times a week, million sheets	57.4	33.0	-	-	-	-	-	-	-	-	-
Printing of newspapers and periodicals appearing at least 4 times a week, tons	-	-	181.2	379.7	22.5	19.7	18.9	61.7	26.3	13.9	-
Exercise books	558.1	723.3	706.1	1444.6	950.9	893.9	624.5	588.1	443.6	549.7	534.7
Oxygen, thousand m^3	1454.1	1788.5	460.7	326.6	387.9	370.9	416.5	629.9	846.6	450.3	367.6
Carbon dioxide, tons	3198.0	1306.0	c	c	c	3500.7	4518.2	c	c	c	c
Wood charcoal whether or not agglomerated (including shell or nut charcoal), tons	-	c	481.6	600.5	508.1	431.5	542.4	522.4	547.7	787.9	474.9
Undenatured ethyl alcohol, with alcoholic strength of not less than 80% vol., thousand dal	928.8	3396.4	1125.2	2847.6	3851.0	3678.4	3326.6	5106.7	4256.7	4551.2	2932.4
Varnishes and paints, tons	6269.0	12864.0	26857.8	32746.9	29554.9	29597.9	29358.0	31152.2	31867.6	18975.3	18521.1
Soaps, tons	317.1	537.5	993.2	994.5	1243.0	1261.1	1540.0	2042.7	1579.4	1883.8	1840.5
Washing and cleaning preparations, tons	533.0	618.0	1760.0	2821.4	2155.2	2674.4	3715.9	3724.1	4052.7	4148.9	3917.7
Etheric oils	62.5	67.9	42.4	45.5	71.1	36.8	59.6	51.0	45.0	53.2	54.9

	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Provitamins and vitamins, natural or obtained by synthesis (including natural concentrates), as well as their derivatives used mainly as vitamins, mixed or not with each other, even in different solutions, tons	92.4	285.3	799.6	637.5	584.0	305.9	101.9	96.2	65.8	89.2	128.5
Medicines containing alkaloids or their derivatives and vitamins, tons	300.2	2342.0	1652.6	1593.6	1899.4	1625.2	1779.0	1824.0	1863.2	2271.5	2512.2
Plastic tubes and pipes; tons	714.0	1679.4	2749.0	2878.4	2290.6	2467.4	2468.9	2790.7	2295.6	2766.9	2881.4
Boxes, crates, racks and similar articles of plastics, tons	944.7	298.3	159.0	151.1	140.0	152.2	134.8	129.2	179.5	175.2	298.9
Windows, doors, stained glass and their frames, made of plastic, thousand pcs.	-	292.3	141.1	157.9	187.5	172.4	177.0	210.7	287.2	245.8	218.3
Insulating glass with multiple layers, thousand m^2	31.4	339.6	476.8	403.3	445.9	475.0	529.3	530.4	515.5	422.4	392.8
Glass mirrors, thousand m^2	9.8	10.8	-	-	-	-	-	-	-	-	-
Glass mirrors; thousand pcs.	-	-	13.5	8.2	5.1	33.6	26.4	34.3	8.7	11.5	12.4
Bottles and glass vials, million pcs.	354.6	246.2	228.9	218.5	206.0	235.1	215.0	306.8	298.2	336.2	382.0
Ceramic bricks for construction, thousand m^3	114.2	77.3	78.1	71.5	42.6	68.2	75.6	69.4	85.6	83.3	67.1
Dry plaster mixtures, thousand tons	131.5	142.3	194.9	204.4	198.7	186.9	194.3	217.2	210.7	224.7	181.6
Prefabricated elements for cement, concrete or artificial stone constructions, thousands of tons	230.7	202.0	288.5	277.4	396.0	457.5	527.5	603.0	533.2	220.9	209.0
Non-refractory concrete ready to pour, thousand tons	655.9	720.3	1670.5	1532.2	1640.3	1839.9	2061.5	1894.2	2168.2	2454.4	1739.2
Grey cast iron castings, tons	2213.5	874.7	674.8	650.7	482.9	789.6	1147.8	1252.8	1719.8	165.9	96.9
Steel castings, tons	173.3	59.1	70.1	36.1	52.6	25.4	19.3	c	c	c	c
Light non-ferrous metal castings, tons	7.8	6.1	10.3	c	c	4.8	2.5	c	c	c	-
Doors, windows and their frames, thresholds, windowsills, made of ferrous metal, pcs.	1718.0	3110.0	4012.0	4614.0	4460.0	4024.0	4575.0	3814.0	4565.0	3317.0	2111.0
Doors, windows and their frames, thresholds, windowsills, made of ferrous metal, pcs.	36806.0	64636.0	25717.0	21736.0	21336.0	25280.0	25197.0	26100.0	26074.0	24123.0	19783.0
Reservoirs, tanks, vats and similar containers of cast iron, iron, steel or aluminum, with a capacity exceeding 300 L, tons	266.0	123.0	711.9	670.6	477.8	779.7	887.0	962.0	1248.0	3410.5	2488.4
Metallic fabrics, gratings, nets and lattices, of iron or steel wire, tons	-	4488.6	5142.7	5402.7	6010.1	6735.3	7537.1	10420.7	11792.1	9593.5	11307.5
Non-portable personal computers, pcs.	4662.0	5134.0	5600.0	5369.0	4274.0	2391.0	1488.0	c	c	c	c
Electrical conductors, with or without connectors, for voltage<=1000V, thousand pcs.	-	c	10960.0	10508.3	16632.4	21125.4	21050.2	11216.8	8748.3	5484.7	-
Centrifugal pumps, other pumps for liquids or liquid elevators, pcs	3704.0	1537.0	910.0	1180.0	964.0	1050.0	931.0	722.0	652.0	366.0	371.0
Ploughs and disc harrows	725.0	846.0	227.0	187.0	285.0	188.0	124.0	81.0	79.0	78.0	45.0
Machinery for the industrial preparation of food or beverages, oils, animal or vegetable fats, not included in other categories, pcs.	1213.0	551.0	297.0	309.0	457.0	200.0	416.0	228.0	92.0	451.0	510.0
Ignition wiring sets and other wiring sets used for transport means, tons	-	c	13109.0	12094.4	13248.9	20025.2	26983.3	21017.6	19269.3	21883.1	26910.1
Electricity, produced to be delivered, mil. kWh	1229.0	1064.0	938.0	905.3	895.0	957.6	940.1	981.1	1129.2	972.1	1094.0
Thermal energy, produced to be delivered, thousands Gcal	3591.0	2874.0	1729.0	1824.7	1747.2	1827.0	1618.4	1571.0	1826.8	1499.0	1449.9

Source: <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__14%20IND__IND030/ IND030100.px/table/tableViewLayout2/>

The aggregated information on production of the main industrial products with an impact on the direct and indirect GHG emissions evolution in the Republic of Moldova during 1990-2022 is presented below for the entire country (the right and left banks of the Dniester river) (Table 2-13). As shown in the table, with few exceptions, production of the main industrial products in Moldova showed a clear decreasing trend during 1990-2022.

Table 2-13: Production of the main industrial products with an impact on the greenhouse gas emissions evolution in the Republic of Moldova during 1990-2022

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Cement, kt	2288.0	518.8	431.9	772.8	861.4	1 122.8	900.2	1 045.9	1 174.9	1 220.2	1 164.1	1170.6	969.3
Clinker, kt	1801.3	459.7	320.3	678.7	655.6	830.9	809.0	759.1	958.2	982.1	876.4	955.2	761.9
Commercial lime, kt	204.3	38.8	15.1	9.1	3.4	8.2	4.1	22.4	24.8	27.9	22.2	23.8	32.1
Lime – autoproducers, kt	151.8	66.3	27.2	28.4	17.3	13.0	14.3	16.4	12.6	9.2	6.2	4.2	5.7
Glass sterilizing jars, mil. conventional pieces	657.6	87.4	156.2	103.1	99.8	C	C	C	C	C	C	C	C
Glass bottles and vials, mil. pieces	165.5	184.0	260.5	354.6	246.2	228.9	218.5	206.0	235.1	215.0	306.8	298.2	336.2
Brick, mil. conventional pieces	235.5	59.2	52.9	73.7	49.0	46.8	43.9	39.1	38.5	43.3	42.7	52.5	51.3
Polymer film, kt	5.2	0.7	1.7	4.6	3.8	3.6	3.5	3.4	3.7	3.9	4.5	4.6	4.9
Synthetic resins, kt	17.5	1.4	1.1	1.0	1.5	0.9	1.5	1.3	2.1	2.5	2.2	2.2	2.3
Steel, kt	711.9	656.8	908.1	1049.4	242.4	431.8	129.6	471.7	505.0	394.3	467.1	556.4	557.0

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Laminates, kt	614.2	357.0	636.0	890.0	237.7	318.8	222.5	451.4	497.9	394.6	455.6	304.4	304.4
Bituminous concrete, kt	1 220.3	370.0	69.6	215.1	194.4	250.4	214.3	273.7	767.0	523.4	844.3	712.7	692.1
Paint and varnishes, kt	11.7	0.8	2.1	6.3	12.9	26.8	32.7	29.5	29.5	29.3	31.0	32.1	19.2
Rubber articles, kt	46.9	1.4	1.6	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Pharmaceuticals, kt	1.9	0.3	0.5	0.7	5.0	4.1	3.8	4.4	3.5	3.6	3.7	3.8	4.6
Restored tires, thousand pieces	75.3	6.6	7.0	3.2	6.7	6.0	7.3	7.4	8.6	8.1	9.6	6.8	8.5
Shoes, mil pairs	23.2	7.6	5.9	7.5	6.2	5.5	5.2	4.6	4.4	3.8	3.3	3.5	3.0
Timber, thousand m^3	265.0	25.1	14.9	23.1	25.6	16.5	14.3	17.1	18.5	13.4	11.3	20.0	14.4
Cigarettes, billion pieces	9.1	7.1	9.3	6.2	6.3	1.8	1.8	1.4	0.7	0.7	0.5	3.4	2.3
Meat, kt	257.9	58.4	13.4	6.7	24.7	46.0	45.9	55.9	62.2	62.6	70.5	66.2	74.1
Fish and fish products, kt	9.5	0.0	1.9	3.0	1.3	10.0	8.1	7.8	10.7	10.1	10.3	8.6	8.5
Dry cereals in elevators, kt	2169.8	1581.1	899.6	814.7	764.9	724.7	987.6	1115.5	1161.5	1100.0	551.3	1632.6	725.8
Sugar, kt	435.8	218.7	105.4	133.5	103.2	84.5	100.0	129.0	73.9	86.9	54.4	101.2	67.8
Confectionery, kt	24.3	5.2	8.7	20.7	27.7	34.3	35.1	36.5	37.9	40.2	39.4	39.8	38.8
Bread, kt	601.9	268.4	138.1	142.0	160.4	161.3	157.6	158.0	156.3	158.1	148.8	154.7	141.9
Ready animal feed, kt	1037.3	333.6	59.8	50.8	74.4	80.1	101.7	94.0	89.7	74.8	87.2	91.0	104.0
Crude oils, kt	125.6	50.7	31.3	83.4	80.7	109.5	80.0	86.8	106.3	124.7	154.9	104.7	230.2
Refined oils, kt	57.5	23.2	14.4	38.2	26.5	16.7	25.7	13.7	13.9	11.3	26.4	21.7	45.3
Grapes wine, thousand hl	1630.0	996.9	1092.2	3643.5	1285.5	1356.5	1345.8	1652.3	1717.3	1787.2	1746.2	1577.4	1435.9
Grapes white wines, thousand hl	764.5	467.5	512.3	1 710.2	591.7	622.5	576.2	775.7	774.9	781.5	801.4	675.3	655.2
Grapes red wines, thousands hl	865.5	529.4	580.0	1 933.3	693.8	734.0	768.4	880.8	932.5	979.2	922.5	877.3	778.2
Sparkling wine	80.4	94.8	41.6	105.1	55.6	50.2	63.3	65.2	67.4	67.9	66.3	96.5	100.0
Cognac (divine), thousand hl	139.4	102.7	71.8	171.1	74.6	70.2	50.1	84.0	87.7	91.9	73.3	96.1	90.1
Spirits and liqueurs, thousand hl	55.9	412.7	48.9	238.8	127.1	162.3	162.8	156.9	151.9	143.0	137.0	134.3	121.3
Beer, thousand hl	760.0	302.9	257.9	777.8	952.6	994.5	847.8	866.5	819.5	839.3	832.6	924.6	885.4

Energy industries

In 2022, enterprises in the energy industries accounted for about 10.2% of the total production produced by large enterprises with main industrial activities. In 2022 the output of these enterprises was worth MDL 8,754.4 billion (current prices), by 30.5% more compared to 2021 (MDL 6,705.1 billion, current prices)[47].

Brief description of the power system of the Republic of Moldova

In the Republic of Moldova, the electricity generation capacity includes the Moldovan Thermal Power Plant (MTPP) in the city of Dnestrovsk (situated on the left bank of the Dniester river), with a nominal installed capacity of 2,520 MW, operating on natural gas, fuel oil and coal, built between 1964-1982; CHP-2 Chisinau, with a nominal installed power of 240 MW electrical capacity (available 210 MW) and 1200 Gcal/h thermal capacity, built between 1976-1980; CHP-1 Chisinau, with a nominal installed power of 66 MW electrical capacity (available 40 MW) and 254 Gcal/h thermal capacity, built between 1951-1961; CHP-North Balti, with a nominal installed capacity of 28.5 MW electrical capacity (available 24 MW) and 200 Gcal/h thermal capacity, built between 1956-1970; HPP Dubasari on the Dniester river, with a nominal installed capacity of 48 MW (available 30 MW), wear degree 75%, built between 1954-1966; HPP Costesti on the Pruth river, with a rated installed capacity of 16 MW (available 10 MW), wear degree 67%, built in 1978; other power plants, including nine CHPs in sugar refineries with a nominal installed capacity of 97.5 MW operating on natural gas and fuel oil, built in 1956-1981.

Of the relatively large nominal total capacity (2,996.5 MW), only about 346 MW can be used in cogeneration in Chisinau and Balti, and only about half of the CTEM capacity (in particular, due to difficult commercial conditions) is used on hydro base. Most of the country's consumption (about 75-78% in 2007-2020) was covered by electricity imports from Ukraine, respectively supplies from the MTPP. The amount of locally produced electricity increased in 2023 by about 19%, reaching 1,010.8 million kWh, which is by 159.7 million kWh more than in 2022. The key driver of this increase is the emergence of new generation capacities based on photovoltaic panels and wind turbine technology. In 2023 the HPP Costesti generated 68.8 million kWh, which is by about 60% more compared to 2022, thus recording the highest production in the last five years. The amount of imported electricity decreased by 497.8 million kWh, being replaced by electricity generated by local producers, including

[47] <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__14%20IND__IND020/ IND020100.px/table/tableViewLayout2/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>

electricity fed in the grids by the power plants of the final consumers. The amount of electricity purchased from the MTPP in 2023 was about 3,278.5 million kWh, or by 572.2 million kWh more than in 2022. It should be noted that during 1990-2023, electricity production decreased in the Republic of Moldova by about 54.3%, and electricity consumption by about 48.8% (Table 2-14).

Table 2-14: Production and supply of electricity in the national economy during 1990-2023, billion kWh.

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Production	15.690	6.168	3.624	4.225	6.115	6.050	5.701	4.815	5.239	5.557	6.047	5.746	5.040
Supply	11.426	7.022	4.510	5.838	5.257	5.455	5.274	5.520	5.755	5.776	5.812	6.102	5.997

Source: Statistical Yearbooks for the years 1994, 1999, 2003, 2006, 2009, 2012; 2014, 2017, 2020, 2021, 2022, 2023; Statistical Yearbooks of ATULBD for the years 2000; 2006; 2009; 2010; 2011; 2012; 2014; 2017; 2020; 2021.

It should be noted that according to the reports submitted by the distribution system operators and the transmission system operator, the total amount of electricity generated by the power plants which use renewable energy sources, the holders of which benefit from the support scheme and the producers selling electricity at negotiated prices, except for the HPP Costesti, was 282.8 million kWh in 2023, which is by about 44.1% more compared to 2022 (Table 2-15).

Table 2-15: Production of electricity from renewable energy sources during 2016-2023

	Amount of electricity generated, mil kWh							
	2016	2017	2018	2019	2020	2021	2022	2023
Solar (PV)	1.311	1.509	1.457	1.437	3.275	7.764	30.297	77.748
Biogas	14.030	21.576	27.961	28.748	27.793	32.239	23.567	13.785
Wind	2.477	7.066	21.968	36.915	50.138	76.310	142.373	191.290
Hydroelectric	0.000	0.038	0.279	0.330	0.147	0.239	0.096	0.000
TOTAL	**17.818**	**30.189**	**51.665**	**67.430**	**81.353**	**116.552**	**196.333**	**282.823**

Of the total amount of electricity generated from renewable sources, the largest share is the wind generated electricity (67.6%), followed by electricity produced from solar energy (27.5%), electricity produced from biogas (4.9%).

The electricity transmission network operator (SOE "Moldelectrica") manages the internal transmission network on the right bank of the Dniester river, including 400 kV (203 km), 330 kV (377.34 km), 110 kV (3,337.04 km) and 35 kV (807.59 km) and 6-10 kV radial lines. Interconnections include 7 lines of 330 kV and 12 lines of 110 kV with Ukraine, 4 lines of 110 kV with Romania and one line of 400 kV with Romania and from there with Bulgaria.

In 2000 Moldova privatized a large part of the distribution sector (approximately 70%), i.e. three out of five electricity distribution units, which subsequently merged into I.C.S. RED "Union Fenosa" SA (currently I.C.S. RED "Premier Energy" SRL), while the other two retained their status of state-owned enterprises: "RED Nord" SA and "RED Nord-Vest" SA (which subsequently merged into "Electricity Supply Nord" SA). On the left bank of the Dniester river, the service is provided by "RED East" SA and "RED South-East".

Electricity generation by MTPP

In the energy system of Moldova there is only one thermoelectric power plant with condensation, situated in Dnestrovsk (on the left bank of the Dniester river). The plant is equipped with eight condensing power groups with electrical capacity of 200 MW each operating on coal (put into operation in the period 1964-1971), of which only four energy groups are currently operational; in the period 1999-2007 none were operational), two condensing energy groups with an electrical capacity of 210 MW each operating on fuel oil and natural gas (put into operation in 1973 and 1974, both operational) and two energy groups with an installed power of 250 MW each, which operate on natural gas based on combined gas-seam cycle (put into operation in 1980, both operational).

The technological processes at CTEM are based on the classic steam turbine cycle with condensation and involve combustion of fossil fuel for production of electricity, production of thermal power being only a secondary process. Production of electricity at MTPP during 1990-2022 decreased by about 65.7% (Table 2-16).

Table 2-16: Electricity generation at MTPP during 1990-2022, billion kWh

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Production of electricity	13.569	4.747	2.463	2.701	4.723	4.610	4.447	4.447	4.447	4.447	4.447	4.912	4.173

Source: Express Information, "Main Performance Indicators of the Republic's Industry for 2009-2020 r. (excluding small businesses) ". State Statistical Service of the ATULBD.

Combined heat and power generation

There are three power plants with combined cycle on the right bank of the Dniester river: CHP-1 and CHP-2 in Chisinau municipality, and CHP-North in Balti municipality. There are also a few small cogeneration power plants at sugar refineries. The installed capacity of cogeneration power plants on the right bank of the Dniester river accounts for only about 14% of the total installed capacity of power plants in Moldova. Of the total nominal capacity installed on the right bank of the Dniester river, the largest share is represented by CHP-2 in Chisinau municipality, about 55% of the total, followed by CHP-1 in Chisinau municipality, with a share of about 14%, and respectively by CHP-North in Balti municipality, with a share of about 7%. The total rated capacity installed on the right bank of the Dniester river satisfies its own electricity needs in a proportion of about 30% only.

The total production of electricity on the right bank of the Dniester river decreased from about 1,901 billion kWh in 1990 to about 1,018 billion kWh in 2022.

Heat generation

In the Republic of Moldova there are several thermal power plants which operate on natural gas and on residual fuel oil, less on coal and biomass. The amount of fuel consumed is accounted for in the Energy Balances of the Republic of Moldova. Between 1990 and 2022, the total amount of heat generation in the Republic of Moldova decreased by about 83.7%: from 22,212 million Gcal in 1990 to 3,630 million Gcal in 2022.

2.2.2. Agriculture

The value of agricultural output in 2022 was about MDL 44,817 billion (in current prices). Compared to 2021 the index of agricultural production output decreased by 25.1% (under comparable conditions). The reduction in global agricultural production was determined by the decrease in plant production by 55.2% and in animal production by 65.5%. In 2022, the share of crop production in the total agricultural production output was 67.6% (in 2021 – 78.1%), livestock production accounted for 30.4% (in 2021 – 19.8%).

During 1991-2022, the evolution of agricultural production was fluctuating, the best results were reported in 1993, 1997, 2004, 2008, 2010, 2011, 2013, 2014, 2017 and 2021, and the worst, respectively, in 1992, 1994, 1996, 1998, 2003, 2007, 2012, 2015, 2019, 2020 and 2022.

It should be noted that during 1990-2022 the areas sown with certain agricultural crops were significantly reduced in Moldova (for example, the areas sown with oats were reduced by 57.1%, cucurbit crops– by 76.1%, vegetables – by 46.4%, potatoes – by 44.4%, autumn and spring barley – by 57.2%, legumes – by 55.1%, perennial herbs for green fodder, silage and fodder – by almost 100.0%, buckwheat – by almost 100.0%, sugar beet – by 85.6%, corn for silage and green mass – by 97.7%, etc.).

Between 1990 and 2022, the number of domestic animal species decreased significantly: cattle – by 90.2% (dairy cows – by 82.7%), swine – by 81.2%, sheep – by 66.2%, horses – by 58.5%.

Compared to the previous year, in 2022 production (growth) of cattle and poultry (live weight) in households of all categories increased by 32.5% and 11.8%, respectively, due to the increase in the volume of animal production in agricultural enterprises and peasant (farmer) households by 98.3% and 20.4%, respectively. At the same time, cattle and poultry breeding in households decreased by 23.6% and 8.1%, respectively. Milk production in households of all categories decreased by 10.0%, while egg production increased by 16.0%.

2.2.3. Transport

The structure of the transport sector of Moldova comprises: road transport, railway transport, air transport and naval transport.

The public roads network with a total length of about 9.4 thousand km (of which 9.1 thousand km are with hard top). The road network is sufficiently developed (the density of public roads is about 322 km/1000 km^2, and the network of public roads with hard top is about 306 km/1000 km^2). In recent years, large-scale works are being carried out to repair and restore the national roads network.

Auto transport is represented by a wide spectrum of means of transport: cars, buses and minibuses, trucks, special purpose cars (ambulances, fire trucks, mobile cranes and others). The main types of fuels consumed are gasoline, diesel, LPG and compressed natural gas. During the reference period, there was an intense increase in the number of auto vehicles in the Republic of Moldova.

Rail transport has been operating for over 140 years. The length of the railroads is about 1.15 thousand km, and the density of communication routes per 1,000 km^2 is about 34 km. Rail transport is provided by means of diesel line locomotives (power 400-4,000 kW), shunting locomotives (power 200-2,000 kW), Diesel trains, freight and passenger wagons. During the reference period, the number of inventory rolling stock tended to decrease. The main type of fuel used in rail transport is diesel fuel.

Naval transport in the Republic of Moldova is developing and increasing both the number of ships and the number of ports. The length of the navigable waterways is currently about 476 km (including 410 km to the right of the Dniester River, respectively 66 km to the left of the Dniester River).

There are four airports in the country: in Chisinau, Balti, Cahul and Marculesti. Of these, only Chisinau airport operates regular passenger routes. The airports in Cahul and Marculesti are in the process of certification. Balti airport is certified, but only serves irregular routes.

Compared to 1990, both the quantity of goods transported by transportation means (from 331.1 million tons in 1990 to 49.0 million tons in 2022) and the turnover of the transported goods (from 21,648 million ton-km in 1990 to 7,872 million ton-km in 2022) reduced considerably.

During the period under review, both the number of transported passengers (from 757.7 million passengers in 1990 to 257.4 million passengers in 2022), and the turnover of transported passengers (from 10.102 billion passenger-km in 1990 to 5.518 billion passenger-km in 2022) reduced significantly.

2.2.4. Buildings

As of December 31, 2022, the housing stock (on the right bank of Dniester river) was 90.5 million m^2 (by 0.6% more than in the previous year, i.e. 16.2% more than in 1990).

Between 1990 and 2022, the indicative energy consumption per m^2 of the total area decreased in the residential sector from about 26.0 kg c.e./m^2 in 1990 to about 17.5 kg c.e./m^2 in 2022.

During 1990-2022, the gasification of the country was successfully carried out. This allowed to considerably reduce the consumption of solid and liquid fuels in favor of natural gas, and after 2010 in favor of renewable energy sources (especially biomass).

The length of natural gas networks increased in the Republic of Moldova between 1990 and 2022 by about 12.9 times (from 1,873 thousand km in 1990 to 25,362 thousand km in 2022).

2.3. Description of the nationally determined contribution under Article 4 of the Paris Agreement, including updates

On September 25, 2015 the Republic of Moldova officially submitted its intended nationally determined contribution[48] (NDC 1.0) and associated information to the UNFCCC Secretariat to facilitate clarity, transparency and understanding in relation to the provisions of Decisions 1/CP.19 and 1/CP.20.

In accordance with this, the Republic of Moldova has committed to achieve by 2030 the unconditional economy-wide target of reducing GHG emissions by 64% compared to the level recorded in the reference year (1990), and to make maximum efforts to reduce GHG emissions by 67% compared to the level recorded in 1990. The respective reduction commitment could be conditionally increased up to about 78%, if important topics were considered, such

[48] <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Moldova/1/INDC_Republic_of_Moldova_25.09.2015.pdf>

as the provision of low-cost financial resources, technology transfer and technical cooperation, access to all of these to the extent proportionate to the challenges of global climate change. The economy-wide GHG emission reduction targets have been set in an emissions budget covering the period from January 1, 2021 to December 31, 2030. The economy-wide GHG emission reduction targets, set out in the NDC 1.0 of the Republic of Moldova, were subsequently officially approved at national level by Government Decision no. 1470 as of 30.12.2016 on approval of the Low Emission Development Strategy until 2030 (LEDS 2030) and the Action Plan for its implementation[49].

On March 4, 2020, the Republic of Moldova submitted to the UNFCCC Secretariat the updated version of its nationally determined contribution (NDC 2.0)[50]. In line with this, the Republic of Moldova has committed to achieve more ambitious economy-wide absolute GHG emission reduction targets by 2030. Thus, the unconditional target increased from 64-67% to 70% compared to the level recorded in the reference year (1990), and the conditional target advanced accordingly from 78% to about 88% compared to the level recorded in 1990. The new GHG emission reduction targets were introduced in the Low Emission Development Program until 2030 (LEDP 2030) and the Action Plan for its implementation, approved at national level by the Government Decision no. 659 as of September 6, 2023[51].

According to NDC 1.0 (2015), total emissions in the base year (1990) amounted to 43.4 Mt CO_2 equivalent, excluding LULUCF and 37.5 Mt CO_2 equivalent, with LULUCF.

In NDC 2.0 (2020), the total emissions in the reference year (1990) – 44.9 Mt CO_2 equivalent, without LULUCF, respectively – 43.4 Mt CO_2 equivalent with LULUCF.

The difference observed between NDC 1.0 and NDC 2.0 is due to the complete transition from the IPCC 1996 Revised Guidelines to the IPCC 2006 Guidelines, but also the transition from the GWP values for a 100-year horizon (GWP_{100}) included in IPCC SAR, to GWP values included IPCC AR4, as well as due to recalculations undertaken as a result of using higher-tier methodologies, revised values of country-specific and default emission factors, updating the time series for activity data and taking into account for the first time in the national GHG inventory new categories of emissions and removals, etc.

In the NDC 3.0, to be presented by the Republic of Moldova in 2025, the GWP values for 100 years from IPCC AR5 will be used. The Republic of Moldova will consider future updates by the IPCC of the GWP values for a 100-year horizon.

The circumstances, in which Moldova would update its benchmark values, could arise from the need to improve the quality of the national GHG inventory, by taking into account the availability of updated activity data, the higher-tier methodological approaches available in the 2006 IPCC Guidelines, the update of country-specific emission factors and the recalculation of GHG emissions and removals, following the implementation of the recommendations resulting from the implementation of the QA/QC Plan.

The economy-wide GHG emission reduction commitment is foreseen for the period from January 1, 2021 to December 31, 2030.

Fulfilment of this commitment will be monitored at least every two years, by means of the national inventory of greenhouse gas emissions sources and sinks, reported to the UNFCCC as a technical annex to the BTRs.

The economy-wide GHG mitigation target corresponds to the absolute reduction of the net greenhouse gas emissions compared to the reference year level (1990).

The geographical coverage corresponds to the geopolitical borders of the internationally recognized country (including the administrative-territorial units on the left bank of the Dniester river).

Moldova applies the net-net approach (net-net accounting basis)[52] to account for 100% of the national greenhouse gas emissions and removals for the reference year, as published in the NIR.

The gases covered: all greenhouse gases not falling under the Montreal Protocol - carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), nitrogen trifluoride (NF_3).

[49] <https://www.legis.md/cautare/getResults?doc_id=114408&lang=ro>
[50] <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>
[51] <https://www.legis.md/cautare/getResults?doc_id=139980&lang=ro>
[52] Net-Net Accounting - a Party accounts emissions and removals from LULUCF both in the base year (1990) and in the commitment period (2030). In other words, under the net-net accounting, a Party would account for the difference between 1990 and 2030.

Sectors covered: Energy, IPPU, Agriculture, LULUCF and Waste.

Both the anthropogenic emissions and removals categories and the sectors considered are included in categories and sectors covered in the 2006 IPCC Guidelines, used by Moldova to calculate national greenhouse gas emissions. Moldova took into account paragraph 31 (c) and (d) of Decision 1/CP.21.

Moldova intends to include all emission categories by sources and removals by sinks, as well as all carbon pools and gases, as reported in the national GHG inventory; to account for the land use sector using a net-net approach; and to use a "production approach" to account for harvested wood products, in line with the 2006 IPCC Guidelines. Moldova could exclude emissions from natural disturbances, as recommended by the IPCC.

Estimating emissions and removals in the land use sector pose challenges related to data collection, as well as methodological challenges. According to the good practices of the 2006 IPCC Guidelines, Moldova will continue to improve its reporting of greenhouse gas emissions and removals from LULUCF sector, which will also involve updating the methodologies used.

According to NDC 2.0, the Republic of Moldova has committed to reduce its net GHG emissions under the unconditional scenario, from 43.4 Mt CO_2 equivalent in 1990 to 12.8 Mt CO_2 equivalent in 2030, i.e. about 3.4 times less in a period of 40 years, thus contributing to stabilizing the GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system and ensure that the country's food production is not threatened and would allow economic development in a sustainable manner.

It should be noted that the LEDP 2030, approved at the national level by the Government Decision no. 659 as of September 6, 2023, and which is the legally-binding instrument for achieving the mitigation targets of the NDC 2.0, provides also specific targets for seven sectors to reduce direct GHG emissions by 2030, both for the unconditional and conditional scenarios (Table 2-17).

Table 2-17: Sector specific targets to reduce direct GHG emissions by 2030, according to the LEDP until 2030, Mt CO_2 equivalent

	1990	2030
Unconditional		
Energy	21.3	4.0
Transport	4.5	2.2
Buildings	9.9	2.5
Industry	1.6	1.1
Agriculture	5.2	2.9
LULUCF	-1.5	-1.7
Waste	1.5	1.3
Total, with LULUCF	**43.4**	**12.8**
Total, without LULUCF	**44.9**	**14.5**
Conditional		
Energy	21.3	2.8
Transport	4.5	2.0
Buildings	9.9	2.2
Industry	1.6	1.1
Agriculture	5.2	2.8
LULUCF	-1.5	-7.5
Waste	1.5	1.2
Total, with LULUCF	**43.4**	**5.0**
Total, without LULUCF	**44.9**	**12.5**

2.4. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement

The Republic of Moldova has only one indicator, which must be tracked, the net direct greenhouse gas emissions recorded at the level of the entire national economy.

Net national GHG emissions are to be reduced unconditionally by 70% by 2030 compared to baseline year level (1990). According to the information available in the "*National Inventory Report: 1990-2022. Greenhouse Gas*

Emissions Sources and Sinks in the Republic of Moldova", during the period 1990-2022, net direct greenhouse gas emissions, expressed in CO_2 equivalent, decreased by **69.5%**: from 43.8 Mt CO_2 equivalent in 1990 to 13.4 Mt CO_2 equivalent in 2022.

The level of progress in achieving this indicator is also shown in the CTF tables.

2.5. Mitigation policies and measures related to implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

2.5.1. Quantitative economy-wide emission reduction targets

The Paris Agreement (2015), ratified by the Republic of Moldova by Law no. 78/2017[53], established an action plan to limit global warming below 2°C. In order to achieve the objective of the Paris Agreement (2015) all its signatories are to communicate to the UNFCCC, through the Nationally Determined Contributions (NDCs), the efforts undertaken at national level to reduce GHG emissions.

On March 4, 2020 the RoM updated its NDC (NDC 2.0) and submitted it to the UNFCCC Secretariat[54]. In NDC 2.0, the RoM intends to achieve more ambitious reduction targets than those included in NDC 1.0. The updated unconditional target provides for a reduction of greenhouse gas emissions by 2030 by up to 70% compared to the 1990 reference year. Regarding the conditional objective, the reduction commitment was increased to 88% below the 1990 level, provided that external support was obtained, including in the form of low-cost financial resources, technology transfer and technical cooperation, etc.

With more ambitious economy-wide GHG emission reduction targets in NDC 2.0, the Republic of Moldova developed and approved by the Government Decision no. 659 of September 6, 2023 the Low Emission Development Program until 2030[55] (LEDP 2030), which replaced the Low Emission Development Strategy of the Republic of Moldova until 2030 (LEDS 2030), approved by the Government Decision no. 1470 as of 30.12.2016 (repealed at the time of LEDP 2030 approval).

2.5.2. Activities related to NAMAs

In order to achieve the general and specific targets of the LEDP 2030, nationally appropriate mitigation actions (technologies and/or measures) have been identified (NAMA) for each sector concerned (Energy, Transport, Buildings, Industry, Agriculture, LULUCF and Waste), with prioritized participation of all stakeholders.

NAMAs are divided into three categories:

1. Unconditional: unilateral mitigation actions taken by the country on its own;
2. Conditional: mitigation actions supported by funding, technology transfer and capacity-building assistance from developed countries; and
3. Credited: mitigation actions with the potential to generate credits for the carbon market.

According to the LEDP 2030, the achievement of the unconditional economy-wide emissions reduction target of NDC 2.0 is based on the achievement of NAMAs, 12 of which have already been registered in the UNFCCC's NAMA Register[56].

The list of NAMAs requesting implementation support, registered in the UNFCCC's NAMA Registry, was previously reported in the BUR3 of the RoM to the UNFCCC (2021).

The largest contribution to reaching the conditional objective of NDC 2.0 is expected to be achieved through the financial mechanisms of the Paris Agreement, including with the financial support of the Green Climate Fund (GCF).

[53] Law no. 78 of 04.05.2017 for the ratification of the Paris Agreement. published in the Official Gazette no. 162-170 art. 282. <https://www.legis.md/cautare/getResults?doc_id=99251&lang=ro>
[54] <https://www4.unfccc.int/sites/ndcstaging/Pages/LatestSubmissions.aspx>
[55] <https://www.legis.md/cautare/getResults?doc_id=139980&lang=ro>|
[56] <http://www4.unfccc.int/sites/nama/SitePages/NamaImplementation.aspx

In this respect, in 2019, the Country Programme for engagement with Green Climate Fund (GCF) in the period 2019-2024[57]. This activity was carried out within the GCF Project "*Support to the Republic of Moldova in Establishing and Strengthening the National Designated Authority, Developing the Strategic Framework and Developing the National Program for Engagement with the Green Climate Fund*". The Country Programme for engagement with Green Climate Fund in the period 2019-2024 was not approved, however, instead, the Country Programme for engagement with Green Climate Fund in the period 2024-2027 was recently developed, and is currently in the process of consideration and approval.

In an aggregated form, the measures identified to achieve the NDC 2.0 objectives were previously reported in Annex 2 of the BUR3 of the RoM to the UNFCCC (2021), set out in the format specified in Annex III of the Decision 2/CP.17 of the Conference of the Parties in Durban.

In addition, the unconditional economy-wide emissions reduction target of NDC 2.0 will also be achieved through the implementation of the National Energy and Climate Plan 2025-2030 (NECP), which includes 95 measures and policies, of which 44 are measures that will directly contribute to the decarbonization of the country.

2.5.3. Economic instruments

Taxes and other economic instruments can play a significant role in achieving climate change objectives. They are able to provide incentives for behavior that protects or improves the environment and also discourages actions with a negative impact. Such an economic instrument as tax contributes to the achievement of environmental objectives at low cost and efficiently. Taxes being reflected in product and service prices, the latter send appropriate signals for structural changes in the economy, making it more sustainable. They can encourage innovation and development of new technologies. Environmental tax revenues can then be used to reduce the level of other taxes, thereby helping to reduce distortions in the economy.

From the experience of other countries, once introduced, a tax must pass the test of success before it gets the long-term green light. That is, it must be well designed, without generating the accumulation of negative impacts in the future, or if they occur, they should be minimal. Of course, the implications for international competitiveness must also be taken into account. Where environmental taxes meet these requirements, the Government should implement them.

To date, few tools of this kind have been used in the Republic of Moldova, especially to reduce GHG emissions. Therefore, the Law no. 1540/1998 on environmental pollution payments[58], updated along the way, including in 2023, establishes the payments for pollution so that they do not induce a significant decrease in GHG emissions. For example, the payment for emissions of pollutants from stationary sources applies to a list of pollutants to which greenhouse gases do not belong. And the tax on goods which in the process of use (the law does not specify separately the mobile sources), cause environmental pollution (hydrocarbons, used vehicles, fertilizers, etc., according[59] to Annex 8 of the Law) is: (a) 0.6% of the customs value of imported goods and goods purchased from businesses in the Republic of Moldova that do not have fiscal relations with its budget system and (b) 0.6% of the value of the delivery of goods, excluding VAT, by domestic producers.

The environmental pollution tax set for road transport aimed[60] to reduce carbon monoxide emissions, not carbon dioxide emissions. In order to discourage imports of second-hand vehicles, which are considered sources with a high degree of emissions, the Parliament of Moldova introduced an age limit for the imported vehicles[61]. Subsequently, the restrictions related to the imported vehicles operation age, provided for in the Customs Code, have been removed by the Law on amendment of some normative acts no. 257 of 16.12.2020[62]. Instead, increased excise duties were introduced for transport means older than 10 years in operation. The legislative amendments aim to ensure stimulation of imports of new vehicles with a shorter operating period (less polluting) and, respectively, to discourage the purchase of old means of transport (with a higher degree of pollution).

[57] <http://portal.clima.md/public/files/FS_Country_Programme_En.pdf>
[58] Law on Environmental Pollution Payments no. 1540-XIII of 25.02.1998. Published in: Official Gazette no. 54-55 art.378. <https://www.legis.md/cautare/getResults?doc_id=117159&lang=ro>
[59] <http://lex.justice.md/UserFiles/File/2016/mo472-477md/an.8_1540.doc>
[60] Instruction on calculation of environmental pollution payments when exercising instrumental ecological control of means of motor transport of 25.11.98. Published: 10.12.1998 in the Official Gazette no.109-110 art.211. <https://www.legis.md/cautare/downloadpdf/79912>
[61] Law amending and supplementing certain legislative acts no. 154 of 21.07.2005. Published: 23.09.2005 in the Official Gazette no.126-128 art. 611(the age limit for the import of motor vehicles was increased from 7 to 10 years by the Law on the amendment and completion of certain legislative acts no.178 of 11.07.2012 (Published: 14.09.2012 Official Gazette no.190-192 art. 644 <https://www.legis.md/cautare/getResults?doc-cid=22707&lang=ro>; however, higher taxes are charged for import of cars older than 7 years).
[62] Law on the amendment of some normative acts no. 257 of December 16, 2020. Published in: Official Gazette no. 353-357 Article 288. <https://www.legis.md/cautare/getResults?doc_id=124566&lang=ro>

In order to curb the rising level of pollution generated by motor vehicles, the authorities intervened with the reduction by half of the customs duties for hybrid-powered vehicles imported into the country. As a result, in 2017, every eighth car imported to Moldova was a hybrid car, and since 2020, imports of means of transport equipped with an electric motor have been exempted from VAT.

It should be noted that according to the information provided by the Public Services Agency, by the end of 2023, 1,145,852 vehicles were registered in the country, of which 42.3% were powered by gasoline (484,575 thousand vehicles), 44.4% by diesel (508,622 thousand vehicles), 5.1% by gasoline - liquefied gas (propane, butane) (58,046 thousand vehicles), 1.1% by gasoline - compressed natural gas (methane) (13,150 thousand vehicles), 3.4% hybrids (39,070 thousand vehicles) and only 0.3% electric (3,105 thousand vehicles).

2.5.4. Policies and measures to mitigate climate change at sector level

Policies and measures to mitigate climate change are reflected in the sectors' strategies, programmes and action plans, and only the most relevant of them and only their key elements are described below.

2.5.4.1. Energy Sector

The main document outlining the energy sector policies is the Energy Strategy of the Republic of Moldova until 2030 (ESM 2030). Approved in 2013, the document contains concrete objectives only until 2020, and is far surpassed by the course of events, which have not only changed reality, but have forced the formulation of new objectives, much different from those set out in the ESM 2030. In 2016-2017, an updated version of ESM 2030 was attempted and submitted for approval, but it was not approved by the Government.

A new initiative to update the ESM 2030 was launched in 2022. With the support of USAID-funded project "Moldova Energy Security Activity" (MESA), the draft Energy Strategy of Moldova until 2050 (ESM 2050) was developed[63].

The following are the most relevant policies of the Republic of Moldova on energy, in force or in the form of projects in public debates, which can or have an impact on with measures and with additional measures scenarios on GHG emissions by 2050.

- ***Energy Strategy of Moldova until 2030, GD no. 102/2013[64]***

Description: The strategy sets out the general objectives (Chap. 3) and specific objectives (Chap. 4) for 2013-2020 (Chap. 3), as well as the specific objectives for the period 2021-2030 and the related measures (Chap. 5). Estimation of costs and benefits: EUR 617.5 million for construction of 650 MW installed power combined cycle; other costs and benefits not available.

Objective: The objectives for the period 2020-2030 are the following:

- *Development of the use of renewable energy sources. Availability of long-term carbon capture and storage (CCS) technology.* Given that the carbon capture and storage technology at coal-fired plants will not be of high performance, renewable sources will have to be developed at a more accelerated pace;
- *Energy efficiency improvement.* Increased carbon market prices are expected to accelerate the implementation of energy efficiency measures;
- *Introducing of smart electricity grids.* It will be necessary to develop a specific regulatory framework and attract funds for the realization of this idea

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: under implementation

Considered in: with existing measures (WEM) scenario

Implementation initiation year: 2013

Responsible entity: Ministry of Energy

[63] <https://particip.gov.md/ro/download_attachment/18137>
[64] <https://www.legis.md/cautare/getResults?doc_id=68103&lang=ro>

Mitigation impact: Reduce GHG emissions by 25% in 2020 as compared to 1990

- ***Law on Electricity, No. 107/2016[65], amended by Law 334/2022***

Description: The Law transposes art. 16, art. 18, art. 38, art. 40–43, as well as the provisions of Annex I to Directive 2009/72/EC on common rules for the internal market in electricity; Article (3), Article 17, art. 19 and 21, as well as the provisions of Annex I of Regulation (EC) 714/2009 on conditions for access to the network for cross-border exchanges in electricity; Directive 2005/89/EC on measures to safeguard security of electricity supply and investment in infrastructure.

Objective: Establish a general legal framework for the organization, regulation, ensuring efficient operation and monitoring of the electricity sector aimed at supplying consumers with electricity in conditions of accessibility, availability, reliability, continuity, quality and transparency; ensuring free access to the electricity market; promoting electricity production; ensuring the appropriate balance between supply and demand, the appropriate level of capacity of interconnections to facilitate cross-border exchanges of electricity; developing the electricity market and integrating it into a competitive electricity market; establishing measures aimed at guaranteeing the security of electricity supply; proper fulfillment of public service obligations; ensuring compliance with consumer rights as well as environmental protection rules.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: Regulatory

Status: in process of implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2016

Responsible entity: Ministry of Energy, ANRE, license holders

Mitigation impact: not available

Estimated costs and benefits: not available

- ***Energy Law, Nr. 174/2017[66], the last amendment produced by Law no. 52/2023***

Description: The Law establishes the legal framework for setting up, regulating and ensuring the efficient and safe operation of the energy sectors.

Objective: The Law aims at: a) creating the legal framework for organizing and carrying out activities in the energy sectors; b) establishing the basic conditions necessary to ensure the independence of the regulatory authority; c) regulating the legal relations between energy enterprises, between energy enterprises and consumers, system users, etc.; d) creating necessary conditions for limiting the monopoly activity, for liberalizing energy markets, as well as for promoting competition on the energy markets; e) establishing the basic principles for providing consumers with quality energy under fair, transparent and non-discriminatory conditions; f) creating the legal framework that will ensure the country's energy security.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: Regulatory

Status: implemented

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2017

Responsible entity: Ministry of Energy

Mitigation impact: not available

Estimated costs and benefits: not available

- ***Power system development project[67]***

Description: The project is dedicated to increasing the capacity of the national electricity system to interconnect with ENTSO-E and, therefore, to increasing the energy security of the country and the competitiveness of

[65] <https://www.legis.md/cautare/getResults?doc_id=121988&lang=ro#>
[66] <https://www.legis.md/cautare/getResults?doc_id=101612&lang=ro#>
[67] <https://www.mepiu.md/rom/proiecte-curente/proiectul-de-dezvoltare-a-sistemului-electroenergetic-pdse>

the electricity market. Project value: EUR 61 million Funder: International Development Association - IDA (World Bank Group). Implementer: Ministry of Economic Development and Digitalization through UCIPE (Consolidated Unit for the Implementation and Monitoring of Energy Projects). At the moment, the extension of interconnections with Romania is under discussion, following the construction of 400 kV overhead transmission line (OHTL) Suceava-Balți, the project to be carried out by 2030.

Objective: Construction of about 158 km of single-circuit high voltage overhead power transmission line (400 kV) Vulcanesti – Chisinau; modernization of the 330 kV Chisinau electrical substation and extension of the 400 kV Vulcanesti electrical substation; consolidation of the Dispatch and Evidence System.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: under implementation within the period 2020-2024

Considered in: with existing measures (WEM) and in with additional measures (WAM) scenarios

Year of implementation initiation: 2020

Responsible entity: Ministry of Energy

Mitigation impact: Not available

- ***Capacity limits, maximum quotas and capacity categories in the field of electricity from renewable sources, GD no. 401/2021, amended by GD 117/2023***

Description: Approval of capacity limits, maximum quotas and capacity categories in the field of electricity from renewable sources valid until December 31, 2025, in order to apply the support schemes provided for in Article 34 of the Law nr.10/2016 on Promoting use of energy from renewable sources.

Objective: To ensure by 31.12.25 the following RES capacities in operation: intermittent sources – 320 MW, including wind sources – 120 MW and photovoltaic sources – 200 MW; non-intermittent sources – 90 MW, including 65 MW biogas cogeneration plants.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2021

Responsible entity: Ministry of Energy

Mitigation impact: Not determined

- ***Law on labelling of energy-related products, no. 44/2014[68], amended by Law 156/2022[69]***

Description: The Law transposes Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication, by labelling and standard product information, consumption of energy and other resources of energy-related products.

Objective: Establish regulatory framework for labelling and standard information on energy-related products.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: Regulatory

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2014

Responsible entity: Ministry of Energy, National Center for Sustainable Energy

Mitigation impact: not available

[68] <https://www.legis.md/cautare/getResults?doc_id=21702&lang=ro>
[69] <https://www.legis.md/cautare/getResults?doc_id=133293&lang=ro#>

Estimated costs and benefits: not available

- ***Law on Heat and Promotion of Cogeneration no. 92/2014[70], amended by Law no.185/2017[71], Law no.74/2020[72] and Law no.175/2021[73]***

Description: The Law partially transposes Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on Energy Efficiency. The Law contains the following as annexes: Methodology for determining the efficiency of the cogeneration process; General principles for calculation of electricity produced by cogeneration; Energy efficiency potential in the context of heating and cooling demand; Guarantee of origin for electricity produced in high efficiency cogeneration mode.

Objective: The Law regulates the activities carried out in the thermal energy sector; establishes the principles and objectives of the state policy in the field of centralized heat supply systems; state management of the thermal energy sector; diminishing the negative impact of the thermal energy sector on the environment; determining and approving the regulated tariffs for heat; licensing the activities carried out in the thermal energy sector, etc. The most important objectives of the Law include:

- promoting the production of thermal energy in cogeneration mode;
- ensuring the security, quality and reliability of heat supply;
- affordability of tariffs for heat consumers;
- promoting centralized heat supply systems;
- efficient use of energy resources and reducing its impact on the environment

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2014

Responsible entity: Ministry of Energy, National Center for Sustainable Energy, local public administration authorities

Mitigation impact: not available

Estimated costs and benefits: not available

- ***Law on Energy Performance of Buildings, no. 282/2023[74]***

Description: Partially transposes Directive 2010/31/EU on the energy performance of buildings (recast), Directive 2012/27/EU on energy efficiency, as well as Regulation (EU) 2018/1999 on the governance of the Energy Union and climate action. The Law replaces the previous Law no. 128/2014[75].

Objective: The Law establishes requirements regarding:

1) Methodology for calculating the integrated energy performance of buildings and building units;
2) Sectoral strategy for the renovation of the national long-term real estate fund;
3) National plans for increasing the number of nearly zero-energy buildings;
4) Application of minimum energy performance requirements for:
    a. future buildings and new units of the existing buildings;
    b. existing buildings and building units undergoing major renovation;
    c. building elements that form part of the building envelope and that have a significant impact on the energy performance of the building envelope when they are retrofitted or replaced;
    d. technical building systems whenever they are installed, replaced or upgraded;

[70] <https://www.legis.md/cautare/getResults?doc_id=48676&lang=ro>
[71] <https://www.legis.md/cautare/getResults?doc_id=101154&lang=ro>
[72] <https://www.legis.md/cautare/getResults?doc_id=121896&lang=ro>
[73] <https://www.legis.md/cautare/getResults?doc_id=129129&lang=ro#>
[74] <https://www.legis.md/cautare/getResults?doc_id=139619&lang=ro>
[75] <https://www.legis.md/cautare/getResults?doc_id=21474&lang=ru#>

1) certification of the energy performance of buildings and building units;
2) periodic inspection of heating systems, ventilation and conditioning systems;
3) the control mechanism of the energy performance certificates issued;
4) control mechanism of heating systems inspection reports and ventilation and conditioning systems inspection reports.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: Regulatory

Status: approved

Considered in: with additional measures (WAM) scenario

Year of implementation initiation: 2024

Responsible entity: the Government, the central specialized body of the public administration in the field of energy, the central specialized body of the public administration in the field of constructions, the supporting public institution, the administrative authority with technical supervision and control responsibilities, the local public administration authorities.

Mitigation impact: not available

Estimated costs and benefits: increasing the energy performance of buildings; costs not available

- ***Law on Promoting the Use of Energy from Renewable Sources, no.10/2016[76], amended by Law no.34/2018[77] and Law no. 255/2022[78]***

Description: The Law creates the necessary framework for the application of Directive 2009/28/EC on the promotion of the use of energy from renewable sources. It aims to establish a legal framework for the promotion and use of renewable energy.

In order to promote the production and use of electricity from renewable sources, the following support scheme shall apply:

a. fixed price, established in the tender for the eligible producer who owns or is to own a power plant (s) with installed/cumulative power pre-established by law.
b. fixed rate for the eligible producer who owns or is to own a power plant (s) with installed/cumulated electrical power that does not exceed the capacity limit established by law, but which is not less than 10 kilowatts.

The final consumer, owner of the power plant, who requests the net metering of electricity from renewable sources must have an installed power of up to 200 kW, but not higher than the power contracted with the respective supplier., The final consumers, owners of power plants the cumulative installed capacity of which does not exceed 5% of the value of the maximum load during the previous year, recorded by the distribution system operator of the networks to which the respective power plants are connected, can benefit from the net metering mechanism on the "first come, first served" basis.

Objective: The basic objectives of the state policy in the field of renewable energy are the following:

- achieving a share of energy from renewable sources of at least 17% in the gross final consumption of energy in 2020, calculated in accordance with this Law;
- achieving a share of energy from renewable sources of at least 10% in the final consumption of energy in transport in 2020, calculated in accordance with this Law.

Other objectives of the state policy in the field of renewable energy are set out in the national action plan in the field of renewable energy, approved by the Government.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: in process of implementation

[76] <https://www.legis.md/cautare/getResults?doc_id=98936&lang=ru#>
[77] <https://www.legis.md/cautare/getResults?doc_id=105420&lang=ru>
[78] <https://www.legis.md/cautare/getResults?doc_id=132691&lang=ro#>

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2018

Responsible entity: Ministry of Energy, ANRE, license holders

Monitoring and evaluation indicators: feed-in tariffs and cap prices; RES power capacity; number of eligible producers; number of consumers benefiting from net metering; amount of renewable energy in the energy balance, including electricity, heat and biofuels produced from renewable sources

Mitigation impact: not available

Estimated costs and benefits: reducing environmental impact; increasing energy security; costs not available

- ***Low Emission Development Program of the Republic of Moldova until 2030 (LEDP 2030), approved by the Government Decision no. 659 of September 6, 2023.***

Description: The aim of the LEDP 2030 is to achieve the greenhouse gas emission reduction targets set out in the updated Nationally Determined Contribution (NDC 2.0). According to NDC 2.0, the unconditional objective, which covers the entire economy of the country, consists in the implementation of the green economy principles based on the efficient use of resources and energy, application of environmentally friendly performance technologies, which will contribute to reduction of greenhouse gas emissions by 70% by 2030 compared to 1990. Regarding the conditional target, the reduction commitment could be increased to 88% below 1990 level, provided adequate support from international donors. The implementation period includes the years 2024-2030. At the same time, concrete actions are planned for years 2024-2026 with a budget of MDL 24 billion to achieve the conditional objective, plus additional MDL 9.6 billion – for the conditioned one. In the electricity sector, the Isaccea-Vulcanesti-Chisinau interconnection with a capacity of 600 MW; 120 MW wind sources and 200 MW photovoltaic sources is to be built by 2026.

Targets: According to the LEDP, by 2030, GHG emissions are to be reduced unconditionally as compared to 1990: in the energy sector - by 81%; in the transport sector - by 52%; in the buildings sector - by 74%; in the industrial sector - by 27%; in the agricultural sector - by 44%; in the waste sector, by 14%.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: under implementation

Considered in: with additional measures (WAM) scenario

Year of implementation initiation: 2024

Responsible entities: Ministry of Environment, Ministry of Energy, Ministry of Infrastructure and Regional Development, Ministry of Agriculture and Food Industry

Mitigation impact: reduction of total GHG emissions by 2030 by about 30.4 Mt CO_2 equivalent compared to baseline year (1990), including 17.3 Mt CO_2 equivalent, from the energy sector

- ***Law on Energy Efficiency, no.139/2018[79], amended by Law no. 113/2023[80]***

Description: The Law establishes policy measures on energy efficiency, aimed at ensuring the achievement of the respective objectives, as well as the continuous development and consolidation of the respective field. Energy efficiency policy measures are applied throughout the energy chain: primary resources, production, transport, distribution, storage, supply and final energy consumption, in order to increase the country's energy security and reduce the negative impact of the energy sectors on the environment and climate by reducing greenhouse gas emissions. In order to achieve the energy savings attributed under the commitment scheme, the committed parties transfer annual contributions equivalent to the total expenditure needed to carry out the energy efficiency measures in order to meet the related obligations, to the treasury accounts.

Objective: To create the necessary legal framework to promote and improve energy efficiency by carrying out action plans in the field of energy efficiency, by developing the energy services market, as well as by implementing

[79] <https://www.legis.md/cautare/getResults?doc_id=105498&lang=ro>
[80] <https://www.legis.md/cautare/getResults?doc_id=137465&lang=ro>

other energy efficiency measures. In order to meet at least the minimum energy performance requirements, the annual renovation rate of public buildings will be 3% of the total area of public buildings with a total useful area of over 250 m^2.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: Regulatory

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2018

Responsible entity: Ministry of Energy, National Center for Sustainable Energy,

Mitigation impact: not available

Estimated costs and benefits: not available

- ***Program on implementing the obligation regarding the renovation of buildings of the specialized central public administration authorities for the years 2020-2022, GD no. 372/2020***[81]

Description: The Program aims to implement the provisions of the Law no. 139/2018 on Energy Efficiency related to the annual renovation obligation, for the period 2019-2020, of 1% (according to the Law 113/2023, 1% was changed in 3%) of the total area of the public buildings with a total useful area of more than 250 m^2, in which the specialized central public administration authorities operate. Estimation of costs and benefits: investments of approx. MDL 38 million; energy savings of about 694.9 MWh/year

Objective: Implementing, during 2020-2022, of the necessary measures for renovation of public buildings on an area of about 10,086 thousand m^2

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2020

Responsible entity: National Center for Sustainable Energy

Mitigation impact: approx. 140.3 tons CO_2/year

- ***National Strategy for Buildings Renovation by 2030***

Description: The strategy sets out three levels of buildings renovation, which aim to fully renovate the national buildings stock by 2050 and award it the 'nZEB' category (almost zero consumption). Each level of renovation implies specific implementation costs, and estimated amounts of reduced greenhouse gases.

Objective: Renovation of premises with an area of 2,065,715 m^2. Achieving energy savings of 45.2 ktoe.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: planned to be initiated in 2025

Considered in: with additional measures (WAM) scenario

Responsible entity: Ministry of Energy, National Center for Sustainable Energy

Mitigation impact: 121.7 kt CO_2 during 2025-2030

Estimated costs and benefits: EUR 1.1 billion

- ***National Integrated Energy and Climate Plan 2030 (NECP 2030)***

Description: The document includes 95 policies and measures to be implemented by 2030, which must contribute to achieving the NDC 2.0 objectives. It sets out the policies, exact measures and their costs to be

[81] <https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro>

implemented to reduce GHG emissions on the right bank of the Dniester river by 2030 by 68.6% compared to the reference year (1990).

Objective: Decarbonization of the energy sector by installation by 2030 of 220 MW photovoltaic parks, 510 MW wind parks, 6 MW photovoltaic-thermal systems, 372 MW heat pumps, development of 3 interconnection lines with Romania of 400 kV, etc.

GHGs affected by the policy: CO_2, CH_4, N_2O

Measure category: regulatory and economic

Status: planned to be initiated in 2025

Considered in: with additional measures (WAM) scenario

Responsible entity: Ministry of Energy, National Center for Sustainable Energy

Mitigation impact: 614 kt CO_2 equivalent over the period 2025-2030

Estimated costs and benefits: EUR 1.33 billion

2.5.4.2. Industrial Processes and Other Products Use Sector

In the Republic of Moldova, only two policies expressly stipulating reduction of GHG emissions from the industrial sector during the implementation of the Paris Agreement were approved, namely: LEDS 2030 (repealed, was in force until December 31, 2023), and LEDP 2030 (in force as of January 1, 2024).

- ***Low Emission Development Program of the Republic of Moldova until 2030 (LEDP 2030), approved by the Government Decision no. 659 of September 6, 2023.***

With reference to Specific Objective 4 of the LEDP 2030, it is planned to unconditionally reduce GHG emissions from the industrial sector by 27% by 2030 and to reduce conditional GHG emissions by 31% compared to 1990.

GHGs affected by the policy: CO_2, CH_4 and N_2O

Category of mitigation policy and/or measure: Regulatory

Status: in force during 2024-2030

Considered in: with additional measures (WAM) scenario

Year of implementation initiation: 2024

Responsible entity: Ministry of Environment, Minister of Energy, Ministry of Infrastructure and Regional Development, Ministry of Agriculture and Food Industry

Monitoring and evaluation indicators: number of enterprises that have implemented the energy management system and the National Standard SM ISO 50001:2018 "Energy management systems. Requirements and user guide"; the amount of energy and fuel saved; the amount of clinker used compared to the amount of cement produced; electronic system for reporting data on the import and consumption of hydrofluorocarbons, products and equipment with HFCs, PFCs and SF_6 created; the national regulatory framework on fluorinated greenhouse gases adjusted to that of the EU for the staggered suppression of hydrofluorocarbons; persons trained on refrigeration and air conditioning equipment service; persons trained on identification of freon leaks; freon identifiers made available to customs officers; refrigeration and air conditioning units with new generation alternative freons; refrigeration and air conditioning equipment units operating with HFCs subject to retrofit and refurbishment.

Mitigation impact: reduction by 2030 of GHG emissions from the industrial sector compared to 1990, unconditionally - by 27% and conditionally - up to 31%

Estimated costs and benefits: with reference to Specific Objective 4, for the period 2024-2026, MDL 72.9 million were planned for implementation of the unconditional with measures scenario, plus additional MDL 19.2 million for implementation of the conditional with additional measures scenario.

- ***"Net Zero Carbon Emissions, Science-Based Target" pledge signed by LafargeHolcim Group on September 21, 2020 at the New York Climate Conference***[82]

[82] <https://www.lafarge.md/ro/lafargeholcim-semneaza-angajamentul-net-zero-emisii-de-carbon-cu-obiective-bazate-pe-stiinta>.

On the first day of the New York Climate Week (21-25 September 2020), the LafargeHolcim Group signed the Commitment "Net Zero Carbon Emissions, Science-Based Target", being the first global building materials company to sign the "Business Ambition for Climate 1.5°C Target", commitment with interim targets validated through the Science-Based Targets Initiative (SBTi), in line with the course of net zero CO_2 emissions. This commitment is based on LafargeHolcim's global leading position in the construction sector with state-of-the-art "green" solutions such as ECOPact ecological concrete and Susteno circular cement.

In its 2030 targets, the LafargeHolcim Group sets out its ambition to increase its CO_2 mitigation targets by reducing the intensity of emissions from cement production to 475 kg of CO_2 net emissions per ton of cement produced, based on an investment roadmap of around 160 million Swiss francs.

LafargeHolcim is working with SBTi to develop the cement production roadmap to align with the climate goal of the Paris Agreement (2015), to keep global surface temperature increases within 1.5°C by the end of the 21st century.

SBTi approved the commitment of LafargeHolcim Group to reduce the intensity of CO_2 emissions per ton of cement produced by about 40% compared to 1990 and by more than 20% compared to 2018, in the case of level 1 and level 2 emissions by 2030. Thus, LafargeHolcim Group has committed to reduce its level 1 greenhouse gas emissions (all direct GHG emissions from activities of organizations controlled by LafargeHolcim Group) by 17.5% per ton of cement produced, and its level 2 emissions (all indirect emissions from the consumption of electricity procured and used by organizations controlled by LafargeHolcim Group) by 65% per ton of cement produced, compared to 2018.

The target to reduce the intensity of CO_2 emissions to 475 kg per ton of cement produced by 2030 is to be achieved by means of the following activities: reduction of clinker content to 68%; wider use of waste-derived fuels, achieving 37% substitution rate; alternative raw materials; carbon capture and storage.

The target to reduce the intensity of emissions from electricity procurement up to 13 kg CO_2 per ton of cement produced (or by 65% compared to 2018) by 2030 is to be achieved by means of the following activities: waste heat recovery and renewable energy portfolio.

The target to reduce emissions of level 3, or those from the transport of finished production, is to be achieved by means of the following activities: optimization of transport networks; optimization of routes and loads due to better logistics and distribution; optimization of the vehicle fleet to reduce traditional fossil fuel consumption.

GHGs affected by the policy: CO_2

Category of mitigation policy and/or measure: economic

Status: effective as of 2020

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2020

Responsible entity: Lafarge Cement (Moldova) S.A. (member of LafargeHolcim group)

Monitoring and evaluation indicators: clinker content in the types of cement produced and reduced CO_2 emissions

Mitigation impact: Lafarge was the first building materials company to commit in 2000 to reduce its net CO_2 emissions through its partnership with the World Wildlife Fund (WWF), the leading environmental NGO. The target for mitigating the net CO_2 emissions per tons of cement stated by the LafargeHolcim Group for 2030 is 40% compared to 1990[83]. Compared to 1990, by the end of 2010 the efforts to reduce net CO_2 emissions resulted in a 21.7% reduction of CO_2 emissions per ton of cement[84], by the end of 2015 specific CO_2 reductions per ton of cement accounted for 24%, and by the end of 2019 specific CO_2 reductions per ton of cement were 27% in LafargeHolcim Group.

Cost estimate: 160 million Swiss francs.

[83] LafargeHolcim <https://www.lafargeholcim.com/our-climate-pledge>.
[84] <http://www.lafarge.md/wps/portal/md/7_3-TheNews_Detail?WCM_GLOBAL_CONTEXT=/wps/wcm/connectlib_md/Site_md/AllPR2/PressRelease_1327993713495/PR_Header>.

- ***Regulation on measures to reduce emissions from air conditioning systems of motor vehicles, GD no. 1242/2016***[85]

The regulation transpose the Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 relating to emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/156/EEC 79, as well as the Regulation (EU) No. 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases. The Regulation lays down provisions on the installation of air-conditioning systems for motor vehicles, with a view to placing them on the market, and the recharging of air-conditioning systems for any vehicles with fluorinated greenhouse gases with a global warming potential greater than 150.

GHG affected by the policy: HFCs with GWP>150

Category of mitigation policy and/or measure: Regulatory

Status: effective as of 2016

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2016

Responsible entity: Ministry of Environment, Ministry of Infrastructure and Regional Development

Monitoring and evaluation indicators: number of vehicles with installed air-conditioning systems containing fluorinated greenhouse gases with GWP_{100} lower 150; emissions of fluorinated greenhouse gases from reduced vehicle air-conditioning systems

Mitigation impact: not estimated

Estimated costs and benefits: not estimated

- ***Kigali Amendment to the Montreal Protocol for the progressive reduction of the use of hydrofluorocarbons worldwide, signed on 15.10.2016***[86]***, ratified by the Republic of Moldova by Law no. 178 of June 30, 2023***[87]

The Kigali Amendment to the Montreal Protocol for the progressive reduction of the use of hydrofluorocarbons (HFCs) worldwide (signed on October 15, 2016), ratified by the Republic of Moldova by Law no. 178 of 30.06.2023 for the accession of the Republic of Moldova to the Amendment to the Montreal Protocol on substances that destroy the ozone layer, provides for the start of the stage of staggered reduction of hydrofluorocarbons in CO_2 equivalence.

The objective of the Kigali Amendment to the Montreal Protocol, provides by 2048 that all countries ("developed countries" – Art. 2; "developing countries"- Art. 5; and the countries in Group 3 – India, Persian Gulf States, Iran, Iraq and Pakistan) will reach the target of 15–20% of their current HFC consumption, expressed in CO_2 equivalent.

The Republic of Moldova, classified according to the Montreal Protocol in **Group 1** of developing countries (**country of Art. 5**), has the following HFC suppression schedule:

- estimation of the base level (production/consumption of HFCs) as an average for the years 2020-2022 (*about* 491,825 *thousand tons of* CO_2 *equivalent*) + 65% of the base level (production/consumption) of HCFCs (*base level consumption of HCFCs in the Republic of Moldova was about 17 metric tons or 30,770 thousand tons of* CO_2 *equivalent; 65% of the base level consumption accounts for about 20,001 thousand tons of* CO_2 *equivalent*);
- 2024-2028 – freezing consumption at the basic consumption level (*about 511,825 thousand tons of* CO_2 *equivalent*);
- 2029-2034 (stage I) – reducing consumption by 10% from the basic level (*or by about 51,183 thousand tons of* CO_2 *equivalent*);

[85] Government Decision no. 1242 of 14.11.2016 approving the Regulation on measures to reduce emissions from air conditioning systems of motor vehicles. Published in the Official Gazette no. 405-414, Article no: 1353. <https://www.legis.md/cautare/getResults?doc_id=114298&lang=ro>.

[86] Kigali Amendment to the Montreal Protocol to Progressively Reduce the Use of Hydrofluorocarbons Worldwide, < http://conf.montreal-protocol.org/meeting/oewg/oewg-39/presession/briefingnotes/ratification_kigali.pdf>, <https://europa.eu/capacity4dev/unep/document/full-text-kigali-amendment-pt-1>

[87] Law no. 178 of 30.06.2023 on accession of the Republic of Moldova to the Amendment to the Montreal Protocol on ozone layer depleting substances. Published in the Official Gazette no. 237-239 Article 422. <https://www.legis.md/cautare/getResults?doc_id=137970&lang=ro>.

- 2035-2039 (stage II) – reducing consumption by 30% from the basic level (*or by about 153,548 thousand tons of CO_2 equivalent*);
- 2040-2044 (stage III) – reducing consumption by 50% from the basic level (*or by about 255,913 thousand tons of CO_2 equivalent*);
- 2045 and later (stage IV) – reducing consumption by 80% from the basic level (*or by about 409,460 thousand tons of CO_2 equivalent*).

In the Republic of Moldova, the sectors using hydrofluorocarbons are stationary and mobile air conditioning, commercial and industrial refrigeration, refrigerated transportation of food products, production and use of expanded foams and aerosols.

GHG affected by the policy: HFCs

Category of mitigation policy and/or measure: Regulatory

Status: Approved in 2023

Considered in: with additional measures (WAM) scenario

Year of implementation initiation: 2023

Responsible entity: Ministry of Environment

Monitoring and evaluation indicators: annual consumption of hydrofluorocarbons expressed in metric tons and thousands of tons of CO_2 equivalent

Mitigation impact: the schedule for the HFCs suppression in the Republic of Moldova will be the following: (1) estimation of the base level (production/consumption of HFCs) as an average of the years 2020-2022 + 65% of the base level (production/consumption) of HCFCs; (2) 2024-2028 – freezing consumption at the basic consumption level; (3) 2029-2034 – reducing consumption by 10%; (4) 2035-2039 – reducing consumption by 30%; (5) 2040-2044 – reducing consumption by 50%; (5) 2045 and thereafter – reducing consumption by 80%

Estimated environmental benefits: the cost is not available; the ratification of the Kigali Amendment will contribute to reducing the consumption of HFCs in the Republic of Moldova, to eliminating the environmental impact resulting from use.

- ***Law no. 43 of 03.03.2023 on fluorinated greenhouse gases***[88]

The Law establishes the legal framework for the implementation of measures to mitigate climate change and protect the environment by reducing emissions of fluorinated greenhouse gases.

In accordance with Art. 2, the Law aims to regulate precautions at national level regarding: a) the isolation, use, recovery and disposal of fluorinated greenhouse gases, as well as related ancillary measures; b) placing on the market of specific products and equipment containing, or whose operation relies on fluorinated greenhouse gases, with the exception of refrigeration and/or air conditioning equipment, which, at the time of importation, does not contain such gases; c) specific use of fluorinated greenhouse gases; and d) application of quantitative limits for placing hydrofluorocarbons on the market.

In accordance with Art. 3, the Law establishes norms, conditions and limits applicable to the following fluorinated greenhouse gases: hydrofluorocarbons (HFCs), used as refrigerants, cleaning solvents and as foaming agents (such as those used in fire extinguishers); b) perfluorocarbons (PFCs), used in the manufacture of semiconductors, as cleaning solvents and as foaming agents; c) sulfur hexafluoride (SF_6), used in high-voltage circuit breakers and magnesium production.

The provisions of the Law shall apply to refrigeration, air conditioning, other equipment, installations and products containing or whose operation relies on fluorinated greenhouse gases.

In accordance with Art. 26, as of January 1, 2026, it is prohibited to install and commission new refrigeration and/or air conditioning installations, the operation of which is based on fluorinated greenhouse gases with a global warming potential of 2,500 or more.

[88] Law no. 43 of 03.03.2023 on fluorinated greenhouse gases. Published: 05-04-2023 in the Official Gazette no. [113–116] art. 178. <https://www.legis.md/cautare/getResults?doc_id=136259&lang=ro>.

From January 1, 2030, it shall be prohibited to use fluorinated greenhouse gases with a global warming potential of 2,500 or more to maintain or service refrigeration equipment with a load capacity equal to or greater than 40 tons of CO_2 equivalent.

Until January 1, 2035, the prohibition set out above shall not apply to the following categories: (a) fluorinated gases that have been recycled, that have a global warming potential of 2,500 or more, and that are used to maintain or service, existing refrigeration equipment, subject to appropriate labelling; (b) fluorinated gases that have been recycled and/or reclaimed, that have a global warming potential of 2,500 or more, and that are used to maintain or service existing refrigeration equipment, subject to recovery from such equipment.

These recycled F-gases may only be used by the company which carried out their recovery in the course of maintenance or servicing activities or by the company for which the recovery was carried out in the course of maintenance or servicing activities. According to the same article, the use of sulphur hexafluoride to fill the tires of vehicles is prohibited.

GHGs affected by the policy: HFCs, PFCs, SF_6

Category of mitigation policy and/or measure: Regulatory

Status: Approved in 2023

Included in: with additional measures (WEM) scenario

Year of implementation initiation: 2023

Responsible entity: Ministry of Environment

Monitoring and evaluation indicators: annual consumption of HFCs, PFCs and SF_6 expressed in metric tons and thousands of tons of CO_2 equivalent

Mitigation impact: not estimated

Estimated environmental benefits: not estimated

2.5.4.3. Agriculture Sector

At the level of 2023, the policies approved in the Republic of Moldova and expressly aimed at reducing greenhouse gas emissions from the agriculture sector are LEDS 2030 (repealed, in force only until December 31, 2023), respectively LEDP 2030 (in force as of January 1, 2024).

- ***Low Emission Development Program of the Republic of Moldova until 2030 (LEDP 2030), approved by the Government Decision no. 659 of September 6, 2023.***

Its objective has already been described in the previous sections.

GHGs affected by the policy: CO_2, CH_4 and N_2O

Category of mitigation policy and/or measure: Regulatory

Status: in force 2024-2030

Included in: with additional measures (WAM) scenario

Year of implementation initiation: 2024

Responsible entity: Ministry of Environment; Ministry of Agriculture and Food Industry

Monitoring and evaluation indicators: area in ha covered by conservation agriculture (no-till and mini-till); amount of manure in thousands of tons stored in communal platforms or individual warehouses; share of livestock covered by advanced animal feeding technologies

Mitigation impact: reduction by 2030 of GHG emissions from the agricultural sector compared to 1990, unconditionally - by 44% and conditionally - up to 47%

Estimation of costs and benefits: with reference to Specific Objective 5, for the period 2024-2026, MDL 191.5 million were planned for the implementation under unconditional scenario, plus additional MDL 66.4 million under the conditional scenario.

- ***National Strategy for Agricultural and Rural Development (NSARD) for the years 2023-2030, GD no. 56/2023***[89]

NSARD 2023-2030 defines four general strategic objectives:

1. strengthening the potential of the primary agricultural sector and promoting smart, sustainable and climate resilient agricultural practices;
2. development of the food industry and diversification of markets;
3. supporting sustainable rural socio-economic development;
4. ensuring the transposition of the EU acquis and its progressive implementation in the field of agriculture, rural development and food safety.

The general objectives of NSARD 2023-2030 include, for each of the components, associated measures, including the cross-cutting objective of the EU Common Agricultural Policy aimed at modernizing the agricultural sector by stimulating and sharing knowledge, promoting innovation and digitization, adaptation to climate change and sustainable development of rural areas.

With reference to General Objective 1 "*Strengthening the potential of the agricultural sector and promoting smart, sustainable and climate resilient agricultural practices*", the following result indicators are provided:

- The level of growth of areas cultivated with high value crops, ha;
- Growing the number of areas under organic farming by at least 10% of agricultural land;
- Applying good agricultural practices, including conservation, on an area of at least 150 thousand ha of agricultural land;
- Supporting agri-environment-climate practices (*growing green fertilizers, protein crops, ensuring crop rotation, applying "no-till" or "mini-till" practices*) for at least 5% of agricultural land;
- Building and rehabilitation of existing centralized irrigation systems on an area of 30 thousand ha;
- Development of small-scale irrigation systems on an area of at least 5 thousand ha;
- The level of livestock growth in livestock holdings, expressed in conventional units, increased by at least 30%;
- Increasing the outputs of primary livestock production (beef, milk, eggs, fish), in livestock holdings, by at least 50%;
- Increasing the share of local varieties in the total varieties and hybrids by at least 10%;
- Carrying out land improvement projects on an area of at least 10 thousand ha;
- The areas of the protective forest strips extended over an area of 3 thousand ha;
- Increasing the number of beneficiaries of agricultural and rural advisory services by 20%;
- Extension of the agricultural and rural advisory system at zonal, later regional level, 100% coverage;
- Increasing the share of insured agricultural areas by 5%.

GHGs affected by the policy: CO_2, CH_4 and N_2O

Category of mitigation policy and/or measure: regulatory and economic

Status: in force between 2023 and 2030

Included in: with additional measures (WAM) scenario

Year of implementation initiation: 2023

Responsible entity: Ministry of Agriculture and Food Industry

Monitoring and evaluation indicators: number of farms created/upgraded; livestock with high productivity optimized; irrigated areas expanded; areas cultivated using sustainable land management practices and minimal soil processing technologies, no-till/mini-till, extended; areas of agricultural holdings insured and the number of animals insured extended; areas protected by crop protection systems against extended adverse climatic conditions.

[89] Government Decision no. 56 of February 17, 2023 on approval of the National Strategy for Agricultural and Rural Development for the years 2023-2030. Published: 06.04.2023 in the Official Gazette no. 117-118 Article 244. <https://www.legis.md/cautare/getResults?doc_id=136318&lang=ro>.

Mitigation impact: reduction of GHG emissions from the agricultural sector, without indicative targets compared to 1990

Estimated costs and benefits: The main source of funding for NSARD 2023-2030 is the National Fund for Agriculture and Rural Development (NFARD), approved annually by the State Budget Law. The NFARD's resources, as well as the resources of the development partners allocated for intervention measures in agriculture are managed through the Agency for Intervention and Payments in Agriculture (AIPA), and in the case of projects financed from external sources – through the project implementation units.

- ***Government Decision no. 864 of 09.12.2020 on the approval of the Land Improvement Program to ensure the sustainable management of soil resources for the years 2021-2025 and the Action Plan on its implementation for the years 2021-2023***[90]

The Programme aims to implement the following objectives:

- **Objective 1**: Research and education system connected to the priorities of the sector by 2025.
- **Objective 2**: Measures applied to prevent and combat soil erosion on an area of 2,552 hectares of agricultural land, by 2025:
  - Specific objective 2.1: Combating surface erosion on 482 hectares of agricultural land by 2025;
  - Specific objective 2.2: Combating deep erosion on 1,900 hectares of agricultural land by 2025;
  - Specific objective 2.3: Combating wind erosion (deflation) on 170 hectares of agricultural land by 2025.
- **Objective 3**: Soil improvement on 68.5 thousand hectares of agricultural land by 2025:
  - Specific objective 3.1: Chemical improvement measures on 500 hectares of agricultural land by 2025;
  - Specific objective 3.2: Water improvement measures (irrigation facilities), and increase of irrigated areas by 68 thousand hectares by 2025.
- **Objective 4**: Preservation and enhancement of soil fertility on an area of 5 thousand hectares of agricultural land by 2025.

GHGs affected by the policy: CO_2 and N_2O

Category of mitigation policy and/or measure: economic

Status: in force from 2021 to 2025

Included in: with existing measures (WEM) scenario

Year of implementation initiation: 2021

Responsible entity: Ministry of Agriculture and Food Industry

Monitoring and evaluation indicators: 150 ha of rehabilitated grass cover, improved pastures, degraded land, rehabilitated filter strips, decontaminated polluted land, grassy terraces; 162 ha of agricultural land subject to landslides afforested; 935 ha of hydrotechnical and phytoameliorative anti-erosion facilities; 65/25 ha of established/rehabilitated forest strips; 30 ha of created agroforest plantations; 30 ha of created riparian water protection strips; 20 ha of forest strips in ravines and created valleys; 244 ha of improved soils; 1,268 ha of sidereal crops and 1,821 ha of leguminous crops.

Mitigation impact: reduction of GHG emissions from the agricultural sector, without indicative targets compared to 1990

Estimated costs and benefits: for the implementation of the Action Plan on the implementation of the Programme for 2021-2025, estimated financial means equivalent to MDL 4,278 billion were planned, including MDL 59,626 million from the state budget, respectively MDL 4,219 billion from external sources.

Main measures to reduce GHG emissions in plant production and soil resources sectors

GHG emissions mitigation in agriculture can be influenced by a wide variety of technical solutions, the way each landowner (farmer) decides to address the problem depends a lot on the extent to which these solutions also

[90] Government Decision no. 864 of 09-12-2020 on approval of the Land Improvement Program ensure sustainable management of soil resources for the years 2021-2025 and the Action Plan on its implementation for the years 2021-2023. Published in the Official Gazette no. 13-20 22. <https://www.legis.md/cautare/getResults?doc_id=125027&lang=ro>.

allow to adapt to the adverse effects of drought, reduction of groundwater, water erosion, reduction of organic matter, etc. However, in agriculture, conditions can be created for the manifestation of synergy between control measures and adaptation measures.

The main measures to reduce GHG emissions in the plant production and soil resources sectors are as follows:

- *Agricultural land management* (organic fertilization, minimum soil works, irrigation / drainage, land use change (agricultural use) or non-cultivation);
- *Management of pastures* (adjustment of grazing, fertilization, inclusion of plant species appropriate to the type of soil);
- *Wetland management* (avoiding wetland drainage, creating wetlands to restore that habitat);
- *Restoration of degraded land* (implementation of anti-erosion, agrotechnical and phytotechnical procedures, recultivation and organic improvement);
- *Manure management* (creation of landfills and storage platforms for fertilizers and organic residues, use of composting technologies).

To encourage the implementation of these measures, financial incentives are needed to reward the effort invested to improve soil management, the efficient use of fertilizers and irrigation.

2.5.4.4. Land Use, Land Use Change and Forestry Sector

Forestry Code[91] no. 887/1996 (last update – 2017) is the basic document regulating the relationships in forest use, land and water protection, as well as the use and conservation of the plant and animal kingdom within the forest fund. The document sets out the purpose of regulating the sustainable management of the forest fund through the rational use, regeneration, guarding and protection of forests, maintaining, preserving and improving forest biological diversity, ensuring the current and future needs of society with forest resources based on their multifunctionality. Another important document related to the LULUCF sector is the Land Code[92], no. 828/1991 (last update – year 2023), which regulates land relations, establishes the ways of assigning and changing the categories of destination and categories of land use, regulates the land ownership regime, the protection and improvement of land, etc.

At the same time, the legal framework associated with the LULUCF sector problems approach finds its reflection - though episodic, tangential, in a general way or with a more accentuated footprint, in a number of legislative acts such as: the Law on Environmental Protection, no. 1515/1993[93]; the Law on rivers and water basins protection areas and strips, no. 440/1995[94]; GD no. 595/1996 on improving the management of forest management and protection of forest vegetation[95]; the Law on Natural Resources, no. 1102/1997[96]; the Law for the improvement of degraded land by afforestation, no. 1041/2000[97]; National Strategy and Action Plan on biological diversity conservation, PD no. 112/2001[98]; on Nut Crops, no. 658/1999[99]; GD 740/2003 for the approval of the normative acts on forest management[100]; Regulation on the authorization of cuts in the forest fund and forest vegetation outside the forest fund, GD 27/2004[101]; the Law of the Vegetable Kingdom, no. 239/2007[102]; GD no. 618/2007 on the approval of the List of indicators for each criterion of sustainable forest management[103]; Regulation on grazing and mowing,

[91] Forestry Code, no. 887/1996, Published: 16-01-1997 in the Official Gazette no. 5, art. 36. Effective as of 27.10.2017. <https://www.legis.md/cautare/getResults?doc_id=118482&lang=ro>
[92] Land Code, nr.828/1991. Published in the Official Gazette no. 107. 817, Amended LP 96 of 11.06.20, MO161-164/03.07.20 art. 311; effective August 3, 2020, https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[93] Law no. 1515/1993 on Environmental Protection Published: 30-10-1993 in the Official Gazette No. 10, article 283 amended by LP 253 of 22.11.18, OG1-5/04.01.19 art.4; in force 04.02.2019, <https://www.legis.md/cautare/getResults?doc_id=112032&lang=ro>
[94] Law no. 440/1995 on rivers and water basins protection areas and strips. Published in the Official Gazette no. 43, art. 482, Amended LP64 of 23.04.20, OG115-117/15.05.20 art. 203; effective 15.05.2020, <https://www.legis.md/cautare/getResults?doc_id=121475&lang=ro>
[95] No. 595/1996 on improvement of forest management and protection of forest vegetation. Published in the Official Gazette no. 78/79 635, https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[96] Law nr.1102/1997 on Natural Resources. Published in the Official Gazette no. 40. 337 Amended LP185 of 21.09.17, OG371-382/27.10.17 art.632; effective 27.10.2017, <https://www.legis.md/cautare/getResults?doc_id=109389&lang=ro>
[97] Law no.1041/2000 on Improvement of Degraded Land by Afforestation, Published: 09-11-2000 in the Official Gazette no. [141–143] 1015 effective since 01.01.2004 based on amendments by LP482/04.12.03, OG6-12/01.01.04 art.48, <https://www.legis.md/cautare/getResults?doc_id=64409&lang=ro>
[98] PD. no.112/2001 on approval of the National Strategy and Action Plan on biological diversity conservation. Published in the Official Gazette no. 90 and art. 700 in force as of 04.05.07 based on amendments by PD80-XVI as of 29.03.07, MO60-63/04.05.07 art.288, <https://www.legis.md/cautare/getResults?doc_id=77328&lang=ro>
[99] Law no.658/1999 on Nut Crops. Published in the Official Gazette no. 155, art. 749, in force since 15.06.2018 based on the amendments by LP79 of 24.05.2018, OG195–209/338 of 15.06.2018, <https://www.legis.md/cautare/getResults?doc_id=108460&lang=ro>
[100] GD no.740/2003 on approval of the normative acts on forest management. Published in the Official Gazette no. 126-131 Article 778 Amended GD 1143 of 21.11.18, OG13-21/18.01.19 art. 7; effective 18.01.2019, <https://www.legis.md/cautare/getResults?doc_id=112873&lang=ro>
[101] GD no. 27/2004 on approval of the regulation on the authorization of felling in the forest fund and forest vegetation outside the forest fund published in the official gazette no. 324. 155 Amended GD 1143 of 21.11.18, OG13-21/18.01.19 art. 7; effective 18.01.2019, <https://www.legis.md/cautare/getResults?doc_id=113236&lang=ro>
[102] Law nr.239/2007 of the Vegetable Kingdom. Published in the Official Gazette no. 40-41 art. 114. In force since 24.08.18 based on the amendments by LP172 of 27.07.18, OG 321-332/24.08.18 art.529; <https://www.legis.md/cautare/getResults?doc_id=107020&lang=ro>
[103] GD no. 618/2007 on approval of the List of indicators for each criterion of sustainable forest management. published in the Official Gazette no. 85, Article no: 663 Amended: GD 1143 of 21.11.18, OG13-21/18.01.19

GD no. 667/2010[104]; National Program on the establishment of the national ecological network for the years 2011-2018, GD no. 593/2011[105]; Strategy for Rural Extension Services Development for the years 2012-2022, GD no. 486/2012[106]; National Strategy for agricultural and rural development for the years 2014-2020, GD nr. 409/2014[107]; Regulation on the afforestation of degraded land public property of administrative-territorial units and degraded land private property, GD 1186/2016[108]; Program for promoting "green" economy in the Republic of Moldova for the years 2018-2020 and the Action Plan for its implementation, GD no. 160/2018[109]; Regulation on conditions and procedures for implementing land improvement, protection, conservation and soil fertility enhancement activities, GD 691/2018[110]; Action Plan for the years 2018-2022 on implementation of the Strategy for Rural Extension Services Development in the Republic of Moldova (2012-2022), draft GD, etc.

- ***Government Decision no. 106/1996 on measures to ensure the protection of forests, forest belts and other forest plantations[111]***

Objective: to stop the illegal logging of forests, forest protection belts, other forest plantations, as well as other violations of forest legislation

GHG covered by the policy: CO_2 (indirect)

Measure category: Regulatory

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of initiation of implementation: 1996

Responsible entity: Ministry of Environment, "Moldsilva" (Forestry) Agency, district executive committees, town halls of communes and municipalities

Monitoring and evaluation indicators: measures to prevent and combat violations of forestry legislation undertaken; extent of illicit cuts detected and documented

Mitigation impact: not available

Estimated costs and benefits: not available.

- ***Government Decision no. 32/2001 on measures for establishing riparian areas and rivers and water basins protection strips[112]***

Objective: to establish the size of the riparian water protection areas and strips of rivers and water basins in the Republic of Moldova (84 thousand ha), as well as to carry out the afforestation works of the riparian water protection areas and strips on a total area of 23 thousand ha

GHGs covered by the policy: CO_2

Measure category: Regulatory

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2001

Responsible entity: local public authorities, Agency for Land Relations and Cadaster, "Apele Moldovei" (Water Management) Agency, Ministry of Agriculture and Food Industry, Ministry of Environment, "Moldsilva" (Forestry) Agency

art.7; in force 18.01.2019; GD no. 150 of 02.03.10, OG no. 33/05.03.10 art. 204; <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=324607>

[104] GD no. 667/2010 approving the Regulation on grazing and mowing. Published in the Official Gazette no. 134, Article 748, <https://www.legis.md/cautare/getResults?doc_id=19561&lang=ro>

[105] GD no.593/2011 on approval of the National Program on the establishment of the national ecological network for the years 2011-2018. Published in the Official Gazette no. 131, 133, 664, amended HG1143 of 21.11.18, OG13-21/18.01.19 art. 7; effective 18.01.19, < https://www.legis.md/cautare/getResults?doc_id=114335&lang=ro>

[106] GD no. 486/2012 on approval of the Strategy for Rural Extension Services Development for the years 2012-2022. published in the Official Gazette no. 143-148 Article 537 Amended GD no.1143 of 21.11.18, MO13-21/18.01.19 art. 7; effective 18.01.2019, <https://www.legis.md/cautare/getResults?doc_id=114376&lang=ro>

[107] GD no. 409/2014 on approval of the National Strategy for Agricultural and Rural Development for the years 2014-2020. Published: 31.10.2014 in the Official Gazette no. 152. In force since 28.09.18 based on the amendments by GD no. 785 as of 01.08.18, OG no. 366-376/28.08.18 art.962, <https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>

[108] GD no.1186/2016 on approval of the Regulation on the afforestation of degraded land public property of administrative-territorial units and degraded land private property. Published in the Official Gazette no. 379-386 Article 1283, amended by GD no. 1143 of 21.11.18, OG no. 13-21/18.01.19 art.7; effective 18.01.19, <https://www.legis.md/cautare/getResults?doc_id=114853&lang=ro>

[109] GD no.1186/2016 on approval of the Regulation on the afforestation of degraded land public property of administrative-territorial units and degraded land private property. Published in the Official Gazette no. 379-386 Article 1283, amended GD no. 1143 of 21.11.18, OG no. 13-21/18.01.19 art.7; effective 18.01.19, <https://www.legis.md/cautare/getResults?doc_id=114853&lang=ro>

[110] GD no.691/2018 on approval of the Regulation on conditions and procedures for carrying out the land improvement, protection, conservation and of soil fertility enhancement activities. Published in the Official Gazette no. 295-308. Repealed by GD no. 985 of 22.12.20, OG no. 22-32/29.01.21 art.33; effective 29.01.21, https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro

[111] GD no. 106 of 27.02.1996 on measures to ensure protection of forests, forest protection curtains and other forest plantations. <https://www.legis.md/cautare/getResults?doc_id=112777&lang=ro>|

[112] GD no. 32 of 16-01.2001 on measures for the establishment of riparian areas and strips for rivers and water basins protection. Published in: Official Gazette no. 57-58. 366. <https://www.legis.md/cautare/getResults?doc_id=48658&lang=ro>

Monitoring and evaluation indicators: forest belts and forest plantations planted in riparian water protection areas

Mitigation impact: CO_2 removals – estimated at 210 kt CO_2 annually

Estimated costs and benefits: MDL 2.3 million.

- ***Strategy for Sustainable Development of the Forestry Sector, approved by PD no. 350/2001***[113]

Objective: to cover at least 130 thousand ha of forest vegetation; to create new forest bodies, green islands of trees and shrubs, interconnection corridors between wooded areas, protective curtains along rivers, roads and around industrial sites

GHGs covered by the policy: CO_2

Measure category: Regulatory

Status: under implementation

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2001

Responsible entity: "Moldsilva" (Forestry) Agency, Ministry of Environment

Monitoring and evaluation indicators: wooded areas

Mitigation impact: CO_2 removals – estimated at 1,180 kt CO_2 annually

Estimated costs and benefits: MDL 345.9 million ($US 25.5 million) (according to GD no. 739/2003).

- ***Horticulture Development Program for 2021-2025 and the Action Plan for its implementation, approved by GD no. 840 of 18.11.2020***[114]

Objective: the document will contribute to the achievement of the objective "*Orientation of investments to strengthen the value chain and the processing infrastructure of agricultural production and modernization of the processing industry by creating a system of small and medium-sized enterprises for processing, storing and packaging of agri-food products*", established by the plan indicated for the agricultural sector and food industry;

Specific objectives with reference to LULUCF sector – stimulating the establishment of intensive multiannual plantations with the product range required on the regional markets and stimulating the grabbing-up of ageing multiannual plantations to prevent the spread of diseases and pests.

GHGs covered by the policy: CO_2

Measure category: Regulatory

Status: in force

Considered in: with existing measures (WEM) scenario

Year of implementation initiation: 2021

Responsible entity: Ministry of Agriculture and Food Industry

Monitoring and evaluation indicators: 21.8 thousand ha of established plantations and implemented investments; grabbed-up areas (estimated 21 thousand ha, including orchards and vineyards with overdue exploitation)

Mitigation impact: CO_2 removals – 26 kt annually

Estimated costs and benefits: MDL 3,026 million for the establishment of multiannual plantations and MDL 391 million for grabbing-up aging multiannual plantations.

- ***National Program for expansion and rehabilitation of forests for the period 2023-2032 and the Action Plan for its implementation for the period 2023-2027, approved by GD no. 55 of February 17, 2023***[115]

[113] Parliament Decision no. 350 of 12.07.2001 approving the Strategy for Sustainable Development of the Forestry Sector of the Republic of Moldova. Published in: Official Gazette no. 135, Article 1021., <https://www.legis.md/cautare/getResults?doc_id=63247&lang=ro>

[114] Government Decision no. 840 of 18.11.2020 on the approval of the Horticulture Development Program for 2021-2025 and the Action Plan on its implementation, <https://www.legis.md/cautare/getResults?doc_id=124291&lang=ro>

[115] Government Decision no. 55 of February 17, 2023 on approval of the National Forest Extension and Rehabilitation Program for the period 2023-2032 and the Action Plan for its implementation for the period 2023-2027. Published in the Official Gazette no. 85-86. 167, <https://www.legis.md/cautare/getResults?doc_id=135917&lang=ro>

Overall objective of the Programme is sustainable development of the forestry sector, through conservation and expansion of national forest resources, in order to increase long-term climate resilience and meet the country's needs for forest-generated products and services. It will be achieved by increasing the climatic resilience of the territory/landscape and by maintaining, preserving and developing forest vegetated lands in order to better contribute to protection of water resources, soil resources, combating disruptive climatic factors and providing forest products and services for the national economy and population.

GHGs covered by the policy: CO_2

Measure category: Regulatory

Statute: in force

Considered in: with additional measures (WAM) scenario

Year of implementation initiation: 2023

Responsible entity: Ministry of Environment, "Moldsilva" (Forestry) Agency

Monitoring and evaluation indicators: extensive activities are planned to plant trees/seedlings and to rehabilitate/promote forest vegetation on the area of at least 145 thousand ha during 10 years; including the extension (by afforestation) of about 110 thousand ha – activities to create new forest crops, with the primary objective of social (energy, economic) and ecological safety (forest habitats, biodiversity shelter) by creating forests with production functions (energy, industrial); rehabilitation (mainly by reforestation) of about 35 thousand ha – restoration or reconstruction of lands with forest vegetation strongly affected by various forms of degradation, where forest vegetation is practically absent or in unfavorable condition, with the primary objective to restore natural forests and ensure predominantly ecological functions (carbon sequestration, hydrological carcass, biodiversity conservation, etc.); young stands and/or forest crops will also be considered until the massive state is achieved, which have not achieved the optimal parameters established in the projects/projects and according to the stational conditions (consistency; success; etc.).

Mitigation impact: cumulative CO_2 removals – around 12 Mt until 2050.

Expected results and benefits: expansion of areas covered with forest vegetation to at least 15% of the country's area by 2032; increased productive potential by 10% by 2032 compared to the existing potential; rehabilitation/reconstruction by 2032 of new forest plantations (110 thousand ha) and land (35 thousand ha); reduction of the forest fragmentation index by 0.75 units (which means higher compactness) by improving ecological connectivity with habitats provided for biodiversity by 2032; reducing the area of degraded land by 45 thousand ha by 2032; strengthening the communal forestry sector by expanding forest areas and rehabilitating the existing ones, training staff and developing forest management plans (85 thousand ha) by 2032; strengthening the private forestry sector by expanding forest areas, training staff and developing forest management plans by 2032; reducing the area of heavily eroded land by 15 thousand ha by 2032; strengthening the hydrological carcass by afforestation of 15 thousand ha of riparian strips by 2032; reducing soil erosion processes and protection of about 350 thousand ha of agricultural land by creating/rehabilitating 10 thousand forest curtains to protect agricultural fields by 2032; strengthening capacities to reduce the incidence of forest fires by developing fire management plans, as well as creating fire infrastructure in new or rehabilitated forests (equipment, water supply sources, mineralized strips, watch and monitoring towers, etc.) –145 thousand ha by 2032; consolidation of grassland management capacities through the implementation of practical activities for the creation and rehabilitation of silvo-pasture systems – 5 thousand ha by 2032; strengthening the capacities of private and communal forest nurseries with the achievement of production capacities of 5-7% of the forest reproductive material (FRM) needs for forest regeneration/expansion/rehabilitation by 2032; creating jobs for about 20.6 thousand people by 2032; updating and improving the legal framework by 2032; reorganization of the FRM insurance subsector (90% of quality FRM grown under production-line conditions, including 20-30% with protected roots), growing about 860 million seedlings by 2032; strengthening forest management capacities by digitizing the necessary processes and activities for the execution of forestry works and provision of forest reproductive material by 2032.

Estimation of costs: The general cost of implementing the Program is MDL 15,210 billion, or an annual average of MDL 1,521 billion, including: direct costs for afforestation/reforestation works (including maintenance) is

estimated at about MDL 12,607 billion, or 82.9% of the general costs; costs for land identification and design of forestry crops are estimated at about MDL 0.756 billion (5.0% of the total costs); management costs are estimated at about MDL 0.451 billion, or about 3% of the total budget.

2.5.4.5. Waste Sector

In the Republic of Moldova, the legal framework in the field of environmental protection is being updated in accordance with the National Action Plan for the implementation of the Association Agreement between the Republic of Moldova and the EU. Thus, during the last years, new regulations have been introduced on waste management, including in terms of reducing GHG emissions, which contain stipulations regarding the endowment of MSW deposits with biogas recovery facilities. Policies dedicated to GHG emission reductions in the waste sector are reflected also in BUR3 of the RoM to the UNFCCC (2021), respectively in the NC5 of the RoM to the UNFCCC (2023).

The national policy on waste management is focused on the development of the infrastructure and services needed for adequate protection of the environment at global, national and local level from the effects associated with management of waste generated by the population, enterprises and institutions, according to the provisions of the Waste Management Strategy of the Republic of Moldova for 2013-2027, approved by GD no. 248/2013, LEDP 2030, approved by GD no. 659/2023 and the National Waste Management Program for the years 2023-2027, approved by GD no. 972/2023.

The Law no. 209/2016 on Waste transposes Directive 2008/98/EC and 9 other European acts into national law, and it requires development of the secondary framework. Thus, during 2018-2020, several legislative acts were adopted for the consistent application of Law no. 209/2016 on Waste, which transposed the Commission's Decision 2000/532/EC on the list of waste, including hazardous waste, by the GD no. 99/2018 on approval of the Waste List and approval of the GD no. 501/2018 on Instruction on keeping records and transmission of data on waste and waste management, and GD no. 682/2018 approving the Concept of the Automated Information System (AIS) "Waste Management" through which the reporting system www.siamd.gov.md was developed.

Other regulations have also been approved recently, such as:

- Government Decision no. 212/2018 approving the Regulation on electrical and electronic equipment waste.
- Government Decision no. 373/2018 on the National Pollutant Release and Transfer Register, in particular the Regulation on the National Pollutant Release and Transfer Register (PRTR).
- Government Decision no. 561/2020 for the approval of the Regulation on packaging and packaging waste.
- Government Decision no. 939/2023 approving the Waste Disposal Regulation.

Listed below are two recently approved policy documents, which more prominently specify the issues associated with reducing GHG emissions from this sector.

- ***Government Decision no. 939/2023 approving the Waste Disposal Regulation***[116]

The Waste Disposal Regulation aims to establish the legal framework to support waste depositing activities, design, construction, operation, monitoring, closure and post-closure monitoring of new and existing deposit sites, under environment and human health protection conditions. The regulation on waste storage activity aims to prevent or reduce the negative effects on the environment, in particular the pollution of surface water, groundwater, soil, air, including the greenhouse effect, as well as any risk to the population health, throughout the life of the landfill, as well as after its expiry.

GHGs affected by the policy: CH_4 and N_2O

Policy type: Regulatory

Status: approved in 2023

Considered in: with additional measures (WAM) scenario

[116] <https://www.legis.md/cautare/getResults?doc_id=141283&lang=ro>

Year of initiation of implementation: 2023

Responsible entity: Ministry of Environment

Monitoring and implementation indicators: As a monitoring indicator would be the number of closed and re-cultivated deposit sites, the number of built deposit sites.

Mitigation impact: Activities are focused on liquidation, closure and re-cultivation of existing landfills, along with construction of new regional deposit sites equipped with biogas recovery systems would help reduce GHG emissions in the waste sector.

- ***Government Decision no. 972/2023 approving the National Waste Management Program for the years 2023-2027***[117]

The National Waste Management Program for the years 2023-2027 is drawn up to execute the Government's Action Plan for the years 2020-2023, approved by Government Decision no. 636/2019 and will contribute to the achievement of the objective "*consisting in the development by 2027 of an integrated waste management system, economically efficient and ensuring the fundamental right to a healthy and safe environment and the achievement of the main indicators of sustainable development*", included in the National Development Strategy Moldova 2030. This program will serve as a basis for planning investments in developing an efficient integrated waste management infrastructure, stimulating the transformation of waste into resources and taking actions towards the circular economy, as well as raising awareness of the benefits of environmental actions in addressing global waste management challenges.

GHGs affected by the policy: CH_4 and N_2O

Policy type: Regulatory

Status: adopted in 2023

Considered in: with additional measures (WAM) scenario

Year of initiation of implementation: 2023

Responsible entity: Ministry of Environment

Monitoring and implementation indicators: the successful implementation of the National Program will contribute to modernization of the waste management system, intervening on several aspects so as to get as close as possible to the sanitary standards on waste storage and environmental protection, encouraging separation at source and recovery of materials of intrinsic value and directing attention and behavior to circular economy solutions to the detriment of conventional solutions, and the benefits of the actions taken will be primarily improved access to waste management services.

2.6. Projections of greenhouse gas emissions and removals

2.6.1. Key underlying assumptions and parameters used for projections

2.6.1.1. Introduction

The projections of greenhouse gas emissions and removals was made for two scenarios: (1) with existing measures scenario (WEM) and (2) with additional measures scenario (WAM). The need to develop the baseline scenario (BLS) disappeared because at the stage of identifying mitigation targets in the context of the NDC 1.0 (2015), the Republic of Moldova chose an absolute economy-wide emission reduction target as compared to the reference year (1990), so that the GHG emissions in the WEM and WAM scenarios are compared with the emissions recorded in 1990, not with those in BLS.

GHG emission mitigation scenarios were generated for the following sectors: Energy; IPPU; Agriculture; LULUCF; Waste.

In the above-mentioned mitigation scenarios, emissions from the following direct greenhouse gases were considered: CO_2, CH_4, N_2O and F-gases.

The GHG emission projections are given also in aggregated form (in CO_2 equivalent). Projections are presented for the years 2025, 2030, 2035 and 2040; while for the years 1990-2022, the GHG emissions levels corresponds

[117] <https://www.legis.md/cautare/getResults?doc_id=141283&lang=ro>

to the historical ones, with reference to the results of the GHG emissions inventory for the period 1990-2022, as reflected in Chapter 1 "*Greenhouse Gas Inventory*" of the BTR1 of the RoM to the UNFCCC. Emissions from fuel combustion in international transport are also presented in this chapter, although they are not considered in the total national GHG emissions.

2.6.1.2. Considered mitigation scenarios

As already reported above, the projections of greenhouse gas emissions and removals have been developed for the years 2025, 2030, 2035 and 2040 for the following two scenarios, which also considered the actual historical emissions reported the years 1990, 1995, 2000, 2005, 2010, 2015 and 2020: WEM scenario – reflect the projections corresponding to the policies and measures implemented or adopted in the period until 31.12.2022; and WAM scenario – reflect the policies and measures adopted or under development in the period starting with 01.01.2023.

2.6.1.3. Methodologies and the tools used

Various tools have been used to assess the mitigation potential of the GHG emissions and removals, using the top-down and bottom-up methodological approach. Mitigation scenarios have been developed for each sector (energy, industry, agriculture, LULUCF and waste) and GHG emissions were estimated separately for each GHG (CO_2, CH_4, N_2O, F-gases).

The list of the tools considered and selected for use, accompanied by a brief argument regarding their selection, is presented in Table 2-18.

Table 2-18: Tools assessed and used for estimating the GHG emissions reduction potential in the Republic of Moldova

Sector	Recommended tools	Tools used	Notes
Energy	MESSAGE MARKAL TIMES ENPEP-BALANCE LEAP	TIMES calculation tool ENPEP, in complex with subprograms: WASP and IMPACT Standard calculation tool (2006 IPCC Guidance)	1. Calculation of electricity sector development scenarios in the frame of the NECP 2025-2030 were based on use of the TIMES calculation tool. 2. In addition, the electricity sources development scenarios were calculated also using the WASP module, while the GHG emission mitigation potential – using the IMPACT module; 3. Within the thermal energy generation and transport sectors, the GHG mitigation potential was assessed using MS Excel calculation tools developed by sectoral experts.
Industry	LEAP	Standard calculation tool (2006 IPCC Guidance)	Within the "IPPU" and "Agriculture" sectors, the GHG emission mitigation potential was assessed using the MS Excel calculation spreadsheets developed by sectoral experts, based on the methodologies available in the 2006 IPCC Guidelines; The Land Use Matrix for the period 1970-2022, extended for the period 2023-2040 was used to simulate the evolution of GHG emissions and removals in LULUCF sector.
Agriculture	STAIR		
LULUCF	COPATH		
Waste	LEAP	Standard calculation tool (2006 IPCC Guidance) for the Tier 3 evaluation methodology (IPCC First Order Decay Method)	To assess the mitigation potential of methane emissions from solid municipal waste deposit sites, the Tier 3 calculation methodology (IPCC First Order Decay Method) from the 2006 IPCC Guidelines was used with the application of the MS Excel calculation tool developed by the sectoral expert. To assess the mitigation potential of methane and nitrous oxide emissions from wastewater treatment, the methodologies available in the 2006 IPCC Guidelines were used, with the application of the MS Excel calculation spreadsheets developed by the sectoral expert.

2.6.1.4. Key parameters and assumptions

Table 2-19 presents the projected key parameters for the national economy, and Table 2-20 reflects the specific key parameters used for surveys in the sectors.

Table 2-19: Key parameters applied when developing the mitigation scenarios

Parameters	MU	2000	2005	2010	2015	2020	2025	2030	2035	2040
Real GDP level	$US mil.	1,289.0	2,988.0	6,977.0	7,746.0	11,916.0	19,527.6	29,907.8	44,741.0	65,333.6
Annual GDP Growth	%	-2.2	18.3	18.5	2.1	-0.5	9.2	8.7	8.1	7.7
Stable population, annual average	thousand people	3,640.0	3,595.0	3,562.0	3,554.0	No data				
Population of habitual residence, annual average	thousand people	No data			2,835.0	3,109.2	2,893.5	2,671.3	2,450.2	2,230.0
Population growth rate	%	0.2	-0.3	-0.2	-1.4	-1.4	-1.5	-1.6	-1.8	-1.9
Imported natural gas price	US$ /1000 m^3	NA	67.0	273.0	224.4	208.4	418.0	418.0	277.0	415.0
Imported electricity price	US¢/ kWh	2.8	2.4	5.8	5.9	5.5	8.2	9.2	9.3	9.4

Table 2-20: Key parameters applied when developing the mitigation scenarios for relevant sectors

Parameters	MU	2000	2005	2010	2015	2020	2025	2030	2035	2040
Energy										
Electricity demand under WEM	bill. kWh	5.3	6.6	6.0	5.6	5.9	5.1	5.5	5.8	6.2
Electricity demand under WAM	bill. kWh	5.3	6.6	6.0	5.6	5.9	5.6	5.9	6.5	7.5

Parameters	MU	2000	2005	2010	2015	2020	2025	2030	2035	2040
Transport										
Passenger journey – total	mil. passengers-km	NA	NA	NA	NA	2008.0	4055.0	4168.0	4291.0	4337.0
Turnover of goods	million tons-km	NA	NA	NA	NA	5679.0	4422.0	5023.0	5706.0	6481.0
Fuel consumption under WEM	PJ	NA	NA	NA	29.8	34.0	28.2	30.0	32.0	34.0
Fuel consumption under WAM	PJ	NA	NA	NA	29.8	34.0	26.5	28.2	30.1	32.0
Buildings (residential, commercial and tertiary)										
Buildings area	mil m^2	88.0	89.6	92.2	94.2	102.4	104.2	107.4	110.6	113.9
Ambient temperature increase in the heating season caused by global warming, allowed	K						0.5	1.1	1.3	1.3
Industrial processes and products use										
Cement production, WEM	kt	431.9	772.8	861.4	1,122.8	1,164.1	1,300.0	1,450.0	1,600.0	1,750.0
Cement production, WAM	kt	431.9	772.8	861.4	1,122.8	1,164.1	1,350.0	1,500.0	1,650.0	1,800.0
Steel production, WEM	kt	908.1	1,049.4	242.4	431.8	467.1	594.4	715.3	836.3	957.2
Steel production, WAM	kt	908.1	1,049.4	242.4	431.8	467.1	624.3	751.2	878.2	1005.2
Agriculture										
Areas on which the conservation agriculture system will be implemented, WEM	kha	NO	NO	NO	54.0	100.0	100.0	150.0	200.0	250.0
Areas on which the conservation agriculture system, will be implemented will be implemented, WAM	kha	NO	NO	NO	54.0	100.0	150.0	200.0	250.0	300.0
Land use, land use change and forestry										
Successful annual afforestation area, WEM	ha	NA	NA	NA	578.9	715.0	3462.6	6059.6	3462.6	1183.8
Successful annual afforestation area, WAM	ha	NA	NA	NA	578.9	715.0	3788.2	8338.4	4764.8	1573.9
Waste										
Municipal solid waste, WEM	kt	523.8	602.5	1,075.1	1,270.7	1,248.7	1,231.3	1,332.0	1,359.5	1,470.7
Municipal solid waste, WAM	kt	523.8	602.5	1,075.1	1,270.7	1,248.7	1,105.5	1,021.2	1,027.7	1,067.9

2.6.2. Projections of aggregated direct GHG emissions by sectors

Following the promotion of GHG emissions mitigation policies and measures described above in Chapter 2.5 and applied in the concepts of WEM and WAM, the impact on sectors defined by the IPCC, expressed in CO_2 equivalent, has been calculated. The obtained results correspond to the territory of the entire country, including ATULBD, and are set out in Table 2-21 and Figure 2-3.

Table 2-21: Aggregated GHG emissions projections for the period up to 2040, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
Energy	37,087.6	12,467.0	7,018.5	8,935.3	9,574.5	9,317.7	9,467.0	9,673.3	9,909.3	10,733.2	11,497.4
IPPU	1,605.2	456.6	315.3	570.7	553.7	749.8	970.5	1,067.9	1,114.1	1,138.3	1,147.0
Agriculture	5,101.0	3,220.3	2,178.5	2,070.9	1,804.2	1,656.0	1,479.0	1,717.8	1,743.3	1,777.3	1,792.5
LULUCF	-1,676.0	-2,058.7	-2,156.0	-1,699.2	-1,256.7	-1,202.9	-22.1	-217.6	-487.3	-1,246.6	-2,151.2
Waste	1,690.3	1,791.1	1,708.1	1,607.4	1,563.5	1,439.6	1,475.4	1,376.8	1,263.0	1,204.0	1,055.7
Total (with LULUCF)	**43,808.1**	**15,876.3**	**9,064.4**	**11,485.2**	**12,239.2**	**11,960.2**	**13,369.9**	**13,618.2**	**13,542.3**	**13,606.2**	**13,341.3**
Total (without LULUCF)	**45,484.1**	**17,935.0**	**11,220.5**	**13,184.4**	**13,495.9**	**13,163.1**	**13,392.0**	**13,835.8**	**14,029.6**	**14,852.7**	**15,492.6**
Total (with LULUCF), in % compared to 1990	0.0	-63.8%	-79.3%	-73.8%	-72.1%	-72.7%	-69.5%	-68.9%	-69.1%	-68.9%	-69.5%
Total (without LULUCF), in % compared to 1990	0.0	-60.6%	-75.3%	-71.0%	-70.3%	-71.1%	-70.6%	-69.6%	-69.2%	-67.3%	-65.9%
WAM											
Energy	37,087.6	12,467.0	7,018.5	8,935.3	9,574.5	9,317.7	9,467.0	9,289.5	8,768.0	8,560.7	8,617.3
IPPU	1,605.2	456.6	315.3	570.7	553.7	749.8	970.5	1,014.9	1,011.9	1,005.3	995.1
Agriculture	5,101.0	3,220.3	2,178.5	2,070.9	1,804.2	1,656.0	1,479.0	1,701.9	1,708.5	1,719.5	1,721.6
LULUCF	-1,676.0	-2,058.7	-2,156.0	-1,699.2	-1,256.7	-1,202.9	-22.1	-227.6	-1,317.3	-2,381.8	-3,556.3
Waste	1,690.3	1,791.1	1,708.1	1,607.4	1,563.5	1,439.6	1,475.4	1,367.9	989.9	799.0	765.1
Total (with LULUCF)	**43,808.1**	**15,876.3**	**9,064.4**	**11,485.2**	**12,239.2**	**11,960.2**	**13,369.9**	**13,146.6**	**11,161.0**	**9,702.7**	**8,542.8**
Total (without LULUCF)	**45,484.1**	**17,935.0**	**11,220.5**	**13,184.4**	**13,495.9**	**13,163.1**	**13,392.0**	**13,374.2**	**12,478.3**	**12,084.5**	**12,099.1**
Total (with LULUCF), in % compared to 1990	0.0	-63.8%	-79.3%	-73.8%	-72.1%	-72.7%	-69.5%	-70.0%	-74.5%	-77.9%	-80.5%
Total (without LULUCF), in % compared to 1990	0.0	-60.6%	-75.3%	-71.0%	-70.3%	-71.1%	-70.6%	-70.6%	-72.6%	-73.4%	-73.4%

As seen from Figure 2-3, the GHG emissions considered in WEM scenario are just slightly below those related to the unconditional commitment made by the RoM in its NDC 2.0 (2020).

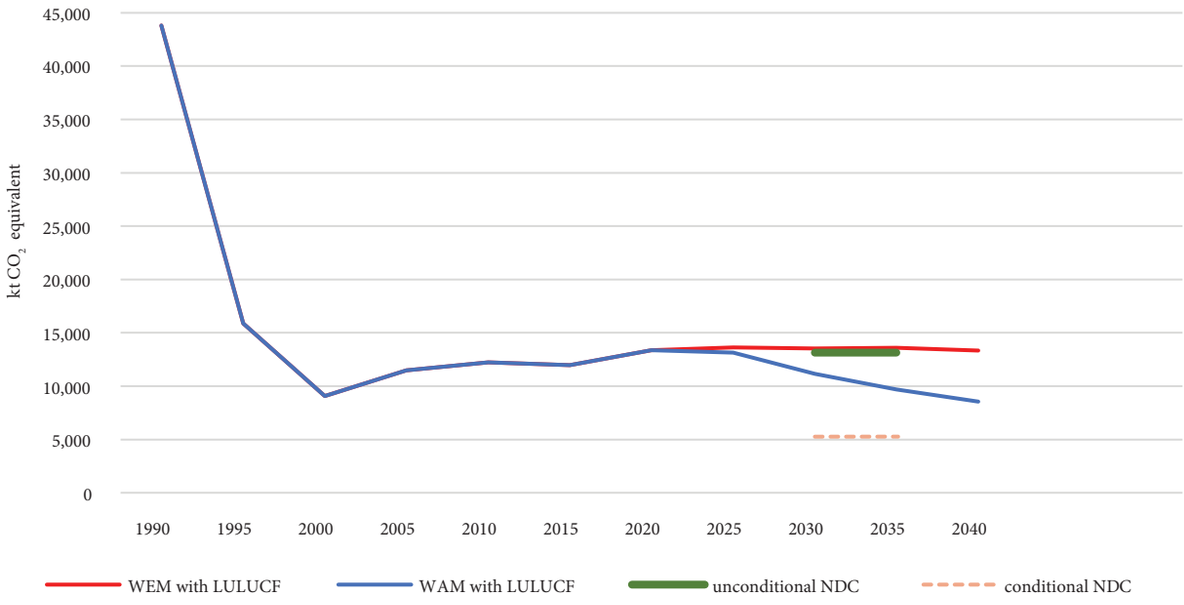
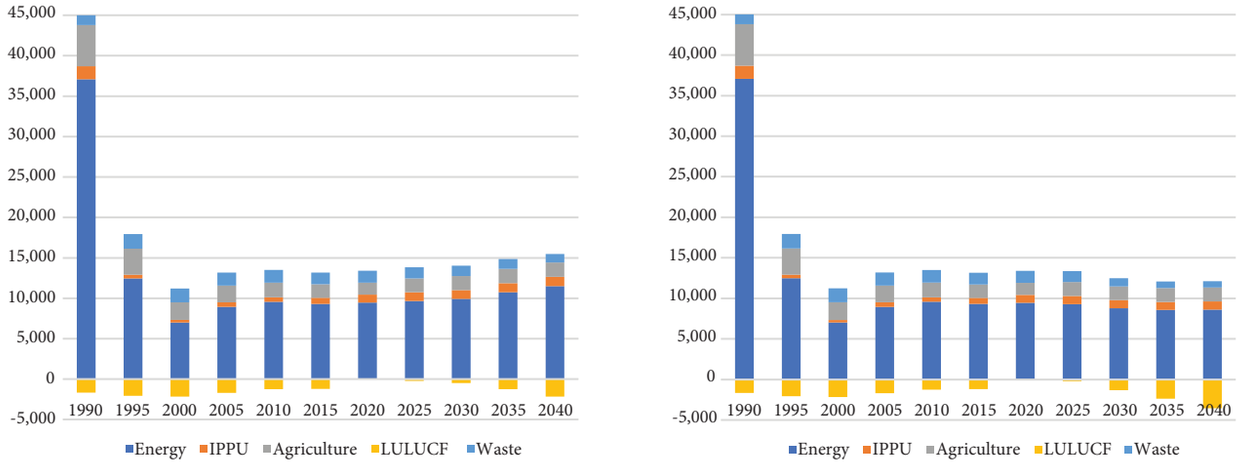


Figure 2-3: Projections of total net GHG emissions (with LULUCF) in the considered mitigation scenarios, kt CO_2 equivalent.

By 2030 they are expected to be lower than those recorded in 1990, by 69.1%, as compared to 70% according to the unconditional economy-wide reduction target from NDC 2.0. By 2040, the net GHG emissions will continue to decrease, reaching a 69.5% reduction as compared to 1990.

As regards the WAM scenario, the GHG emission reductions by 2030 will be lower than the expected conditional economy-wide reduction target from NDC 2.0, due to sector-specific considerations, examined separately in the following sub-chapters, dedicated to the projections of sectoral GHG emissions and removals.

The most significant contribution to achieving these objectives is expected for the 'Energy' and 'LULUCF' sectors, as seen in Figure 2-4 which reflects GHG emissions for the sectors considered.



a) WEM **b)** WAM

Figure 2-4: Sectors share in total net GHG emissions (with LULUCF) under WEM (a) and WAM (b) scenarios.

Due to the promotion of energy efficiency and the use of renewable sources in the country's energy balance, GHG emissions related to energy sector tend to keep their level compared to 2020 in the WEM, and to decrease in the WAM, while the country's real GDP is expected to increase by 548% by 2040 compared to 2020.

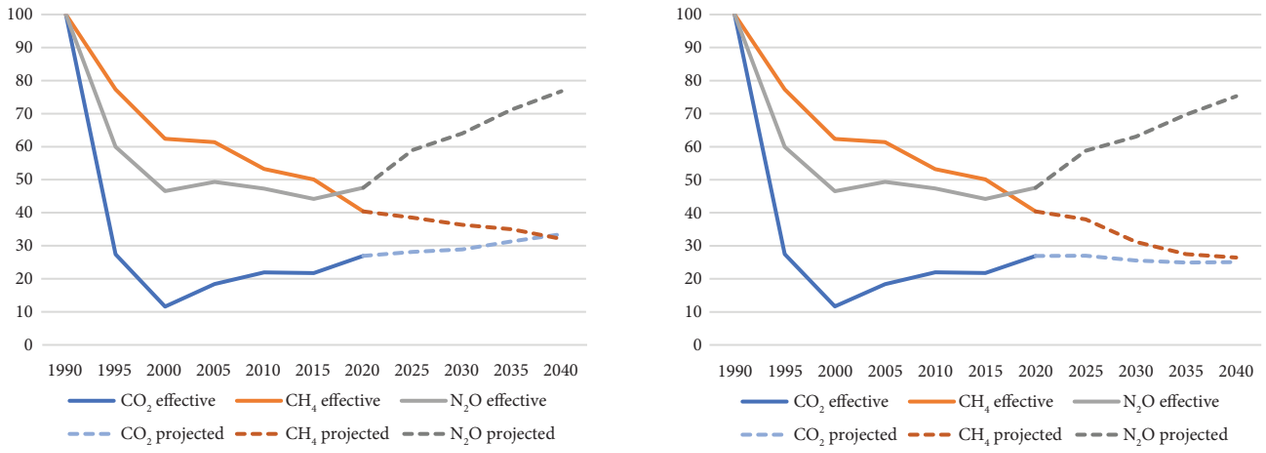
The same trend is observed in the agriculture sector, determined by the application of conservation agriculture, with effects of increasing production on cultivated land.

On the other hand, in the LULUCF sector, the expansion of forested areas, grasslands and the implementation of sustainable agriculture practices will have the effect of gradually increasing the amount of removed GHGs, especially in the WAM.

Figure 2-5 shows the evolution of net individual GHG emissions, according to WEM and WAM scenarios, compared to the level of emissions recorded in 1990.

The projections of F-gases are not presented due to the fact that no such emissions were recorded in 1990. Attention to F-gases should not be significant, given that their share in total national emissions does not exceed 4% during the period under review, in both scenarios considered.

As shown in Figure 2-5, in WEM and WAM scenarios, the amount of CO_2 and CH_4 emissions tends to decrease compared to 2020, while that of N_2O, vice versa, increases in the period after this year.



a) WEM **b)** WAM

Figure 2-5: GHG emissions by type, according to WEM (a) and WAM (b), compared to 1990, %.

The evolution is explained by the gradual increase in the quantities of nitrogenous chemical fertilizers over the years to 2040, as well as the carbon loss through the mineralization process as a result of the change in agricultural land use and soil management practices over the period to 2040, with an increasing impact of N_2O emissions (especially those from the category 3D "Agricultural soils"). It should be mentioned that the share of N_2O in the total volume of direct GHG emissions during the years 2020-2040 represents about 10-15% in WEM scenario, respectively about 10-22% in WAM scenario.

It is also worth mentioning that WAM features CO_2 level almost equal to net zero by 2040, mainly due to the wide promotion of conservation agriculture, afforestation and significant growth of grassland areas.

The absolute values of the GHG emissions for the years under review are also shown in Table 2-22.

Table 2-22: Projections of net direct GHG emissions (with LULUCF) under WEM and WAM scenarios for the period up to 2040, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
Total CO_2 emissions	35,174.3	9,657.6	4,094.1	6,482.4	7,728.5	7,651.8	9,485.0	9,897.5	10,169.3	11,017.9	11,786.2
Total CH_4 emissions	6,000.7	4,640.3	3,740.8	3,683.2	3,193.3	3,006.1	2,424.2	2,309.3	2,182.4	2,100.1	1,923.8
Total N_2O emissions	2,633.1	1,577.5	1,224.9	1,299.3	1,246.1	1,163.3	1,252.4	1,553.7	1,684.3	1,876.2	2,021.5
Total F-gas emissions	NO	0.9	4.7	20.2	71.3	139.0	208.3	257.3	224.6	179.8	131.0
Total net GHG emissions (with LULUCF)	**43,808.1**	**15,876.3**	**9,064.4**	**11,485.2**	**12,239.2**	**11,960.2**	**13,369.9**	**13,618.1**	**13,542.3**	**13,606.3**	**13,341.3**
WAM											
Total CO_2 emissions	35,174.3	9,657.6	4,094.1	6,482.4	7,728.5	7,651.8	9,485.0	9,487.0	8,986.8	8,783.2	8,815.2
Total CH_4 emissions	6,000.7	4,640.3	3,740.8	3,683.2	3,193.3	3,006.1	2,424.2	2,278.8	1,873.3	1,651.0	1,588.1
Total N_2O emissions	2,633.1	1,577.5	1,224.9	1,299.3	1,246.1	1,163.3	1,252.4	1,546.5	1,659.4	1,835.0	1,981.4
Total F-gas emissions	NO	0.9	4.7	20.2	71.3	139.0	208.3	243.9	191.6	143.6	103.3
Total net GHG emissions (with LULUCF)	**43,808.1**	**15,876.3**	**9,064.4**	**11,485.2**	**12,239.2**	**11,960.2**	**13,369.9**	**13,146.6**	**11,161.0**	**9,702.7**	**8,542.7**

2.6.3. Projections of direct GHG emissions by sector

2.6.3.1. Energy Sector

The energy sector generates GHG emissions by combusting and transforming fossil fuels. As for fugitive GHG emissions, they are methane-based and are generated in the process of extracting, transporting and processing natural gas.

Calculation of electricity sector development scenarios were based on use of the TIMES calculation tool, while GHG emissions in this sector were calculated based on emission factors used in the "*National Inventory Report: 1990-2022. Greenhouse Gas Emissions Sources and Sinks in the Republic of Moldova*".

For the other sectors, the standard calculation tools based on 2006 IPCC Guidance were used (IPCC, 2006).

The GHG emissions mitigation measures include energy efficiency, advanced electricity and heat generation technologies, as well as energy produced from renewable energy sources.

Projections of CO_2 emissions

In the energy sector, the CO_2 emissions share in total sectoral GHG emissions, in 2022 was about 94%. The projecting results for CO_2 emissions from the energy sector are presented in Table 2-23.

Table 2-23: Projections of CO_2 emissions from the energy sector for the period until 2040, kt CO_2

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
1. Energy	**35,384.0**	**8,718.0**	**8,391.2**	**8,842.1**	**9,044.1**	**9,237.9**	**10,018.3**	**10,727.1**
1A. Fuel Combustion	**35,383.4**	**8,716.7**	**8,389.6**	**8,840.6**	**9,042.5**	**9,236.3**	**10,016.7**	**10,725.5**
1A.1 Energy industries	21,300.3	4,048.0	3,684.5	3,634.4	4,655.1	4,673.5	4,788.5	4,772.4
1A.2 Manufacturing Industries and Construction	1,898.6	515.6	651.5	692.7	757.2	757.2	924.6	1,008.2
1A.3 Transport	4,698.2	2,139.8	2,261.6	2,462.3	1,815.5	1,934.9	2,066.1	2,201.9
1A.4 Other sectors	7,372.3	1,986.0	1,790.2	2,050.1	1,792.0	1,848.0	2,214.8	2,720.3
1A.5 Other	114.0	27.3	1.8	1.2	22.7	22.7	22.7	22.7
1B. Fugitive emissions from fossil fuels	**0.7**	**1.3**	**1.7**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
1B.2 Oil and natural gas	0.7	1.3	1.7	1.6	1.6	1.6	1.6	1.6
WAM								
1. Energy	**35,384.0**	**8,718.0**	**8,391.2**	**8,842.1**	**8,675.3**	**8,126.9**	**7,882.7**	**7,882.5**
1A. Fuel Combustion	**35,383.4**	**8,716.7**	**8,389.6**	**8,840.6**	**8,673.7**	**8,125.3**	**7,881.1**	**7,880.9**
1A.1 Energy industries	21,300.3	4,048.0	3,684.5	3,634.4	4,089.3	3,264.3	2,587.5	1,908.9
1A.2 Manufacturing Industries and Construction	1,898.6	515.6	651.5	692.7	734.5	726.9	832.1	877.2
1A.3 Transport	4,698.2	2,139.8	2,261.6	2,462.3	1,706.7	1,819.1	1,942.6	2,070.4
1A.4 Other sectors	7,372.3	1,986.0	1,790.2	2,050.1	2,120.5	2,292.3	2,496.2	3,001.7
1A.5 Other	114.0	27.3	1.8	1.2	22.7	22.7	22.7	22.7
1B. Fugitive emissions from fossil fuels	**0.7**	**1.3**	**1.7**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
1B.2 Oil and natural gas	0.7	1.3	1.7	1.6	1.6	1.6	1.6	1.6

Projections of CH_4 emissions

In the energy sector, the share of CH_4 emissions in the total GHG emissions at sector level in 2022 was about 4.8%, of which 52.4% are fugitive emissions from oil and gas operations.

Projections of CH_4 emissions from combustion and transformation of fossil fuels were prepared on the basis of fossil fuel consumption assumptions with the application of methods available in the 2006 IPCC Guidelines, as well as the emission factors from the "*National Inventory Report: 1990-2020. Greenhouse Gas Emissions Sources and Sinks in the Republic of Moldova* ". The results are given in Table 2-24.

Table 2-24: Projections of CH_4 emissions from the energy sector for the period until 2040, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
1. Energy	**1,396.2**	**800.7**	**855.5**	**526.3**	**529.2**	**544.7**	**552.8**	**559.7**
1A. Fuel Combustion	**376.2**	**60.2**	**137.0**	**254.4**	**259.5**	**270.3**	**272.2**	**274.5**
1A.1 Energy industries	13.8	2.5	2.2	2.3	2.0	2.2	2.2	2.2
1A.2 Manufacturing Industries and Construction	2.4	0.6	1.1	1.0	0.8	0.8	0.8	0.8
1A.3 Transport	37.7	13.2	12.0	12.2	10.6	10.8	11.1	11.3
1A.4 Other sectors	322.0	43.8	121.6	239.0	246.1	256.5	258.0	260.1
1A.5 Other	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1B. Fugitive emissions from fossil fuels	**1,020.0**	**740.6**	**718.6**	**271.9**	**269.8**	**274.4**	**280.6**	**285.2**
1B.2 Oil and natural gas	1020.0	740.6	718.6	271.9	269.8	274.4	280.6	285.2
WAM								
1. Energy	**1,396.2**	**800.7**	**855.5**	**526.3**	**516.7**	**518.4**	**520.7**	**529.5**
1A. Fuel Combustion	**376.2**	**60.2**	**137.0**	**254.4**	**254.3**	**257.4**	**257.0**	**259.0**
1A.1 Energy industries	13.8	2.5	2.2	2.3	1.8	1.8	1.5	1.2
1A.2 Manufacturing Industries and Construction	2.4	0.6	1.1	1.0	0.8	0.8	0.7	0.7

	1990	2010	2015	2020	2025	2030	2035	2040
1A.3 Transport	37.7	13.2	12.0	12.2	9.9	10.2	10.4	10.7
1A.4 Other sectors	322.0	43.8	121.6	239.0	241.8	244.7	244.4	246.5
1A.5 Other	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1B. Fugitive emissions from fossil fuels	**1,020.0**	**740.6**	**718.6**	**271.9**	**262.4**	**260.9**	**263.7**	**270.5**
1B.2 Oil and natural gas	1,020.0	740.6	718.6	271.9	262.4	260.9	263.7	270.5

Projections of N_2O emissions

The share of N_2O emissions in the total sectoral GHG emissions is modest, accounting for only 1.1% (2022) of the total. N_2O emissions from combustion and transformation of fossil fuels have been calculated on the basis of fossil fuel consumption assumptions applying the methods available in the 2006 IPCC Guidelines, as well as the emission factors from the "*National Inventory Report: 1990-2020. Greenhouse Gas Emissions Sources and Sinks in the Republic of Moldova* ". The results are provided in Table 2-25.

Table 2-25: Projections of N_2O emissions from the energy sector for the period until 2040, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
1. Energy	**307.3**	**55.8**	**70.9**	**98.5**	**100.0**	**126.7**	**162.1**	**210.6**
1A. Fuel Combustion	**307.3**	**55.8**	**70.9**	**98.5**	**100.0**	**126.7**	**162.1**	**210.6**
1A.1 Energy industries	45.9	2.6	1.8	1.7	2.7	3.0	3.1	3.0
1A.2 Manufacturing Industries and Construction	3.8	0.8	1.5	1.3	1.4	1.4	1.4	1.4
1A.3 Transport	94.9	32.5	31.7	34.5	26.7	29.0	31.5	34.1
1A.4 Other sectors	161.4	19.8	36.0	61.0	69.2	93.3	126.2	172.0
1A.5 Other	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1B. Fugitive emissions from fossil fuels	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
1B.2 Oil and natural gas	NA	NA	NA	NA	NA	NA	NA	NA
WAM								
1. Energy	**307.3**	**55.8**	**70.9**	**98.5**	**97.5**	**122.7**	**157.3**	**205.2**
1A. Fuel Combustion	**307.3**	**55.8**	**70.9**	**98.5**	**97.5**	**122.7**	**157.3**	**205.2**
1A.1 Energy industries	45.9	2.6	1.8	1.7	2.4	2.3	1.9	1.5
1A.2 Manufacturing Industries and Construction	3.8	0.8	1.5	1.3	1.4	1.3	1.3	1.2
1A.3 Transport	94.9	32.5	31.7	34.5	25.2	27.4	29.8	32.4
1A.4 Other sectors	161.4	19.8	36.0	61.0	68.5	91.6	124.3	170.2
1A.5 Other	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1B. Fugitive emissions from fossil fuels	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
1B.2 Oil and natural gas	NA	NA	NA	NA	NA	NA	NA	NA

Projections of sectoral aggregated GHG emissions

Table 2-26 and Figure 2-6 present the projections of total aggregated GHG emissions in the energy sector, including transport, which can be compared with respective emissions recorded in 1990, the reference year for NDC.

Table 2-26: Projections of aggregated GHG emissions from the energy sector for the period until 2040, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
1. Energy	**37,087.6**	**9,574.5**	**9,317.7**	**9,467.0**	**9,673.3**	**9,909.3**	**10,733.2**	**11,497.4**
1A. Fuel Combustion	**36,066.9**	**8,832.6**	**8,597.5**	**9,193.5**	**9,402.0**	**9,633.3**	**10,451.0**	**11,210.5**
1A.1 Energy industries	21,360.0	4,053.1	3,688.4	3,638.4	4,659.8	4,678.7	4,793.8	4,777.6
1A.2 Manufacturing Industries and Construction	1,904.8	517.0	654.1	694.9	759.4	759.4	926.8	1010.5
1A.3 Transport	4,830.9	2,185.5	2,305.3	2,508.9	1,852.8	1,974.7	2,108.7	2,247.3
1A.4 Other sectors	7,855.7	2,049.6	1,947.8	2,350.1	2,107.3	2,197.8	2,599.0	3,152.4
1A.5 Other	115.5	27.5	1.8	1.2	22.7	22.7	22.7	22.7
1B. Fugitive emissions from fossil fuels	**1,020.7**	**741.9**	**720.3**	**273.5**	**271.4**	**276.0**	**282.2**	**286.8**
1B.2 Oil and natural gas	1020.7	741.9	720.3	273.5	271.4	276.0	282.2	286.8
WAM								
1. Energy	**37,087.6**	**9,574.5**	**9,317.7**	**9,467.0**	**9,289.5**	**8,768.0**	**8,560.7**	**8,617.3**
1A. Fuel Combustion	**36,066.9**	**8,832.6**	**8,597.5**	**9,193.5**	**9,025.6**	**8,505.4**	**8,295.4**	**8,345.2**
1A.1 Energy industries	21,360.0	4,053.1	3,688.4	3,638.4	4,093.4	3,268.4	2,590.8	1,911.6
1A.2 Manufacturing Industries and Construction	1,904.8	517.0	654.1	694.9	736.6	729.1	834.1	879.1
1A.3 Transport	4,830.9	2,185.5	2,305.3	2,508.9	1,741.9	1,856.7	1,982.9	2,113.5

	1990	2010	2015	2020	2025	2030	2035	2040
1A.4 Other sectors	7,855.7	2,049.6	1,947.8	2,350.1	2,430.9	2,628.6	2,864.9	3,418.4
1A.5 Other	115.5	27.5	1.8	1.2	22.7	22.7	22.7	22.7
1B. Fugitive emissions from fossil fuels	**1,020.7**	**741.9**	**720.3**	**273.5**	**264.0**	**262.6**	**265.3**	**272.1**
1B.2 Oil and natural gas	1,020.7	741.9	720.3	273.5	264.0	262.6	265.3	272.1

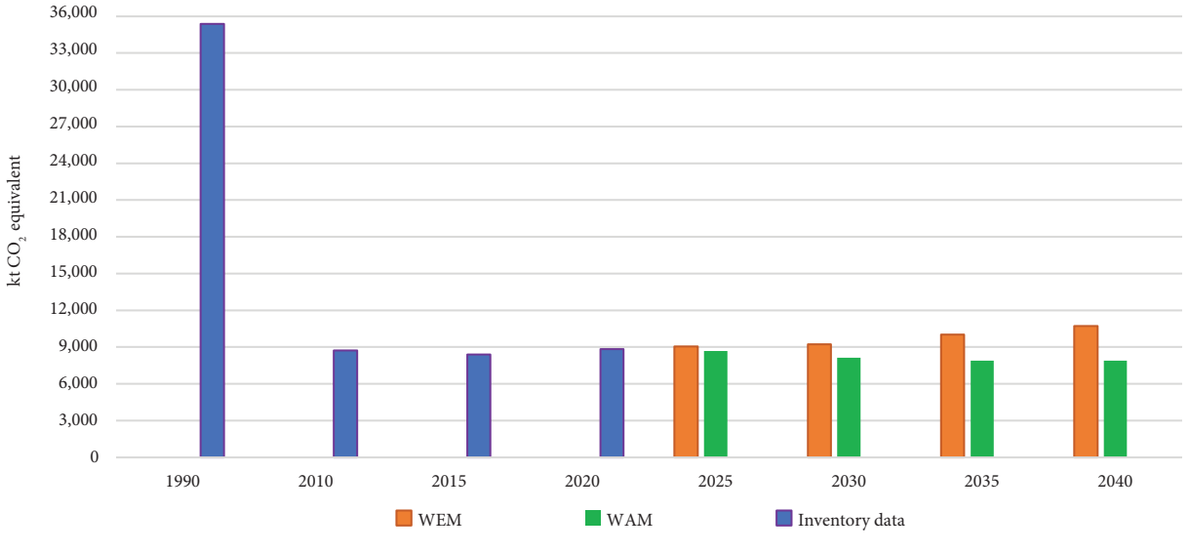


Figure 2-6: Projections of aggregated GHG emissions from the energy sector for the period until 2040, kt CO_2 equivalent.

The data analysis makes it possible to find that energy sector, the most important contribution to the total national GHG emissions in the Republic of Moldova (69.2% in 2022), will contribute considerably to achieving the economy-wide emissions reduction commitments from NDC. Thus, by 2040, the level of sectoral GHG emissions under WEM and WAM scenarios, as compared to 1990 will be respectively 31.0% and 23.2%.

2.6.3.2. IPPU Sector

In 2022, IPPU sector accounted for about 6.7% of total GHG emissions, of which 73.7% were CO_2 emissions, respectively 26.3% were F-gas emissions (HFCs from category 2F "ODS Substitutes", respectively SF_6 and PFC from source category 2G1 "Electrical equipment").

Projections of CO_2 emissions

In IPPU sector, CO_2 emissions come from categories 2A "Mineral industry", 2C "Metal industry", 2D "Non-energy products from fuels and solvent use" and 2G "Other Products Manufacture and Use". Category 2A contributes to about 74.1% (2022) of the total sector CO_2 emissions, of which about 61.6% are from cement production. In both scenarios considered, a continuous growth rate of cement production is foreseen, but it will not reach the level of the reference year. The results of the CO_2 emissions calculations are shown in Table 2-27.

Table 2-27: Projections of CO_2 emission from Sector 2 "Industrial Processes and Product Use" for the period until 2040, kt

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
2. IPPU	**1,605.3**	**455.7**	**310.7**	**550.6**	**482.4**	**610.8**	**762.3**	**810.6**	**889.4**	**958.5**	**1,016.0**
A. Mineral industry	1,339.0	351.7	240.8	439.2	405.4	508.0	538.6	602.5	653.9	695.3	725.6
C. Metal industry	28.5	26.2	36.3	41.9	9.7	17.3	18.7	23.2	27.9	32.6	36.4
D. Non-energy products from fuels and solvent use	234.4	76.6	32.6	68.2	66.3	84.6	204.0	183.9	206.4	229.3	252.6
G. Other products manufacture and use	3.4	1.2	1.0	1.2	1.0	0.9	0.9	1.0	1.1	1.2	1.3
WAM											
2. IPPU	**1,605.3**	**455.7**	**310.7**	**550.6**	**482.4**	**610.8**	**762.3**	**771.0**	**820.3**	**861.7**	**891.8**
A. Mineral industry	1,339.0	351.7	240.8	439.2	405.4	508.0	538.6	560.3	583.9	601.2	606.1
C. Metal industry	28.5	26.2	36.3	41.9	9.7	17.3	18.7	23.1	25.4	26.7	27.4
D. Non-energy products from fuels and solvent use	234.4	76.6	32.6	68.2	66.3	84.6	204.0	186.5	209.8	232.5	256.9
G. Other products manufacture and use	3.4	1.2	1.0	1.2	1.0	0.9	0.9	1.0	1.2	1.3	1.4

Projections of F-gases emissions

In Moldova, the most important sources of F-gases emissions come from the source categories 2F1 "Refrigeration and air conditioning equipment" (about 66.4%, 2022) and 2F2 "Foam Blowing Agents" (about 31.9%). A significant increase in HFC emissions is anticipated by 2040 for category 2F "Product use as substitutes to ODS" compared to the level recorded in 1995 - about 138 times under WEM, and respectively about 108 times under WAM (Table 2-28). At the same time, compared to the historical level of emissions recorded in 2020, a reduction of HFC emissions by 37.6% under WEM, and respectively by 50.9% under WAM is anticipated by 2040.

Table 2-28: Projections of F-gases emission from Sector 2 "Industrial Processes and Product Use" by 2040, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
2F Product use as substitutes to ODS	**NO**	**0.9**	**4.7**	**20.2**	**70.5**	**137.9**	**206.6**	**255.5**	**222.8**	**177.8**	**128.9**
2F1. Refrigeration and air conditioning equipment	NO	0.7	3.5	9.0	20.6	64.5	126.2	185.5	192.0	171.0	126.5
2F2. Foam Blowing Agents	NO	0.3	1.2	11.2	50.0	73.4	76.5	66.3	27.2	3.7	0.1
2F3. Fire protection	NO	NO	NO	NO	NO	NO	3.9	3.7	3.6	3.1	2.4
2F4. Aerosols	NO	NO	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2G Other product manufacture and use	**NO**	**NO**	**NO**	**0.0**	**0.7**	**1.1**	**1.7**	**1.8**	**1.9**	**2.0**	**2.1**
2G1. Electric equipment	NO	NO	NO	0.0	0.7	1.1	1.7	1.8	1.9	2.0	2.1
WAM											
2F Product use as substitutes to ODS	**NO**	**0.9**	**4.7**	**20.2**	**70.5**	**137.9**	**206.6**	**242.1**	**189.8**	**141.7**	**101.4**
2F1. Refrigeration and air conditioning equipment	NO	0.7	3.5	9.0	20.6	64.5	126.2	173.7	160.3	136.4	101.1
2F2. Foam Blowing Agents	NO	0.3	1.2	11.2	50.0	73.4	76.5	65.0	26.8	3.9	0.0
2F3. Fire protection	NO	NO	NO	NO	NO	NO	3.9	3.5	2.7	1.5	0.3
2F4. Aerosols	NO	NO	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2G Other product manufacture and use	**NO**	**NO**	**NO**	**0.0**	**0.7**	**1.1**	**1.7**	**1.7**	**1.8**	**1.9**	**1.9**
2G1. Electric equipment	NO	NO	NO	0.0	0.7	1.1	1.7	1.7	1.8	1.9	1.9

Projections of sectoral aggregated GHG emissions

Table 2-29 and Figure 2-7 present the projections of sectoral aggregated GHG emissions from sector 2 "Industrial Processes and Product Use", which can be analyzed and compared with the GHG emissions level recorded in 1990. According to the obtained results, by 2040 the emissions will account for about 71.5% of the sectoral aggregated direct GHG emissions level recorded in the reference year (1990) under WEM scenario, and respectively about 62.0% under the WAM scenario. A slight increase trend in sectoral GHG emissions will be maintained until 2040. Implementation of mitigation policies at sector level will allow only to temper this growth under WAM scenario.

Table 2-29: Projections of aggregated GHG emissions from sector 2 "Industrial Processes and Product Use" during the period until 2040, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
2. Industrial Processes and Product Use	**1,605.3**	**456.6**	**315.3**	**570.8**	**553.7**	**749.8**	**970.5**	**1,067.9**	**1,114.1**	**1,138.3**	**1,147.0**
A. Mineral industry	1,339.0	351.7	240.8	439.2	405.4	508.0	538.6	602.5	653.9	695.3	725.6
C. Metal industry	28.5	26.2	36.3	41.9	9.7	17.3	18.7	23.2	27.9	32.6	36.4
D. Non-energy products from fuels and solvent use	234.4	76.6	32.6	68.2	66.3	84.6	204.0	183.9	206.4	229.3	252.6
F. Product use as substitutes to ODS	NO	0.9	4.7	20.2	70.5	137.9	206.6	255.5	222.8	177.8	128.9
G. Other product manufacture and use	3.4	1.2	1.0	1.2	1.7	2.1	2.6	2.8	3.0	3.2	3.4
WAM											
2. Industrial Processes and Product Use	**1,605.3**	**456.6**	**315.3**	**570.8**	**553.7**	**749.8**	**970.5**	**1,014.9**	**1,011.9**	**1,005.3**	**995.1**
A. Mineral industry	1,339.0	351.7	240.8	439.2	405.4	508.0	538.6	560.3	583.9	601.2	606.1
C. Metal industry	28.5	26.2	36.3	41.9	9.7	17.3	18.7	23.1	25.4	26.7	27.4
D. Non-energy products from fuels and solvent use	234.4	76.6	32.6	68.2	66.3	84.6	204.0	186.5	209.8	232.5	256.9
F. Product use as substitutes to ODS	NO	0.9	4.7	20.2	70.5	137.9	206.6	242.1	189.8	141.7	101.4
G. Other product manufacture and use	3.4	1.2	1.0	1.2	1.7	2.1	2.6	2.8	3.0	3.1	3.3

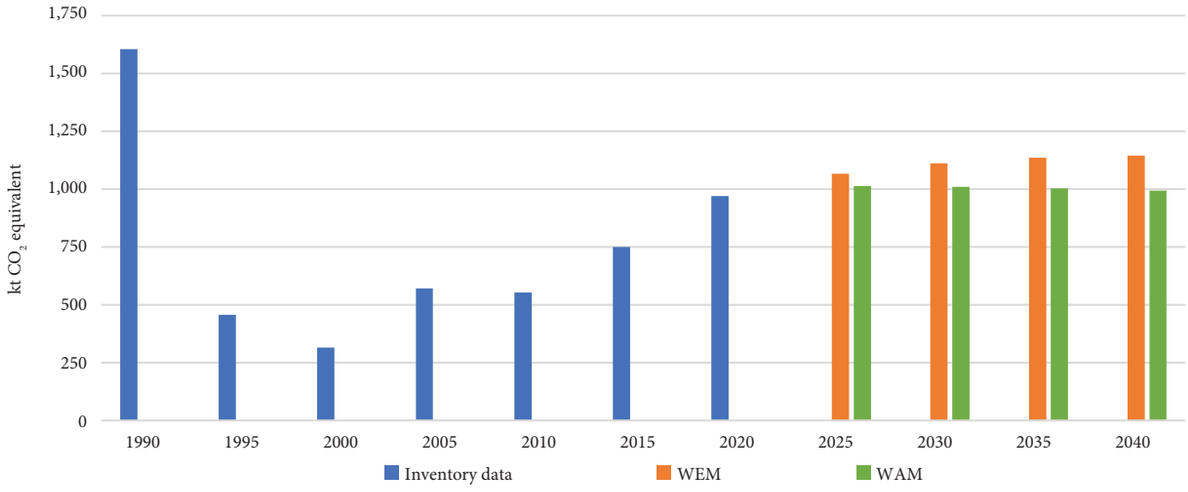


Figure 2-7: Projections of aggregated GHG emissions from sector 2 "Industrial Processes and Product Use" during the period until 2040.

2.6.3.3. Agriculture Sector

CH_4 emissions from categories 3A "Enteric fermentation" and 3B "Manure Management", N_2O emissions from categories 3B "Manure Management" and 3D "Agricultural Soils" as well as CO_2 emissions from category 3H "Urea Application" are monitored within sector 3 "Agriculture".

Projections of CO_2 emissions

Projections of CO_2 emissions in the agriculture sector have been elaborated only for the category 3H "Urea Application". The results are shown in Table 2-30. According to the information provided in the respective table, CO_2 emissions from category 3H "Urea Application" will increase by about 71 times as compared to CO_2 emissions level in the reference year (1990) under WEM, respectively about 68 times under WAM. Implementation of good practices mitigation measures at sectoral level will allow to slightly reduce the growth rate of CO_2 emissions from category 3H "Urea Application".

Table 2-30: Projections of CO_2 emissions from the source category 3H "Urea Application" in the Republic of Moldova under the scenarios considered for the period 1990-2040

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
	WEM										
CO_2 emissions, kt	0.6	0.1	0.4	0.2	1.7	11.2	42.5	35.7	38.1	40.4	42.7
	WAM										
CO_2 emissions, kt	0.6	0.1	0.4	0.2	1.7	11.2	42.5	33.9	36.2	38.4	40.6

Projections of CH_4 emissions

In the agriculture sector, CH_4 emissions are recorded under categories 3A "Enteric Fermentation" and 3B "Manure Management". The projections of these emissions are presented in Table 2-31.

In 2022, CH_4 emissions from enteric fermentation exceeded almost 9 times those from manure management, which requires greater attention to livestock and poultry structure optimization measures that need to be promoted to mitigate GHG emissions from this category. At the same time, manure management generates N_2O emissions (Table 2-32), which are approximately at the same level by volume of CH_4 emissions as those from enteric fermentation. Thus, the effort to mitigate GHG emissions in the livestock sector is to be divided practically equally between these two categories.

Table 2-31: Projections of CH_4 emissions from the agriculture sector for the period until 2040, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
	WEM										
3. Agriculture	**3,006.7**	**2,043.3**	**1,323.7**	**1,138.4**	**890.6**	**771.6**	**485.8**	**458.7**	**423.9**	**387.0**	**349.9**
A. Enteric fermentation	2,452.2	1,812.3	1,216.1	1,034.9	802.7	694.5	434.0	406.7	371.3	334.1	296.8
B. Manure management	554.5	231.0	107.6	103.5	88.0	77.2	51.8	52.0	52.6	52.8	53.0

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WAM											
3. Agriculture	**3,006.7**	**2,043.3**	**1,323.7**	**1,138.4**	**890.6**	**771.6**	**485.8**	**449.7**	**414.4**	**375.7**	**336.0**
A. Enteric fermentation	2,452.2	1,812.3	1,216.1	1,034.9	802.7	694.5	434.0	397.7	362.2	323.4	283.8
B. Manure management	554.5	231.0	107.6	103.5	88.0	77.2	51.8	51.9	52.3	52.3	52.2

Projections of N_2O emissions

N_2O emissions projections from the agriculture sector are presented in Table 2-32. In 2022, N_2O emissions from the category 3D "Agricultural Soils" exceeded more than 5 times those from category 3B "Manure Management".

Table 2-32: Projections of N_2O emissions from the agriculture sector for the period until 2040, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
3. Agriculture	**2,093.8**	**1,176.9**	**854.3**	**932.4**	**911.8**	**873.1**	**950.7**	**1,223.3**	**1,281.3**	**1,350.0**	**1,399.9**
B. Manure management	769.3	459.5	289.5	291.4	271.2	215.8	147.6	144.5	141.5	135.5	130.5
D. Agricultural soils	1,324.5	717.4	564.8	641.0	640.6	657.3	803.1	1,078.8	1,139.8	1,214.4	1,269.4
WAM											
3. Agriculture	**2,093.8**	**1,176.9**	**854.3**	**932.4**	**911.8**	**873.1**	**950.7**	**1,218.3**	**1,257.9**	**1,305.4**	**1,344.9**
B. Manure management	769.3	459.5	289.5	291.4	271.2	215.8	147.6	142.1	139.0	132.5	126.2
D. Agricultural soils	1,324.5	717.4	564.8	641.0	640.6	657.3	803.1	1,076.2	1,118.9	1,172.9	1,218.7

Projections of sectoral aggregated GHG emissions

Table 2-33 and Figure 2-8 reflect the projections of aggregated GHG emissions from the agriculture sector, compared to the emissions level recorded in 1990.

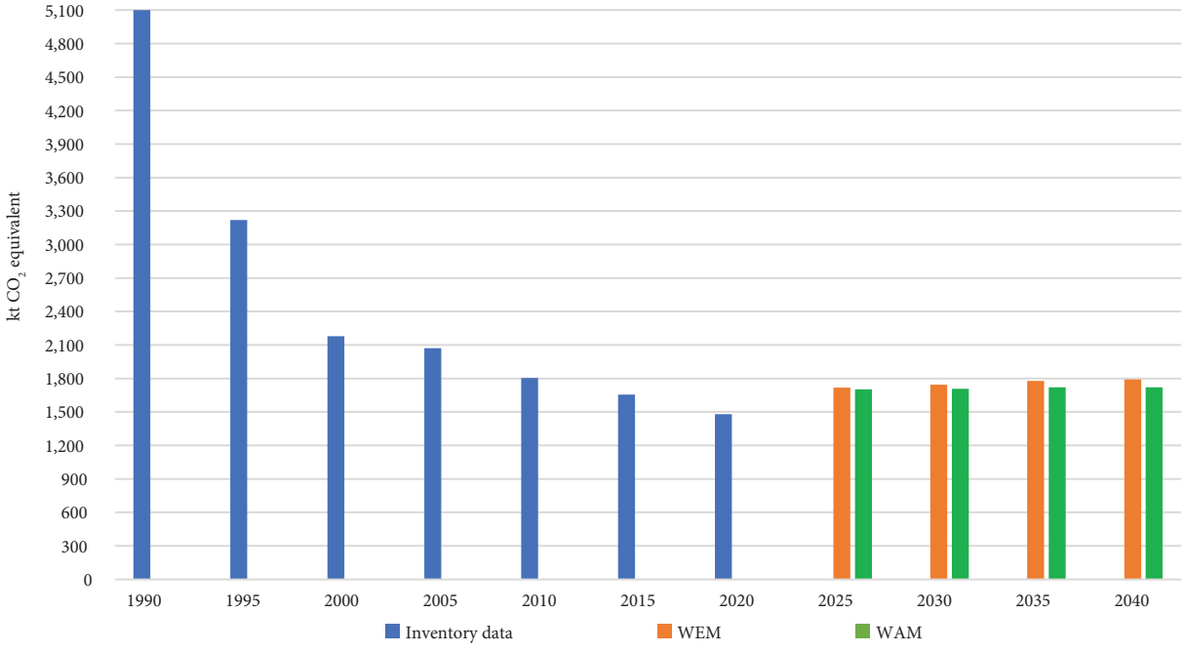


Figure 2-8: Projections of aggregated GHG emission from the agriculture sector during the period until 2040.

Compared to the reference year (1990), in 2040 the level of GHG emissions from the agriculture sector, under WEM and WAM scenarios, will be respectively 35.1% and 33.7%.

Table 2-33: Projections of aggregated GHG emission from the agriculture sector during the period until 2040, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
3. Agriculture	**5,101.0**	**3,220.3**	**2,178.5**	**2,070.9**	**1,804.2**	**1,656.0**	**1,479.0**	**1,717.8**	**1,743.3**	**1,777.3**	**1,792.5**
A. Enteric fermentation	2,452.2	1,812.3	1,216.1	1,034.9	802.7	694.5	434.0	406.7	371.3	334.1	296.8
B. Manure management	1,323.8	690.6	397.1	394.8	359.1	293.0	199.4	196.5	194.1	188.4	183.6
D. Agricultural soils	1,324.5	717.4	564.8	641.0	640.6	657.3	803.1	1,078.8	1,139.8	1,214.4	1,269.4
H. Urea application	0.6	0.1	0.4	0.2	1.7	11.2	42.5	35.7	38.1	40.4	42.7

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WAM											
3. Agriculture	**5,101.0**	**3,220.3**	**2,178.5**	**2,070.9**	**1,804.2**	**1,656.0**	**1,479.0**	**1,701.9**	**1,708.5**	**1,719.5**	**1,721.6**
A. Enteric fermentation	2,452.2	1,812.3	1,216.1	1,034.9	802.7	694.5	434.0	397.7	362.2	323.4	283.8
B. Manure management	1,323.8	690.6	397.1	394.8	359.1	293.0	199.4	194.1	191.3	184.8	178.4
D. Agricultural soils	1,324.5	717.4	564.8	641.0	640.6	657.3	803.1	1,076.2	1,118.9	1,172.9	1,218.7
H. Urea application	0.6	0.1	0.4	0.2	1.7	11.2	42.5	33.9	36.2	38.4	40.6

2.6.3.4. LULUCF Sector

In LULUCF sector, GHG removals/emissions from categories 4A "Forest Land", 4B "Cropland", 4C "Grasslands", 4D "Wetlands", 4E "Settlements", 4F "Other Land" and 4G "Harvested Wood Products" are monitored. CH_4 and N_2O emissions related to sector 4 LULUCF have low values, however they are taken into account while calculating the total GHG removals/emissions, expressed in kt CO_2 equivalent, in each of the categories mentioned above.

Under both scenarios, the Land Use Matrix for the period 1970-2022, extended for the period 2023-2040, was used to simulate the evolution of GHG removals/emissions from LULUCF sector.

Based on the assumptions made under the WEM and WAM scenarios, the evolution of the land fund area divided by categories of use (Table 2-34), as well as GHG removals/emissions in the LULUCF sector were simulated (Table 2-35, Figure 2-9).

Table 2-34: Evolution of the areas of the main categories of land use in the period 1990-2040, kha

Categories of use	1990	2022	2025	2030	2035	2040
WEM						
I. Forest land (4A), total	371.40	417.17	433.28	482.68	522.49	533.90
1.1.Forests (including forest-covered land, regenerating land, etc.)	368.57	415.57	429.82	476.62	519.03	532.72
1.2. Wooded land (conversions)	2.83	1.60	3.46	6.06	3.46	1.18
II. Cropland (4B), total	2,258.40	2,206.77	2,191.24	2,140.61	2,092.89	2,073.87
2.1. Forest vegetation	47.00	50.70	51.28	55.04	61.99	72.70
2.2. Vineyards	218.80	121.65	121.99	121.99	121.99	121.99
2.3. Orchards	251.80	147.78	147.78	147.78	147.78	147.78
2.4. Arable land	1,740.80	1,886.63	1,870.19	1,815.80	1,761.13	1,731.40
III. Grasslands (4C), total	390.70	361.11	361.11	361.11	361.11	361.11
IV. Wetlands (4D), total	89.40	96.94	96.94	96.94	96.94	96.94
V. Settlements (4E), total	218.43	245.24	246.51	250.34	255.65	260.98
VI. Other land (4F), total	56.30	57.40	55.54	52.94	55.54	57.82
TOTAL	**3,384.63**	**3,384.63**	**3,384.63**	**3,384.63**	**3,384.63**	**3,384.63**
WAM						
I. Forest land (4A), total	371.40	417.17	434.16	503.11	557.89	576.09
1.1.Forests (including forest-covered land, regenerating land, etc.)	368.57	415.57	430.37	494.77	553.13	574.51
1.2. Wooded land (conversions)	2.83	1.60	3.79	8.34	4.76	1.57
II. Cropland (4B), total	2,258.40	2,206.77	2,187.35	2,104.83	2,017.65	1,964.31
2.1. Forest vegetation	47.00	50.70	51.48	57.87	69.67	88.04
2.2. Vineyards	218.80	121.65	122.24	123.99	127.99	131.49
2.3. Orchards	251.80	147.78	148.03	150.03	154.53	157.28
2.4 Arable land	1,740.80	1,886.63	1,865.60	1,772.94	1,665.46	1,587.50
III. Grasslands (4C), total	390.70	361.11	363.49	373.56	389.57	406.16
IV. Wetlands (4D), total	89.40	96.94	97.69	100.85	105.54	111.12
V. Settlements (4E), total	218.43	245.24	246.74	251.61	259.74	269.53
VI. Other land (4F), total	56.30	57.40	55.21	50.66	54.24	57.43
TOTAL	**3,384.63**	**3,384.63**	**3,384.63**	**3,384.63**	**3,384.63**	**3,384.63**

Table 2-35: Projections of CO_2 emissions/removals in LULUCF sector during the period until 2040, kt CO_2

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
4. LULUCF	**-1,830.5**	**-1,486.5**	**-1,372.8**	**-172.3**	**-399.6**	**-718.4**	**-1,567.7**	**-2,521.2**
4A. Forest land	-2,563.4	-2,484.2	-2,159.4	-1,887.3	-1,760.1	-1,919.0	-2,470.4	-2,855.3
4B. Cropland	2,379.1	1,271.8	1,112.6	1,629.9	1,469.3	1,510.2	1,412.0	1,029.8
4C. Grassland	-1,205.7	-692.0	-418.5	-223.2	-228.3	-460.1	-674.2	-827.6
4D. Wetlands	-555.4	-46.4	-82.8	-82.8	-83.4	-83.4	-0.7	-0.6
4E Settlements	84.7	45.6	39.2	27.2	54.5	70.8	80.2	73.5
4F. Other lands	152.4	441.5	86.8	329.1	158.6	166.0	95.3	67.2
4G. Harvested wood products.	-122.2	-22.8	49.2	34.7	-10.2	-2.8	-10.0	-8.1

	1990	2010	2015	2020	2025	2030	2035	2040
WAM								
4. LULUCF	**-1,830.5**	**-1,486.5**	**-1,372.8**	**-172.3**	**-409.5**	**-1,550.1**	**-2,710.1**	**-3,945.3**
4A. Forest land	-2,563.4	-2,484.2	-2,159.4	-1,887.3	-1,761.3	-1,901.4	-2,490.5	-2,762.2
4B. Cropland	2,379.1	1,271.8	1,112.6	1,629.9	1,475.2	894.7	771.9	320.6
4C. Grassland	-1,205.7	-692.0	-418.5	-223.2	-248.8	-696.6	-1,138.0	-1,550.3
4D. Wetlands	-555.4	-46.4	-82.8	-82.8	-83.4	-115.9	-72.5	-110.4
4E Settlements	84.7	45.6	39.2	27.2	58.8	75.6	99.1	108.9
4F. Other lands	152.4	441.5	86.8	329.1	162.7	197.0	134.9	62.3
4G. Harvested wood products.	-122.2	-22.8	49.2	34.7	-12.7	-3.5	-15.0	-14.2

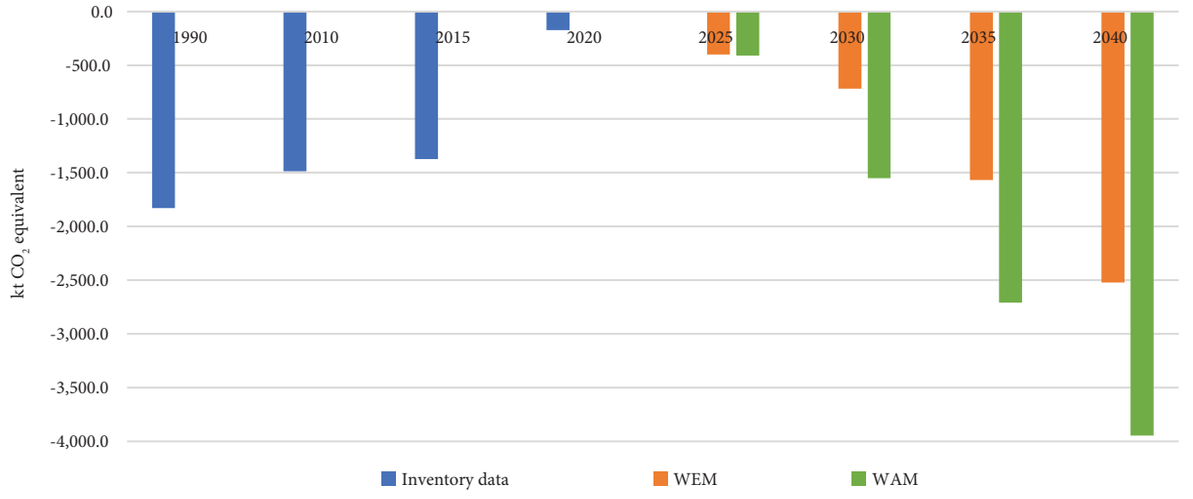


Figure 2-9: Projections of CO_2 emissions/removals in sector 4 LULUCF during the period until 2040, kt CO_2.

Simulations under WEM and WAM scenarios showed significant changes for the subcategory 4B "Cropland". Under the WEM scenario emissions in this category will be reduced by 56.7% by 2040, and under the WAM – by 86.5% (due to increase in the areas of forest stripes and multiannual plantations, reduced emissions from mineralized soils by implementing soil conservation technologies, etc.). The evolution of the category 4C "Grasslands" is important, and under the WEM scenario it shows a 31.4% decrease of its GHG removals capacities, while under the WAM scenario the respective capacities will increase by 28.6%. The evolution of GHG removals in category 4A "Forest land" is relatively constant under both scenarios. This is explained by the fact that at the same time with the increase of afforested areas there is also an increase in the volume of timber harvested from forests (WEM scenario – constant harvest of 612 thousand m^3/yr, including 320 thousand m^3/yr for cuts of main products (as per GD no. 958/2020); WAM scenario – gradual increase of timber harvest up to 886 thousand m^3/yr in 2040, with a harvest rate of up to 50% of the current growths). This approach is determined by the need for interventions in the state and evolution of newly planted forests to bring them as close as possible to natural structures or existing forests in the degradation process, as well as the needs of the population and the national economy in wood products to solve energy and socio-economic problems. Total CO_2 removals in LULUCF sector in 2040 under the WEM and WAM scenarios, compared to the reference year 1990, will be 138% and 215%, respectively, with removals under WAM exceeding removals under WEM by about 1.6 times in 2040.

The projections developed for LULUCF for both scenarios (WEM and WAM) for the period 2025-2040 are supplemented by projections of non-CO_2 (CH_4, N_2O) emissions. Partially non-CO_2 emissions come from forest fires and stubble burning (CH_4, N_2O), being estimated for subcategories 4A2 "Land Converted to Forest Land" and 4B1 "Cropland Remaining Cropland". In both cases, in terms of quantity, the methane (CH_4) and nitrous oxide (N_2O) emissions are insignificant. Forest areas affected by fires usually increase due to severe droughts, primarily affecting young forest crops adjacent to agricultural fields, meadows, etc.

N_2O emissions from LULUCF sector were also calculated for subcategories 4B2 "Land Converted to Cropland" resulting from conversion of grassland to cropland (arable land), as well as for 4E2 "Land converted to Settlement Land" resulting from conversion of grassland to settlement land. This category of N_2O emissions from a

quantitative point of view are relatively significant, being influenced by the land conversion process during the period under consideration.

Under the WEM scenario, by 2040 the N_2O emissions will increase by 2.4 times compared to 1990, and under the WAM scenario the increase will be 2.6 times.

For CH_4 emissions, the projections show a reverse downward trend. Thus, under the WEM, by 2040, CH_4 emissions will account for only 23.0% of 1990-year level, and under the WAM scenario – for about 18.5% of the 1990-year level.

The projections of net direct GHG removals/emissions from the LULUCF sector for the 2025-2040 period are presented in Table 2-36.

Table 2-36: Projections of net direct GHG emissions/removals from LULUCF sector under the considered scenarios, during the period until 2040, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
4. LULUCF	**-1,676.0**	**-1,256.7**	**-1,202.9**	**-22.1**	**-217.6**	**-487.3**	**-1,246.6**	**-2,151.2**
CO_2 emissions	-1,830.5	-1,486.5	-1,372.9	-172.4	-399.6	-718.4	-1,567.7	-2,521.2
CH_4 emissions	3.0	0.2	0.7	0.9	0.6	0.7	0.7	0.7
N_2O emissions	151.5	229.6	169.2	149.4	181.3	230.3	320.4	369.2
WAM								
4. LULUCF	**-1,676.0**	**-1,256.7**	**-1,202.9**	**-22.1**	**-227.6**	**-1,317.3**	**-2,381.8**	**-3,556.3**
CO_2 emissions	-1,830.5	-1,486.5	-1,372.9	-172.4	-409.5	-1,550.1	-2,710.1	-3,945.3
CH_4 emissions	3.0	0.2	0.7	0.9	0.5	0.6	0.5	0.5
N_2O emissions	151.5	229.6	169.2	149.4	181.4	232.2	327.7	388.5

2.6.3.5. Waste Sector

Within the waste sector, direct GHG emissions are monitored from source categories 5A "Solid Waste Disposal", 5B "Biological Treatment of Solid Waste", 5C "Incineration and Open Burning of Waste", 5D "Waste Water Treatment and Discharge". The GHG emission projections were made based on the methodological approaches set out in the 2006 IPCC Guidelines.

The policies applied when developing the mitigation scenarios in the waste sector (WEM and WAM) correspond to those presented in subchapter 2.5.4.5.

Measures to mitigate GHG emissions from the waste sector include: development of the regional infrastructure for waste disposal through the construction of regional municipal solid disposal sites, composting stations, sorting stations and transfer stations, in accordance with the Waste Management Strategy in the Republic of Moldova for the period 2013-2027 and the application of EU and national standards; extension of the current system of primary collection and storage of municipal solid wastes to rural areas; improvement of the water supply and sanitation infrastructure.

Projections of CO_2 emissions

The CO_2 emission projections for category 5C "Incineration and Open Burning of Waste" do not exceed 1% of the total GHG emissions attributed to the waste sector.

Projections of CH_4 emissions

The CH_4 emissions projections for the waste sector for both considered scenarios (WEM and WAM) are shown in Table 2-37. These emissions mainly come from municipal solid waste disposal sites, as well as from domestic and industrial wastewater treatment.

Table 2-37: Projections of CH_4 emissions from waste sector during the period until 2040, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
5.Waste	**1,594.8**	**1,501.8**	**1,378.2**	**1,411.2**	**1,320.8**	**1,213.1**	**1,159.6**	**1,013.5**
A. Solid waste disposal	1,228.1	1,196.0	1,098.5	1,156.7	1,089.8	1,037.7	1,004.1	843.4
B. Biological treatment of solid waste	1.5	1.1	1.3	1.4	1.4	1.8	2.3	2.5
C. Incineration and open burning of waste	8.6	7.3	6.5	6.0	4.0	2.2	0.4	0.2
D. Wastewater treatment and discharge	356.6	297.3	271.8	247.1	225.5	171.3	152.9	167.4

	1990	2010	2015	2020	2025	2030	2035	2040
WAM								
5.Waste	**1,594.8**	**1,501.8**	**1,378.2**	**1,411.2**	**1,311.9**	**939.9**	**754.0**	**722.0**
A. Solid waste disposal	1,228.1	1,196.0	1,098.5	1,156.7	1,084.5	779.8	623.4	572.9
B. Biological treatment of solid waste	1.5	1.1	1.3	1.4	1.9	3.0	4.1	4.2
C. Incineration and open burning of waste	8.6	7.3	6.5	6.0	3.9	1.9	0.2	0.2
D. Wastewater treatment and discharge	356.6	297.3	271.8	247.1	221.6	155.2	126.3	144.7

Projections of N_2O emissions

N_2O emissions projections for the waste sector for both considered scenarios (WEM and WAM) are presented in Table 2-38. These emissions mainly come from category 5D "Wastewater Treatment".

Table 2-38: projections of N_2O emission from the waste sector during the period until 2040, kt CO_2 equivalent

	1990	2000	2010	2015	2020	2025	2030	2035	2040
WEM									
5.Waste	**80.5**	**63.9**	**48.9**	**50.1**	**53.8**	**49.0**	**46.0**	**43.6**	**41.8**
B. Biological treatment of solid waste	0.9	0.3	0.6	0.8	0.8	0.8	1.0	1.3	1.4
C. Incineration and open burning of waste	1.4	1.4	1.2	1.1	1.0	0.7	0.4	0.1	0.0
D. Wastewater treatment and discharge	78.2	62.2	47.1	48.2	52.0	47.6	44.6	42.3	40.4
WAM									
5.Waste	**80.5**	**63.9**	**48.9**	**50.1**	**53.8**	**49.3**	**46.7**	**44.6**	**42.8**
B. Biological treatment of solid waste	0.9	0.3	0.6	0.8	0.8	1.1	1.7	2.3	2.4
C. Incineration and open burning of waste	1.4	1.4	1.2	1.1	1.0	0.6	0.3	0.0	0.0
D. Wastewater treatment and discharge	78.2	62.2	47.1	48.2	52.0	47.6	44.6	42.3	40.4

Projections of sectoral aggregated GHG emissions

Table 2-39 and Figure 2-10 present the aggregate GHG emissions projections for the "Waste" sector compared to the GHG emissions recorded in 1990. Compared to the level of emissions recorded in the base year, in 2040 the level of GHG emissions related to the "Waste" sector will be 51.9% under the MS and 53.1% under the AMS.

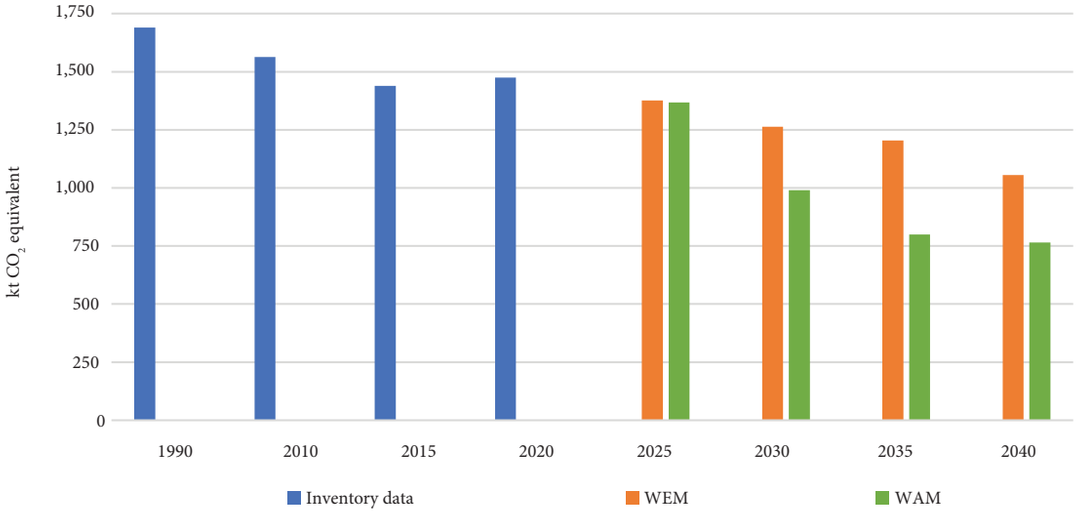


Figure 2-10: Projections of aggregated GHG emissions from waste sector during the period until 2040, kt CO_2 equivalent.

Table 2-39: Projections of aggregated GHG emissions from waste sector during the period until 2040, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035	2040
WEM								
5.Waste	**1,690.3**	**1,563.5**	**1,439.6**	**1,475.4**	**1,376.8**	**1,263.0**	**1,204.0**	**1,055.7**
A. Solid waste disposal	1,228.1	1,196.0	1,098.5	1,156.7	1,089.8	1,037.7	1,004.1	843.4
B. Biological treatment of solid waste	2.4	1.7	2.1	2.2	2.2	2.8	3.6	3.9
C. Incineration and open burning of waste	25.0	21.4	19.0	17.5	11.7	6.5	1.2	0.7
D. Wastewater treatment and discharge	434.8	344.4	320.0	299.1	273.1	215.9	195.2	207.8

	1990	2010	2015	2020	2025	2030	2035	2040
WAM								
5.Waste	**1,690.3**	**1,563.5**	**1,439.6**	**1,475.4**	**1,367.9**	**989.9**	**799.0**	**765.1**
A. Solid waste disposal	1,228.1	1,196.0	1,098.5	1,156.7	1,084.5	779.8	623.4	572.9
B. Biological treatment of solid waste	2.4	1.7	2.1	2.2	3.0	4.7	6.4	6.6
C. Incineration and open burning of waste	25.0	21.4	19.0	17.5	11.3	5.6	0.7	0.5
D. Wastewater treatment and discharge	434.8	344.4	320.0	299.1	269.2	199.8	168.5	185.1

2.6.3.6. International Transport

Of the two types of international transport, water-borne and air-borne, only the air-borne transport is relevant for the Republic of Moldova. Estimates of total national aggregate GHG emissions outlined below do not take into account the projections for the international air transport.

The projections were developed on the basis of international air transport information provided by the Civil Aviation Authority of the Republic of Moldova. The provided information was subject to regression analysis for the period 2000-2022. Emissions were calculated by applying the emission factors available in the 2006 IPCC Guidelines. Projections for GHG emissions from international air transport are presented below in Table 2-40. It is estimated that, compared to 2022, emissions from international air transport will increase by about 1.4 times to 2040.

Table 2-40: Projections of GHG emissions from international air transport by 2040, in kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
WEM											
CO_2	193.5	42.0	61.7	37.0	40.1	55.5	37.0	123.7	141.9	165.9	196.8
CH_4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N_2O	1.7	0.4	0.5	0.3	0.3	0.4	0.3	0.9	1.1	1.2	1.5
Total	**195.6**	**42.5**	**62.1**	**37.3**	**40.4**	**55.9**	**37.3**	**124.7**	**143.0**	**167.2**	**198.3**
WAM											
CO_2	193.5	42.0	61.7	37.0	40.1	55.5	37.0	116.1	133.2	155.7	184.6
CH_4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N_2O	1.7	0.4	0.5	0.3	0.3	0.4	0.3	0.9	1.0	1.2	1.4
Total	**195.6**	**42.5**	**62.1**	**37.3**	**40.4**	**55.9**	**37.3**	**117.0**	**134.2**	**156.9**	**186.0**

Direct greenhouse gas emissions from international waterborne transport were estimated in the Republic of Moldova for the first time in the current inventory cycle, but only for the period 2015-2022, as for the first time it was possible to collect activity data for this period.

At the same time, the diesel consumption in international waterborne transport of the Republic of Moldova is very low and the GHG emissions are insignificant, and in the current reporting cycle no measures to reduce them were considered.

In the next reporting cycle, an attempt will be made to extend the monitoring period of direct GHG emissions from international waterborne transport, respectively long-term projections of direct GHG emissions from this type of transport will be carried out as well.

CHAPTER 3. INFORMATION RELATED TO CLIMATE CHANGE IMPACTS AND ADAPTATION UNDER ARTICLE 7 OF THE PARIS AGREEMENT

3.1. National circumstances, institutional arrangements and legal framework

3.1.1. National circumstances relevant to climate change adaptation

3.1.1.1. Bio-geo-physical features

The Republic of Moldova is located in the southeastern part of Europe, close to the geographic center of the continent. It borders Romania to the west and Ukraine to the other three cardinal directions. At its southern extremity, the Republic of Moldova has an outlet to the Danube River, through which it has potential access to the Black Sea. The area of the country is 33.8 thousand km^2. The minimum altitude is 3 m (Cahul lake shore), and the maximum altitude – 428 m (Bălăneşti). The relief of the country is a hilly plain, sloping from the northwest to the southeast. This topography, hydro-climatic factors and anthropogenic activities cause *landslides, linear erosion, mudslides, influence the distribution of rainfall and of water resources, affecting agriculture and natural resource management.*

Moldova has a temperate-continental climate, as the country is located in the influence zone of the Atlantic air masses from the west, Mediterranean - from the southwest and continental-excessive - from the Northeast, with mild winters and little snow, with hot summers and reduced humidity. According to the NBS data, the average annual air temperature was in the 11.0°C-13.3°C temperature range in 2023, while annual precipitation varied from North to South - from 389 mm to 458 mm in 2023. *Climate change can exacerbate extreme events such as heavy rainstorms, hail, late spring and early autumn frosts, heavy storms, drought and floods, which annually incur considerable damage to the national economy, affecting agricultural production and food security.*

Water resources in Moldova are represented by surface water and underground water. *Surface waters* total more than 3,600 rivers and streams and over 4,000 water bodies. The most important rivers are the transboundary rivers Dniester and Pruth. For the last two decades, the average water volume of the Dniester River was 8.55 km^3, that of the Pruth River – 2.47 km^3, the general trend being towards decrease. *Changes in rainfall patterns and rising temperatures may affect the availability of water resources. Soils in Moldova are fertile, but vulnerable, subject to destructive processes, such as erosion, landslides, especially in climate change context. Sustainable agricultural practices and proper soil management are essential to maintaining agricultural productivity.*

Climate, relief and geological structure have determined that on the territory of Moldova the vegetation varies from deciduous forests (oak, beech, elm, hornbeam) to steppe and forest-steppe vegetation. The fauna of Moldova is grouped into five biotypes; it includes species characteristic of the temperate zone. *Protecting and restoring natural ecosystems are important adaptation measures for maintaining biodiversity and ecosystem services.*

3.1.1.2. Demographic circumstances

The number of population with habitual residence (PHR) on the territory on the right bank of the Dniester River, as of January 01, 2024, was 2,423.3 thousand people, down by approx. 69.0 thousand people (by 2.8%) as compared to the beginning of the previous year, and by 446.0 thousand people (by 15.5%) as compared to January 01, 2014 (Table 3-1). Urbanization on the right bank of the Dniester River has been increasing from 39.6% as of January 1, 2014 to 43.5% as of January 1, 2024, *but urban infrastructure may be insufficiently developed to cope with climate challenges. Big cities face problems related to water management and pollution*. PHR is declining

due to massive emigration and low birth rate. *Mass emigration can lead to labor shortages in critical sectors, including agriculture, affecting the state's ability to implement adaptation measures.*

The negative natural population growth in 2023 was 9.7 thousand people. The population is concentrated in rural areas (approximately 56.5%, as of January 1, 2024), where agriculture is the main source of income. *These rural communities are particularly vulnerable to climate change, with limited resources to adapt to changing conditions*. The Republic of Moldova has an aging population, with a significant proportion of elderly people. The population aging rate on the territory on the right bank of the Dniester River increased from 17.5 people aged 60 and over per 100 inhabitants (2014), up to 23.8 people in 2023. The share of the elderly population has increased in all regions of the country. The largest increase in the share of elderly people, as of January 1, 2024 as compared to January 1, 2023, were recorded in Central and Southern Regions of the country - by 1.5%. *This segment of the population is particularly vulnerable to climate change effects of, such as heat waves and climate-related diseases. It is necessary to implement specific protection and assistance measures.*

Table 3-1: Habitual residence population as of the beginning of the year

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Habitual residence population (total), thou. persons	2869.3	2846.3	2825.6	2780.7	2729.6	2684.8	2643.7	2626.6	2565.0	2492.3	2423.3
Population in the urban space, thou. persons	1137.1	1129.9	1122.8	1111.6	1100.7	1094.6	1092.8	1098.2	1087.7	1071.7	1054.5
Population in the rural space, thou. persons	1732.2	1716.5	1702.8	1669.2	1628.9	1590.1	1550.9	1528.4	1477.3	1420.6	1368.8
Share of population in the urban space, %	39.63	39.70	39.74	39.97	40.33	40.77	41.34	41.81	42.40	43.00	43.52
Share of population in the rural space, %	60.37	60.30	60.26	60.03	59.67	59.23	58.66	58.19	57.60	57.00	56.48

Source: National Bureau for Statistics of the Republic of Moldova, Statistical Database, <https://statbank.statistica.md/PxWeb/pxweb/ro/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice__POP010__POPro/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

The youth enrolment rate in university education in the 2022/2023 academic year, on the territory of the right bank of the Dniester River, reached 50.5% as compared to the population in the 19-23 age group, increasing by 10.5% as compared to the 2015/2016 academic year. *The level of climate change education and awareness varies, particularly between urban and rural areas*. Teaching staff in early childhood education institutions is predominant in rural areas (53.9% in 2022). *Education and awareness building programs are essential to increase community capacity and awareness of the need to adapt to climate change.*

A significant percentage of the population lives below the poverty line. The absolute poverty rate, the depth and severity of absolute poverty increased in 2023 as compared to the level recorded in 2014. In 2023 the absolute poverty rate has reached the level of 31.6%, while in rural areas it is considerably higher – 42.0%. *People with low income have limited capacities to adapt to climate change, being more vulnerable to its impact. Adaptation measures must take into account the needs of these vulnerable groups.*

These demographic circumstances require a holistic and inclusive approach in planning climate change adaptation actions, ensuring that all segments of the population are protected and have the capacity to face future challenges.

3.1.1.3. Economic circumstances

The dynamics of the economic growth rate of Moldova is uneven. During the 2014-2023 period, the economic recession occurred in the years 2015, 2020 and 2022, which were also years of natural disasters (droughts, storms, torrential rains, hail, early frost). The sector that is most subject to natural hazards is agriculture. The contribution of agriculture, forestry and fishing to the formation of production volume in current prices was 10.1% in 2022, which is 4.3% lower than in 2014. However, agriculture remains one of the three core sectors that contribute significantly to GDP and it is in this sector that a large part of the workforce is employed. The share of people employed in this sector was 20.8% in 2022 and 20.9% in 2023.

Agriculture is highly vulnerable to climate change, including drought, floods and temperature fluctuations. Adaptation of the agriculture sector requires investment in irrigation infrastructure, cultivation of climate-resistant varieties and implementation of sustainable agricultural practices.

The largest contribution to the formation of the production volume in current prices belongs to industry (18.1% in 2022), having decreased over the considered period (by 1.4% as compared to 2014). The manufacture of industrial production at the level of territory is not evenly distributed; the highest share belongs to Chisinau

municipality (50.7% in 2022), and the lowest - to the Southern Region (3.8%). *Modernizing industrial processes and improving energy efficiency are essential for reducing vulnerability to climate change.*

3.1.1.4. Infrastructure circumstances

Moldova has a network of roads and railways that needs modernization. During 2014-2023 period, the length of railway lines in operation for general use decreased by 5 kilometers, the length of waterways for general use decreased by 26.5% (148 km), and the length of public roads increased by 1.2% (114 km). *Roads are vulnerable to extreme climate events such as floods and landslides, which may be exacerbated by climate change. Investments in climate-resilient transport infrastructure, including roads and bridges, built to withstand extreme climate conditions, are critical to maintaining transport connectivity and safety.*

Moldova is dependent on energy import, especially natural gas (100% imported). In 2022, according to the energy balance, the share of primary production in gross domestic consumption amounted to 18.9%, while the share of imports – 80.5%. *The existing energy infrastructure is vulnerable to extreme events and price fluctuations. Diversification of energy sources, including investment in renewable energy, is crucial to reduce vulnerability to price fluctuations and climate change risks. The development of renewable energy sources (wind, solar, biomass) and modernization of distribution networks are essential to create a resilient and sustainable energy system.*

The captured water volumes are supplied to the population and economic operators through public water supply networks. Over the last 10 years (2014-2023), the length of public water supply networks doubled, their length having increased from 10.5 thousand km to 20.3 thousand km. On the other hand, the length of public sanitation networks is much shorter as compared to that of the water supply network. The length of sewage systems, as compared to the length of water supply one was only 26% in 2023. *Water and sanitation systems in many areas of Moldova are outdated and insufficient, making them vulnerable to climate fluctuations such as droughts and floods. Modernizing and expanding water and sanitation infrastructure is crucial to ensuring access to safe drinking water and preventing water-borne diseases, which may increase in the context of climate change.*

Moldova is facing a series of climate change effects that directly affect public health. Increased incidence of heat-related diseases, vector-borne diseases and water-borne infections are observed trends. *The healthcare system in Moldova faces challenges related to limited resources and outdated infrastructure. The capacity to respond to public health emergencies, including those caused by climate change (heat waves, new diseases), is limited. Investments in healthcare infrastructure, including upgrading hospitals and clinics, as well as improving early warning systems, are crucial to protecting public health in the context of climate change.*

3.1.2. Institutional, legal and policy frameworks

3.1.2.1. Institutional and governance arrangements

The institutional and governance arrangements related to climate change impact and adaptation in the Republic of Moldova involve several institutions. The Ministry of the Environment (MEnv) is the central public authority, which, under the current Government was reorganized and began to exercise its functions on September 1, 2021, based on Government Decision no. 145/2021[118]. The basic objective of the MEnv is the development, promotion and implementation of environmental policy documents. The scope of its activity covers: 1) environmental protection; 2) climate change; 3) sustainable management of natural resources. The Ministry coordinates national efforts to adapt and mitigate climate change. The following administrative authorities are under the authority of the MEnv: the Environmental Agency, the Ecological Inspectorate, the "Moldsilva" (Forestry) Agency, the "Apele Moldovei" (Moldavian Waters) Agency, the Geology and Mineral Resources Agency, the National Agency for the Regulation of Nuclear and Radiological Activities. The public institutions in which MEnv has the status of founder are: the Public Institution "Environmental Projects National Implementation Office", the State Hydrometeorological Service.

During almost 3 years of operation, the structure and organizational chart of the central staff of the MEnv were changed twice[119],[120], aiming to expand the entity. The environmental component is made up of five divisions, four sections and one service: Division for policies in the area of nature conservation and biosecurity; Division for

[118] <https://www.legis.md/cautare/getResults?doc_id=138706&lang=ro#>.
[119] <https://monitorul.gov.md/ro/monitorul/view/pdf/2566/part/2#page=16>.
[120] <https://www.legis.md/cautare/getResults?doc_id=138685&lang=ro>.

policies in the area of atmospheric air protection; Division for pollution prevention policies; Division for policies for integrated water resource management; Division for waste management policies and related to contaminated sites; Forestry and hunting policies section; Climate change policy section; Policy section in the field of circular economy and economic instruments; Soil and subsoil protection policy section; Chemicals management policy service.

The Government of the Republic of Moldova established by GD no. 425/2024[121], the *National Climate Change Commission (NCCC)*, with competences for coordinating and approving policies in the field of climate change and public capital investment projects in the context of climate change mitigation and adaptation, as well as managing risks of natural disasters.

The Environmental Agency (EA) was established by GD no. 549/2018[122]. According to it, the EA is an administrative authority reporting to the Ministry of Environment, responsible for implementation of state policy in the following fields of activity: 1) prevention of environmental pollution; 2) atmospheric air protection and climate change; 3) protection and regulation of water resource use; 4) protection and regulation of the use of the animal kingdom and the vegetable kingdom, of aquatic biological resources; 5) conservation of biodiversity and management of natural areas protected by the state; 6) waste management; 7) biosecurity.

3.1.2.2. Legal and policy regulatory framework

Other the recent decades, Moldova has faced many climate-related hazards, which have a negative impact on the environment, the national economy and the health of the population. The barriers the country faces in the field of environmental protection and climate change are addressed in the *"National Climate Change Adaptation Program until 2030" (NCCAP 2030)*[123] (approved by the Government on August 30, 2023) and the *"Environmental Strategy for the 2024-2030 years"* (approved by the Government on June 12, 2024)[124].

The NCCAP 2030 aims at strengthening the climate resilience of Moldova, vertical and horizontal synergy between priority sectors, and ensuring implementation of provisions of the *UNFCCC* (ratified by Parliament Decision 404/1995[125]) and the *Paris Agreement* (ratified by Law 78/2017[126]). The Action Plan for Program implementation comprises 90 measures grouped into 18 actions (Table 3-2), which, in turn, are integrated into five special objectives (OS). It is estimated that implementation of the Action Plan of the Program will annually generate over US$ 100 million for the national economy of Moldova by protecting the economic, social and ecological systems from harmful climate change effects.

Table 3-2: NCCAP 2030 actions, competent institutions and sources of funding

Actions	Number of measures	Timeline	Competent authorities	Sources of funding
SO 1. Development of climate change adaptation capacities and inter-sectoral cooperation				
SO 1.1. Activation of the mechanism for coordination of adaptation to climate change	3	2023-2024	MEnv, NCCC	External assistance (NAP-2), budget of relevant authorities, institutions
SO 1.2. Strengthening institutional capacities for effective implementation of climate change adaptation (CCA) measures	2	2023-2024	MEnv, MAFI, ME, MIRD, MH, MIA, MLSP and their subordinate agencies	External assistance (NAP-2),
SO 1.3. Ensuring continuous targeted training on capacity building for implementation of the CCA policy	4	2023-2025	MEnv, NCCC, SC, MLSP, APA, MER, MIA (GIES)	Budget of relevant authorities, institutions and external assistance (NAP-2, NAP-3)
SO 2. Raising awareness on climate change adaptation and disaster risk reduction through reliable and accessible information				
SO 2.1. Ensuring availability and use of climate data and information in priority sectors	3	2023-2027	MEnv, SHS, EGA, ME, MIRD, MH (NPHA), MAFI, MIA (GIES), MLSP	Budget of relevant authorities, institutions and external assistance (NAP-2, NAP-3)
SO 2.2. Targeted capacity building on climate change information collection, management, use and sharing	2	2023-2030	MEnv, ME, MIRD, MH, MAFI, MER, NR$DA	Budget of authorities, institutions and external assistance
SO 2.3. Establishment of a coordinated data collection and management system on ACC and DRR	2	2023-2026	MEnv, MIA (GIES), MEnv (SHS)	Budget of relevant authorities, institutions and external assistance (NAP-2)
SO 2.4. Increasing awareness and preparedness of decision makers and the general public on climate risks and adaptation possibilities	6	2023-2029	MEnv, MIA (GIES), SHS	Budget of relevant authorities, institutions and external assistance (NAP-2, NAP-3)
SO 3. Expanding budgeting for adaptation to climate change and increasing resilience				
SO 3.1. Integrating CCA components into sectoral budgets and ensuring cross-sectoral financial and operational synergies	2	2023-2024	MEnv	Budget of relevant authorities, institutions and external assistance (NAP-2)

[121] <https://www.legis.md/cautare/getResults?doc_id=143648&lang=ro>.
[122] <https://www.legis.md/cautare/getResults?doc_id=127927&lang=ro#>.
[123] <https://gov.md/sites/default/files/document/attachments/subiect-06-nu-242-mm-2023.pdf>.
[124] <https://www.legis.md/cautare/getResults?doc_id=144295&lang=ro>.
[125] <https://www.legis.md/cautare/getResults?doc_id=60740&lang=ro>.
[126] <https://www.legis.md/cautare/getResults?doc_id=99251&lang=ro>.

Actions	Number of measures	Timeline	Competent authorities	Sources of funding
SO 3.2. Capacity building for integration of CCA in budget planning and financing at national and local level	2	2023-2025	MEnv, MF	Budget of relevant authorities, institutions and external assistance (NAP-2)
SO 4. Integration of CCA and DRR in strategic sectoral planning and investment planning at national and local level				
SO 4.1. Integrating climate change adaptation issues in sectoral management practices	4	2023-2027	MEnv	Budget of relevant authorities, institutions and external assistance (NAP-2, NAP-3)
SO 4.2. Integrating climate DRR into development planning and enhancing preparedness for disaster risk management	5	2023-2026	AS, MEnv, MIA (GIES), SHS, MH, MEnv („Moldsilva" Agency)	Budget of relevant authorities, institutions and external assistance (NAP-3, EIB, UNDP-ADA)
SO 4.3. Integrating the gender dimension into CCA and DRM planning, and promoting adaptation actions including at all levels	3	2023-2026	MEnv	Budget of relevant authorities, institutions and external assistance (NAP-2)
SO 5. Enhancing resilience of priority sectors through climate investments and reducing the risks and negative impacts of climate hazards				
SO 5.1. Adapting the agricultural sector to climate change by applying comprehensive agricultural practices, modern adaptation technologies and soil conservation	4	2023-2027	MAFI, MEnv	Within the limits of allocated budgets, external sources, FAO
SO 5.2. Increasing energy efficiency and resilience of the energy sector infrastructure by adjusting to forecasted weather indicators	5	2023-2030	MEnv, EEA, MIRD, UCIPE, ONDRL	Budget of relevant authorities, institutions, „Premier Energy Distribution" SA, SOE „Moldelectrica", JSC „REDNord", external assistance, private sector, (EIB, EBRD, WB)
SO 5.3. Adapting the forestry sector to climate change by applying complex biodiversity conservation practices and an ecosystem approach	14	2023-2030	MEnv, „Moldsilva" Agency, MER, MIRD, MAFI, „Apele Moldovei" Agency	Budget of relevant authorities, institutions and external assistance (PNÎR) (PASCEFPRM)
SO 5.4. Reducing climate change impact on public health and healthcare services	11	2023-2030	MH, NHIC, NPHA, CNAMUP, AMDM	Budget of relevant authorities, institutions and external assistance
SO 5.5. Increasing resilience of the transport sector infrastructure by using technologies adjusted to forecasted weather indicators	5	2023-2030	MIRD, SOE „Administrația de Stat a Drumurilor" (State Roads Administration), SOE „Calea Ferată din Moldova" (Moldovan Railways), Naval Agency	Budget of relevant authorities, institutions and external assistance
SO 5.6. Adapting the water resource sector to climate change through efficient use of resources, ensuring their quality and quantity and reducing the risk of floods	13	2023-2030	„Apele Moldovei" Agency, EA, MIRD, NPHA, MEnv, IEG of SUM, MDED, SHS	Budget of relevant authorities, institutions and external assistance, (project „EU4Environment – Water and Data"), Embassy of Sweden ("Nistru-2" project), EIB, EBRD, WB, eventually ADA

In the context of reaching the general development goal of the Republic of Moldova as an ecological, clean and neutral state with regard to the negative impact on environment and climate, the *"Environmental Strategy for the 2024-2030 years"*[127], covers the necessary measures and solutions aimed at environmental protection – protection of air, water, soil, flora and fauna, in terms of sustainable development.

Since the signature of the Association Agreement with the European Union (27.06.2014)[128], the Republic of Moldova has undertaken to promote policies that ensure reaching of the general objectives of EU-Republic of Moldova cooperation and global policy, including those related to climate change adaptation: *Paris Agreement on climate change*; Declaration of the Sustainable Development Summit.

Moldova has undertaken to implement 17 Goals of the *2030 Sustainable Development Agenda*[129], including the following strategic goals: promoting measures to combat climate change (SDG 13); increasing the share of energy from renewable sources in gross final electricity consumption (SDG 7.2); reduction of surface water pollution (SDG 14.1); significantly increasing afforestation and reforestation (SDG 15.2); combating soil degradation (SDG 15.3), etc.

In line with the *National Development Strategy "European Moldova 2030"*[130], Moldova undertook to regulate the field of environmental protection. First of all, it is expected to promote CCA policies and to reduce the impact of human activity on the environment. Secondly, in accordance with provisions of the aforementioned Strategy, the principles of sustainable development and adaptation to climate change are applied in all national economy sectors.

3.2. Impacts, risks and vulnerabilities

3.2.1. Summary of Observed Trends in Temperatures and Precipitations

The temperatures for the Republic of Moldova (RoM) show continuing long-term warming trends for both annual and seasonal averages (Taranu et al., 2023)[131]. The warming trend over the last 30 years is higher than

[127] <https://www.legis.md/cautare/getResults?doc_id=144295&lang=ro>.
[128] <https://www.legis.md/cautare/getResults?doc_id=83489&lang=ro>.
[129] <https://www.legis.md/cautare/getResults?doc_id=135555&lang=ro>.
[130] <https://www.legis.md/cautare/getResults?doc_id=134582&lang=ro>.
[131] <https://www.researchgate.net/publication/372914680_Climate_Change_Impacts_Risks_and_Vulnerabilities_in_the_Republic_of_Moldova_Observed_Trends_and_Future_Projections>.

over the last 70 years, which highlights that the RoM's rate of warming has increased in recent decades. For the annual mean and extremes, the greatest increase in recent decades was observed in Southern Agro-Ecological Zone (AEZ) (Table 3-3).

Table 3-3: Observed Trends in the Annual Mean and Extremes for Temperatures and Precipitations

Indices		Northern AEZ		Central AEZ		Southern AEZ	
		1961-2022	1991-2022	1961-2022	1991-2022	1961-2022	1991-2022
Mean temperature	°C per decade	+0.4	+0.7	+0.4	+0.6	+0.4	+0.9
Max temperature	°C per decade	+0.4	+0.9	+0.3	+0.8	+0.4	+1.1
Minimum temperature	°C per decade	+0.4	+0.5	+0.4	+0.5	+0.4	+0.8
Cold nights TN10p	*%, per decade*	-1.7	-1.6	-1.6	-2.1	-1.2	-2.8
Cold days, TX10p	*%, per decade*	-1.2	-2.9	-0.9	-2.6	-1.1	-3.4
Warm nights, TN90p	*%, per decade*	+2.6	+2.8	2.8	+2.9	+2.4	+4.6
Warm days, TX90p	*%, per decade*	+2.4	+4.6	+1.6	+3.6	+2.6	+6.0
Warm spell duration, WSDI	*Days per decade*	+4.1	+6.1	+4.2	+5.4	+5.5	+9.9
Cold spell duration, CSDI	*Days per decade*	-0.7	-0.9	-0.3	-1.8	-0.5	-2.4
Frost days, FD	*Days per decade*	-5.3	-7.5	-4.3	-8.7	-5.2	-13.4
Ice days, ID	*Days per decade*	-4.6	-8.3	-2.7	-6.9	-3.2	-8.8
Summer days, SU	*Days per decade*	5.8	12.3	4.2	10.7	5.7	13.3
Tropical nights, TR	*Days per decade*	+0.3	+0.4	3.3	3.4	2.1	1.6
Growing season length, GSL	*Days per decade*	+4.6	+11.7	+3.8	+6.1	+5.5	+18.4
Max 1-day precipitation, RX1day	*mm, per decade*	+1.0	+2.9	+1.8	-2.8	0.1	0.0
Max 3-day precipitation, RX3day	*mm, per decade*	+1.1	+1.3	+2.3	-3.9	-0.3	-2.3
Max 5-day precipitation, RX5day	*mm, per decade*	+1.4	+0.3	+2.6	-5.0	0.3	0.5
Simple daily intensity, SDII	*mm, per decade*	+0.1	0.0	0.2	0.1	0.0	0.1
Heavy precipitation days, R10mm	*Days per decade*	0.0	-1.1	0.0	-0.8	-0.7	-0.3
Very heavy precipitation days, R20mm	*Days per decade*	+0.1	0.0	0.1	0.2	-0.2	0.0
Consecutive dry days, CDD	*Days per decade*	-0.3	0.5	-0.1	3.7	0.1	0.0
Consecutive wet days, CWD	*Days per decade*	0.0	0.3	0.0	-0.2	-0.2	0.0
Very wet days, R95p	*mm, per decade*	7.0	6.4	8.1	1.3	-3.5	-9.2
Extremely wet days, R99p	*mm, per decade*	5.7	6.8	6.8	-7.9	0.2	-5.2
Contribution from very wet days, R95pTOT%	*%, per decade*	+1.1	1.8	1.4	0.7	-0.2	-1.3
Contribution from extremely wet days, R99pTOT%	*%, per decade*	0.9	1.6	1.1	-1.1	0.2	-1.2
Total wet-day precipitation, PRCPTOT	*mm, per decade*	-3.0	-18.4	0.7	-10.0	-14.4	-12.5

The 10 warmest years on record in the RoM have all occurred since 2000 and the five warmest years since 2007 were 2020, 2019, 2007, 2015, and 2022. In RoM, every summer since 2015 has been warmer than the 1991-2022 average (except the 2021), with 2015 experiencing the warmest summer on record by a large margin at 1.4°C (1.9°C for T max) above average, to be mentioned also that the warmest summers registered in the RoM were in 2007 and 2012 with a largest increase by 2.2°C (2.6°C and 2.9°C for T max, respectively). Likewise, six winters and seven autumns of the eight seasons since 2015 have been warmer than average. The nine spring seasons from 2012 to 2022 were all warmer than average, with spring 2021 (-1.52°C) and 2022 (-0.36°C) cooler than average (Taranu et al., 2023).

The frequency of heatwaves observed in the RoM has increased in recent decades, with extreme heatwaves across the RoM in 2007, 2012, 2015, 2018, 2019 and 2020. The 2012 saw the warmest summer on record, with very strong or extreme heat stress. While recent years have been characterized by more warm than cold events, and decreasing trend in Frost days, Ice days and Cold spells the notable cold spells occurred in 2018 and 2020 in the RoM (Taranu et al., 2023)[132].

Unlike temperature, statistically significant changes in precipitation are not observed, so it can be noted just a tendency to increase or decrease in precipitation in 1961-1990 and 1991-2022 time periods. Overall, the RoM is seeing a decrease in precipitation, and the change varies by AEZs, the most decreasing tendency is observed in Northern AEZ, which are accompanied by heavy precipitation frequency trends, that can lead to the increases in pluvial flooding (see Table 3-3).

Due to enhanced evaporation, a drying trend in the RoM has accelerated during recent decades, which is strongest in Southern and Central AEZs (Taranu et.al, 2018)[133]. The frequency of droughts have increased in the RoM.

[132] Taranu et al., 2018, Vulnerability Assessment and Climate Change Impacts in the Republic of Moldova: Researches, Studies, Solutions <https://www.researchgate.net/publication/372914680_Climate_Change_Impacts_Risks_and_Vulnerabilities_in_the_Republic_of_Moldova_Observed_Trends_and_Future_Projections>

[133] Taranu et al., 2018, Vulnerability Assessment and Climate Change Impacts in the Republic of Moldova: Researches, Studies, Solutions <https://www.researchgate.net/publication/372914680_Climate_Change_Impacts_Risks_and_Vulnerabilities_in_the_Republic_of_Moldova_Observed_Trends_and_Future_Projections>

In 2020 and 2022, a persistent lack of precipitation affected large parts of the RoM, together with higher-than-average temperatures, lead to a severe-to-extreme drought with highest registered negative impact on agriculture.

3.2.2. Summary of Projected Trends in Temperatures and Precipitations

While there is uncertainty over future climate patterns, Moldova is likely to experience more frequent and severe impacts from climate extremes in the coming decades.

The regional climate change projections over the Republic of Moldova's Northern, Central and Southern AEZs in terms of the distribution of annual mean and extremes for temperatures and precipitations indices are based on CMIP6 multi-model ensemble of 6 GCMs, introduced by two Shared Socioeconomic Pathways (SSPs) under different GHG and atmospheric aerosol emission assumptions the Representative Concentration Pathways (RCPs) SSP1-2.6 and SSP5-8.5. In terms of future projections, three time periods were approved, following IPCC (AR6)[134] methodology, which are 2021-2040 (short term), 2041-2060 (medium term) and 2081-2100 (long term) comparative to 1995-2014 reference period (see more in Taranu et al., 2023)[135].

In the Table 3-4 is presented the projected future changes in annual mean and extreme temperature and precipitation indices for 2081-2100 time period under two SSP1-2.6 and SSP5-8.5 scenarios, relative to 1995-2014 reference period.

Table 3-4: Projections in Annual Mean and Extreme Temperature and Precipitation Indices, presented for 2081-2100 Time Period under two SSP1-2.6 and SSP5-8.5 scenarios, relative to 1995-2014 Reference Period

Indices		Northern AEZ		Central AEZ		Southern AEZ	
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
Mean temperature	°C	1.6	5.7	1.6	5.7	1.5	5.6
Max temperature	°C	1.7	5.9	1.8	6.0	1.7	5.9
Minimum temperature	°C	1.6	5.6	1.6	5.6	1.5	5.4
Cold nights TN10p	%	-3.3	-6.1	-2.9	-5.7	-2.8	-5.8
Cold days, TX10p	%	-3.2	-6.1	-3.0	-6.0	-2.9	-6.1
Warm nights, TN90p	%	9.3	40.2	9.8	40.5	10.5	41.8
Warm days, TX90p	%	8.5	36.2	8.9	36.6	9.4	37.6
Warm spell duration, WSDI	*Days*	18.3	119.4	20.6	121.9	20.9	125.7
Cold spell duration, CSDI	*Days*	-3.8	-4.9	-2.3	-4.1	-2.0	-4.1
Frost days, FD	*Days*	-12.7	-58.3	-10.8	-51.9	-11.2	-50.8
Ice days, ID	*Days*	-11.4	-35.6	-8.6	-27.4	-8.8	-24.7
Summer days, SU	*Days*	15.7	56.4	14.6	49.5	15.3	44.0
Tropical nights, TR	*Days*	10.6	53.9	16.6	65.7	16.0	64.8
Growing season length, GSL	*Days*	11.9	60.1	10.8	61.4	10.8	60.7
Max 1-day precipitation, RX1day	*mm*	3.9	6.2	2.7	3.6	2.0	4.8
Max 5-day precipitation, RX5day	*mm*	2.0	6.9	0.7	5.5	-0.1	3.6
Simple daily intensity, SDII	*mm*	0.2	0.6	0.3	0.4	0.2	0.6
Heavy precipitation days, R10mm	*mm*	0.8	1.3	1.2	0.0	0.4	-0.5
Very heavy precipitation days, R20mm	*Days*	0.3	1.2	0.4	0.7	0.5	0.7
Consecutive dry days, CDD	*Days*	2.8	13.3	1.3	14.8	3.0	16.0
Consecutive wet days, CWD	*Days*	0.6	0.3	0.2	0.0	-0.1	-0.6
Very wet days, R95p	*Days*	17.3	42.1	20.4	25.2	9.4	22.2
Extremely wet days, R99p	*mm*	11.7	29.9	13.9	17.8	7.0	26.2
Contribution from very wet days, R95pTOT%	*mm*	1.8	7.6	3.2	6.4	1.5	6.4
Contribution from extremely wet days, R99pTOT%	%	1.8	5.0	2.7	3.9	1.1	5.7
Total wet-day precipitation, PRCPTOT	*mm*	14.7	-9.3	17.9	-34.3	8.6	-42.1

Source: Taranu et al., 2023.

The FD and ID are both projected to decrease everywhere in the RoM by the end of the twenty-first century under all two scenarios, with strong model agreement. The projections indicate that the Northern AEZs will experience greatest decrease of FD and ID, with FD decreasing by 58 days and ID by 36 days, under SSP5-8.5 scenario.

[134] IPCC, (2021), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press.

[135] <https://www.researchgate.net/publication/372914680_Climate_Change_Impacts_Risks_and_Vulnerabilities_in_the_Republic_of_Moldova_Observed_Trends_and_Future_Projections>

The largest increase in SU is projected under SSP5-8.5 in Northern AEZ, with an increase of SU by 56 days, while in TR the largest increase will be in Central AEZ, with an increase of TR by 66 days, this means that if the future emission follows the path of SSP5-8.5 scenario, the RoM could experience night time temperatures above 20°C and day time temperatures above 25°C during the entire summer season.

The projected changes in temperature duration indices are consistent with warming and changes in absolute and threshold indices. The warm spell duration index (WSDI) is projected to increase, and cold spell duration index (CSDI) to decrease the maximum increases in WSDI by the end of the twenty-first century will be from 119 days in Northern to 126 days in Southern AEZs under SSP5-8.5, and/or minimum increase by 18-21 days, respectively under SSP1-2.6 scenarios.

Consistent with projections of the absolute and threshold temperature indices, a decrease in TN10p and TX10p, and an increase in TN90p and TX90p are projected. By the end of the twenty-first century, under SSP1-2.6 scenario, the projected TN10p and TX10p decrease will be from 2.8 -2.9% in Southern to 3.3% in Northern to AEZs, while that of TN90p and TX90p increase will be from 9.3% to 10.5% for TN90p and by 8.5 – 9.4% for TX90p, with maximum increase in Southern AEZ.

Projected changes under SSP5-8.5 scenario are much larger with a decrease of 5.7 – 6.1% for TN10p and TX10p, and an increase by 40.2 – 41.8% for TN90p, and of 36.2 -37.6% for TX90p, with maximum increase in Southern AEZ. That is, hot temperatures that occurred once every day in the late twentieth century would become everyday weather by the end of the twenty-first century under SSP5-8.5 scenario.

The total wet-day precipitation (PRCPTOT) is projected to decrease everywhere by the end of the twenty-first century under SSP5-8.5 and to increase according to SSP1-2.6 scenarios. The largest decrease by 42.1 mm is projected in Southern AEZ, relative to reference period 1995-2014. The projected PRCPTOT changes have very large spread among models, max +2.4 mm and min -87.0 mm.

The SDII is projected to increase across the RoM by the end of the twenty-first century under both SSPs scenarios, with strong model agreement. The projections indicate that Northern, and Southern AEZs will experience the greatest increase of SDII by 0.6 mm/day, according to SSP5-8.5 scenario, while in case of SSP1-2.6 scenario, the projected increase will be 0.2 mm/day, comparative to 1995-2014 reference period.

The one-day RX1day and five-day RX5day extreme precipitation are projected to increase under both SSPs scenarios, with greatest increase in Northern AEZ under SSP5-8.5 scenario, by the end of the twenty-first century.

The R10mm is projected to increase in Northern AEZ according to both scenarios by the end of the twenty-first century, while the Southern AEZ will experience the slight decrease by 0.5 days of the R10mm under SSP5-8.5, and/or slight increase by 0.4 days in case of SSP1-2-6 relative to reference period 1995-2014.

The R20mm is projected to increase everywhere by the end of the twenty-first century under both SSPs scenarios. The projections indicate that Northern AEZ will experience the greatest increase of R20mm days by 1.2 days, while in Central and Southern AEZs the increase by 0.7 days is excepted under SSP5-8.5 scenario, relative to reference period 1995-2014.

The R95p and R99p projected to increase everywhere by the end of the twenty-first century under both SSPs scenarios, more pronounced for SSP5-8.5 scenario. The largest increase in R95p is projected in Northern AEZ, with the increase by 42.1 mm (R95p) and 29.9 mm (R99p), relative to reference period 1995-2014.

The consecutive dry days (CDD) is projected to increase everywhere throughout the Republic of Moldova AEZs by the end of the twenty-first century under both SSPs scenarios. The projections indicate that Southern AEZ will experience the greatest increase of CDD by 16 days under SSP5-8.5, and/or by 3 days under SSP1-2.6, scenarios, relative to reference period 1995-2014.

Controversially, by the end of the twenty-first century, the consecutive wet days is projected to decrease in Central and Southern AEZs under SSP5-8.5 scenarios, except Northern AEZ where the slight increase in consecutive wet days by 0.3 - 0.6 days is possible under both SSPs scenarios, relative to reference period 1995-2014, Taranu et al., 2023[136].

[136] Taranu et al., 2023 Climate Change Impacts, Risks and Vulnerabilities in the Republic of Moldova: Observed Trends and Future Projections <https://www.researchgate.net/publication/372914680_Climate_Change_Impacts_Risks_and_Vulnerabilities_in_the_Republic_of_Moldova_Observed_Trends_and_Future_Projections>.

3.2.3. Observed and potential climate change impacts, including sectoral, economic, social and environmental vulnerabilities

3.2.3.1. Estimating Climate Vulnerability Index

Climate change also brings along a number of risks. In some districts, the population of the Republic of Moldova is facing a water crisis. Moldova is an agrarian country. The lack of drinking water has a negative impact on agriculture, which is important for country's economy and worsens the problem of access to clean drinking water. Certain areas of the country are at risk of increased heat waves, which lead to higher mortality rates during the hot season, especially among the elderly, people with chronic diseases, children and people with disabilities. The methodology described in the monograph *"Climate Change Impacts, Risks and Vulnerabilities in the Republic of Moldova: Observed Trends and Future Projections"* (Țăranu et al., 2023), *"Fifth National Communication of the Republic of Moldova"* and the scientific article *"Climate Change Vulnerability Index Case Study for the Republic of Moldova"* (Gutium and Țăranu, 2021) was used to assess the Climate Vulnerability Index (CVI). When estimating the pillars "Sensitivity" (sub-index "Demographic sensitivity") and "Adaptive capacity" (sub-index "Health protection") the fact was taken into account that statistical data are available only for the years 2014-2022.

Exposure. According to the results of the "Exposure" estimate, the districts with the lowest standardized values of exposure to climate risks are: Cahul and Taraclia (0.4025); Criuleni and Straseni (0.4283); Basarabeasca, Cantemir and UTA Gagauzia (0.4327), (Figures 3-1 and 3-2).

The highest values of exposure to extreme temperatures and precipitation refer to Cimișlia, Leova and Hâncești districts (0.4809); Balti municipality, Ocnița and Râșcani districts (0.4674); Drochia, Soroca (0.4636); Chisinau municipality, Anenii Noi and Ialoveni districts (0.4574); Causeni, Stefan Vodă (0.4559); and Fălești, Glodeni, Sângerei districts (0.4531).

In the Northern Region, the highest values of exposure to climate change based on temperature and extreme precipitation indices are refer to: Bălți municipality, Ocnița and Râșcani districts (0.4674), followed by Drochia, Soroca (0.4636) and Fălești, Glodeni, Sângerei districts (0.4531). The increased exposure to climate change caused by extreme temperatures and precipitation in the Northern Region during 2008-2022 is mainly determined by the high values of indices Frost Days (FD) (0.59), Warm Nights (TN90p) (0.51), Growing Season Length (GSL) (0.60) and Contribution from Very Wet Days (R95pTOT) (0.51) in Bălți municipality, and respectively, Ocnița and Râșcani districts; as well as by indices Warm Nights (TN90p) (0.53), Growing Season Length (GSL) (0.58), Total Wet-Day Precipitation (PRCPTOT) (0.51) and Contribution from Very Wet Days (R95pTOT) (0.50) in Drochia and Soroca districts.

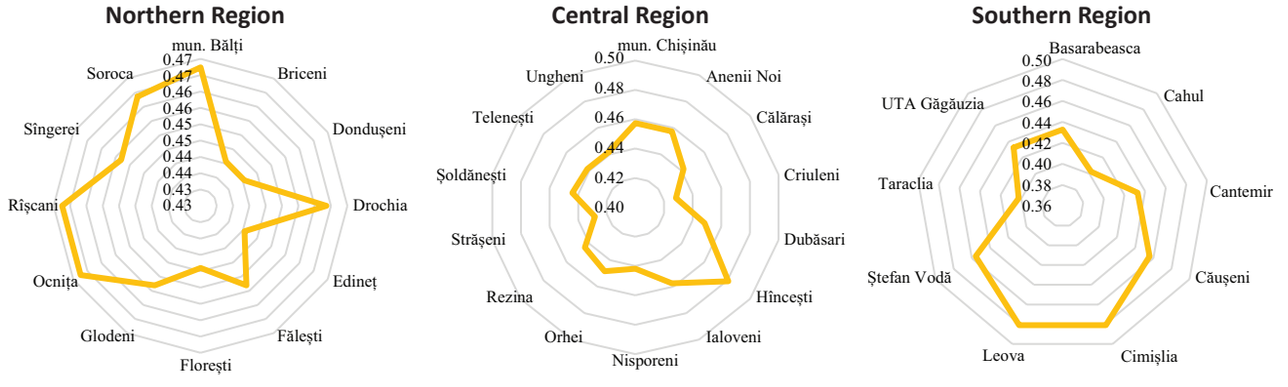


Figure 3-1: Exposure Index in administrative territories of three socio-economic regions of the Republic of Moldova: North, Centre and South.

A comparative analysis of exposure to climate change based on extreme temperature and precipitation indices in the Central Region showed that Hâncești district (0.4809), Chisinau municipality, Anenii Noi, Ialoveni districts (0.4574) reached the highest degree of exposure caused by climate change over the 2008-2022 period, while districts of Criuleni and Strășeni (0.4283), Călărași, Nisporeni, Telenești and Ungheni (0.4419) are the

administrative territorial units with the lowest degree of exposure. This fact can be explained by the high value of Minimum Daily Minimum Temperature (TNn) (0.54), Warm Nights (TN90p) (0.50), Total Wet-Day Precipitation (PRCPTOT) (0.50), Number of Very Heavy Precipitation Days, where daily precipitation amount ≥ 20 mm (R20mm) (0.59), Contribution from Very Wet Days (R95pTOT) (0.69), Max 5-day precipitation (RX5days) (0.50) in Hâncești district and Minimum Daily Minimum Temperature (TNn) (0.58), Summer Days (SU) (0.54), Total Wet-Day Precipitation (PRCPTOT) (0.57), Number of Very Heavy Precipitation Days, where daily precipitation amount ≥ 20 mm (R20mm) (0.52), Contribution from Very Wet Days (R95pTOT) (0.56) in Chișinău municipality and Anenii Noi and Ialoveni districts.

In the Southern Region, the highest values of exposure to climate change caused by extreme temperatures and precipitation are attributed to Cimișlia and Leova districts (0.4809), while for Cahul and Taraclia districts they are the lowest (0.4025). The high exposure to climate change caused by extreme temperatures and precipitation in the southern districts of the Republic of Moldova during 2008-2022 is mainly determined by the increased value of TNn (0.54), TN90p (0.50), PRCPTOT (0.50), Number of Very Heavy Precipitation Days, where daily precipitation amount ≥ 20 mm (R20mm) (0.59), Contribution from Very Wet Days (R95pTOT) (0.69) and Max 5-day precipitation (RX5day) (0.50).

Sensitivity defines the degree to which the system is susceptible to direct or indirect climate impacts. Based on available regional statistical data, the period of 15 consecutive years 2008-2022 was considered. The calculation results of the integral sensitivity index for administrative territorial units (ATU) are presented in Figures 3-3 and 3-4.

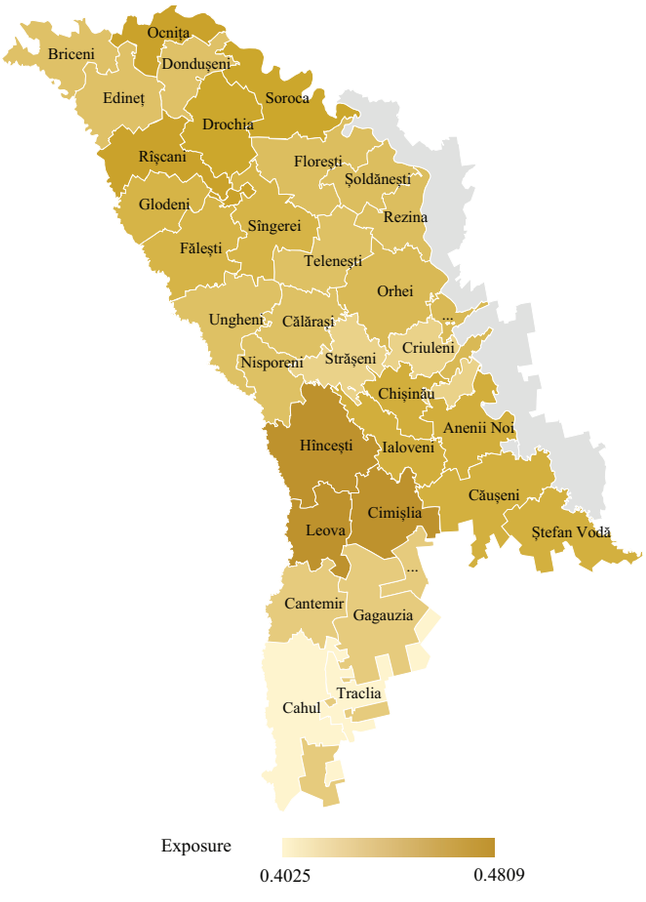


Figure 3-2: Exposure indices in ATU

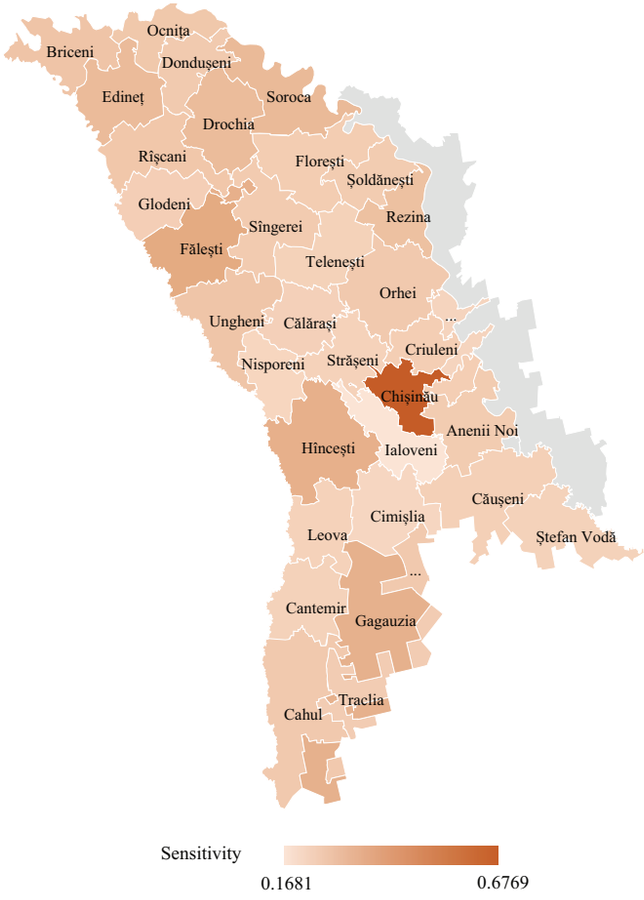
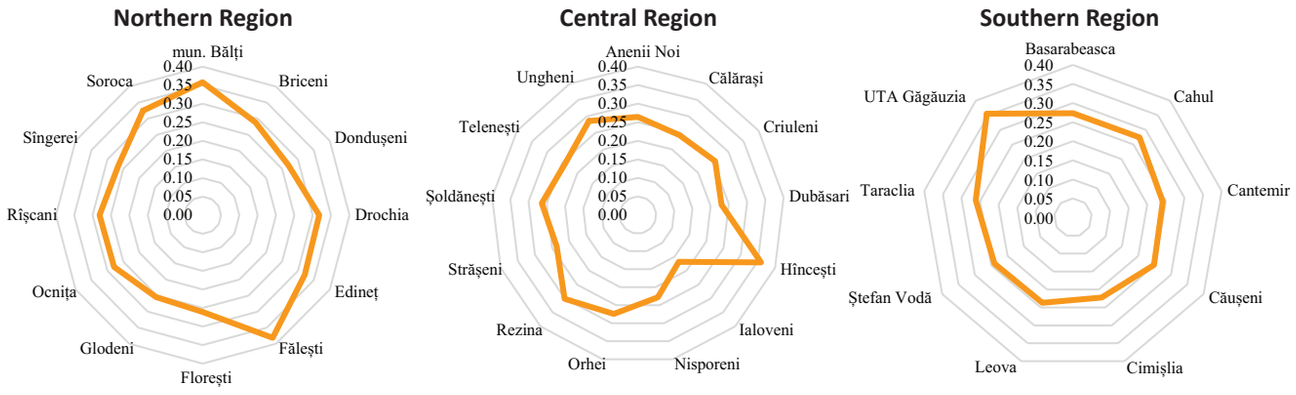


Figure 3-3: Sensitivity index in ATU

In the Northern Region, the most sensitive districts to climate change are Fălești (0.3813), Bălți municipality (0.3582), Soroca (0.3252) and Edineț (0.3213), and the lowest level of sensitivity was shown by Glodeni (0.2544) and Florești (0.2607) districts. The high sensitivity of Fălești district is mainly determined by a large volume of production and consumption waste, the high level of emissions of polluting substances into the atmospheric air from stationary sources of economic operators, a large number of officially registered unemployed and the relatively high number of goats and sheep. The high sensitivity of Soroca district is mainly determined by very

high-water demand, a comparatively small number of water supply and sewage systems, a relatively high level of mortality from malignant tumors and digestive system diseases.



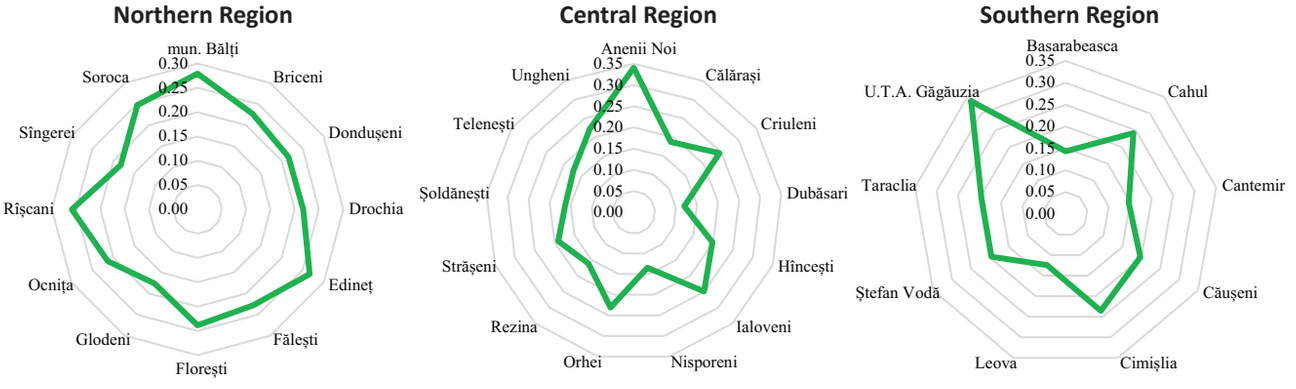
Note: without the municipality of Chisinau, which registered the highest Sensitivity level of 0.6769.

Figure 3-4: "Sensitivity" index in the districts of three socio-economic regions of the Republic of Moldova: North, Centre and South.

The analysis of the integral sensitivity index in districts of the Central Region showed that, apart from Chișinău municipality of (0.6769), the most sensitive is the district of Hâncești (0.3589), which recorded high values of waste generation from production and consumption, a high level of pollutants emissions in the atmospheric air from stationary sources of economic operators, the relatively high herd of cattle, goats and sheep, relatively large number of pensioners, etc.

The comparative analysis of sensitivity results for districts in the Southern Region showed that ATU Gagauzia (0.3549) reached the highest degree of damage to society and ecosystem caused by climate change, while Cimișlia district (0.2226) – the lowest. The high sensitivity of ATU Gagauzia can be explained by the relatively large volume of: pollutants emissions in atmospheric air from stationary sources of economic operators, demand for water, the number of pensioners, the area sown with technical crops in agricultural enterprises and household small farms, number of sheep and pigs, etc.

Adaptability. The adaptive capacity pillar reflects the ability of natural and human systems to adapt to climate change and reduce their own vulnerability. The calculation results are presented in Figures 3-5 and 3-6.



Note: without Chișinău municipality, which recorded the highest level of adaptive capacity of 0.6558.

Figure 3-5: Adaptive capacity index in districts of three socio-economic regions of the Republic of Moldova: North, Centre and South.

In the Northern Region, the municipalities of Bălți (0.2792), Edineț (0.2665) and Rîșcani (0.2587) registered the highest adaptation capacity, while the lowest levels were recorded in the districts of Glodeni (0.1764) and Sângerei (0.1825) (Figure 3-5). As compared to other districts in the region, Balti municipality registered the highest value of manufactured industrial production and delivered industrial production, as well as high values of the following indicators: meat production including poultry, production of bread and bakery products, road transport of goods, carried out by enterprises and organizations, passenger transport carried out by buses and

minibuses, number of doctors per 10,000 inhabitants, number of average healthcare staff per 10,000 inhabitants, number of students in primary and general secondary education, existing capacity of tourist reception facilities with accommodation functions, etc.

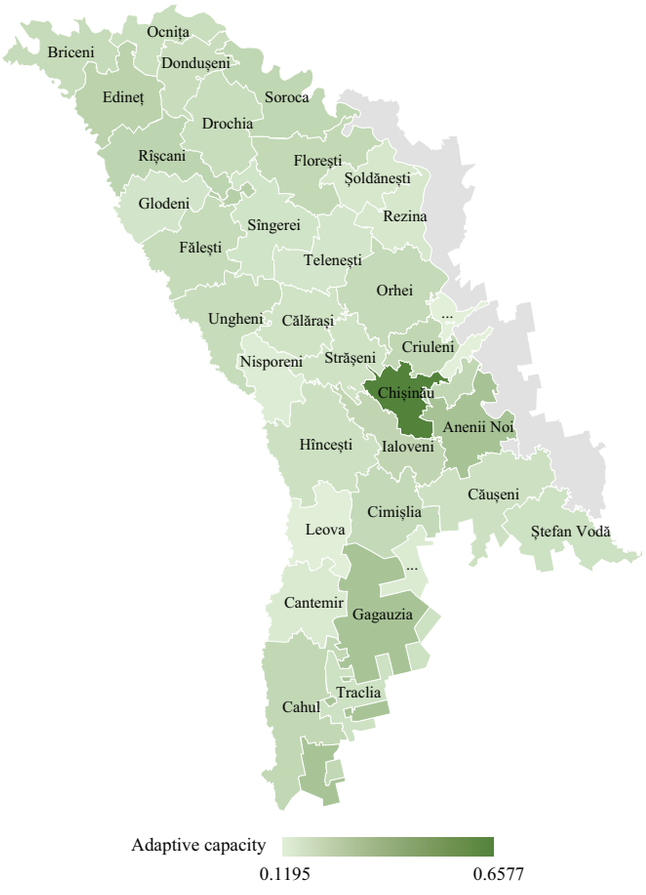


Figure 3-6: Adaptive capacity index in ATU.

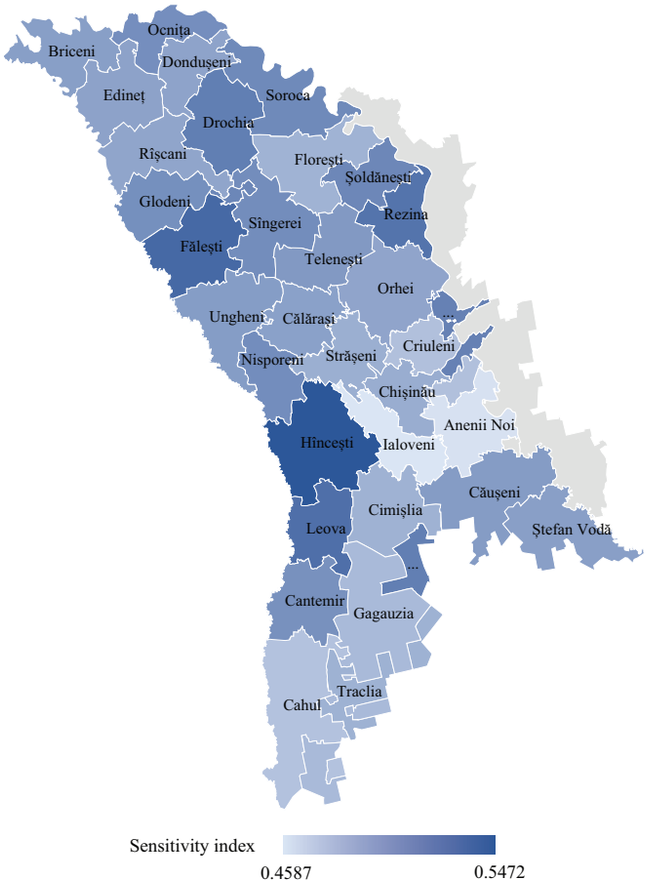


Figure 3-7: Sensitivity index in ATU.

In addition to Chisinau municipality, the highest adaptive capacity in the Central region was recorded by Anenii Noi district (0.3409), which is determined by high values of the following variables: volume of meat production, raising of livestock in live mass, sale of livestock for slaughter and in live mass, length of national roads, providing the population with housing (urban localities), etc.

The analysis of the integral adaptive capacity value in territories of the Southern Region districts showed that ATU Gagauzia has the highest degree of adaptability to climate change, 0.3368, while Leova district – the lowest, 0.1244. In addition, the high adaptive capacity of ATU Gagauzia was ensured by the high values recorded for the following indicators: manufactured industrial production, delivered industrial production, volume of flour production, volume of natural grape wines, breeding of livestock, sale of livestock for slaughter, average annual amount of milk per cow, length of local roads, length of national roads, volume of transported goods, number of doctors per 10,000 inhabitants, number of average healthcare staff per 10,000 inhabitants, availability of computers in primary and general secondary schools, etc.

Climate Vulnerability. Vulnerability to climate change is assessed as a function of exposure, sensitivity and adaptive capacity. The results obtained are reflected in Figures 3-7 and 3-8.

The obtained results show that the most vulnerable to climate change are the following districts: Hâncești (Central Region), Fălești (Northern Region) and Leova (Southern Region). The lowest degree of climate vulnerability was registered by: Ialoveni and Anenii Noi (Central Region), Cahul (Southern Region) and Florești (Northern Region).

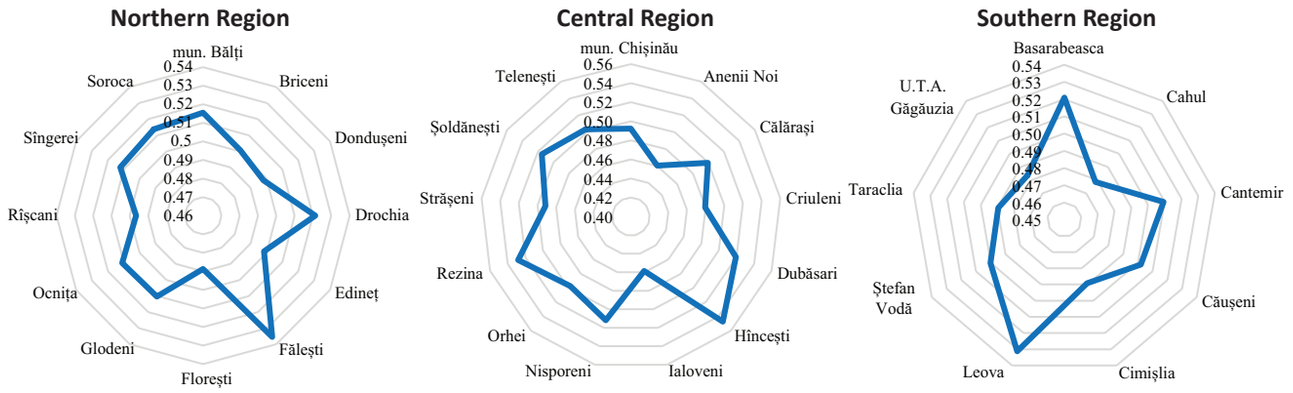


Figure 3-8: Climate Vulnerability Index in districts of three socio-economic regions of the Republic of Moldova: North, Centre and South.

To divide the districts according to the degree of exposure, sensitivity, adaptive capacity and degree of vulnerability, the criterion described in Tables 3-5 – 3-8, was used, and the results are given in Table 3-9.

Table 3-5: Division criterion by exposure of the territory

Interval	Exposure (E)
$0.4025 \le E_i < 0.4182$	Very low degree of exposure
$0.4182 \le E_i < 0.4339$	Low degree of exposure
$0.4339 \le E_i < 0.4495$	Medium degree of exposure
$0.4495 \le E_i < 0.4652$	High degree of exposure
$0.4652 \le E_i < 0.4809$	Very high degree of exposure

Table 3-6: Division criterion by territory's sensitivity

Interval	Sensitivity (S)
$0.1681 \le S_i < 0.2107$	Very low degree of sensitivity
$0.2107 \le S_i < 0.2534$	Low degree of sensitivity
$0.2534 \le S_i < 0.2960$	Medium degree of sensitivity
$0.2960 \le S_i < 0.3387$	High degree of sensitivity
$0.3387 \le S_i$	Very high degree of sensitivity

Table 3-7: Division criterion by adaptive capacity of the territory

Interval	Adaptive capacity (AC)
$0.1195 \le AC_i < 0.1638$	Very low degree of adaptive capacity
$0.1638 \le AC_i < 0.2081$	Low degree of adaptive capacity
$0.2081 \le AC_i < 0.2524$	Medium degree of adaptive capacity
$0.2524 \le AC_i < 0.2966$	High degree of adaptive capacity
$0.2966 \le AC_i$	Very high degree of adaptive capacity

Table 3-8: Division criterion by vulnerability degree of the territory

Interval	Vulnerability
$0.4587 \le CVI_i < 0.4764$	Very low degree of vulnerability
$0.4764 \le CVI_i < 0.4941$	Low degree of vulnerability
$0.4941 \le CVI_i < 0.5118$	Medium degree of vulnerability
$0.5118 \le CVI_i < 0.5295$	High degree of vulnerability
$0.5295 \le CVI_i < 0.5472$	Very high degree of vulnerability

Table 3-9: Climate Vulnerability Index

	E	S	AC	CVI	Rank	Climate vulnerability degree
Bălți municipality	0.4674	0.3582	0.2792	0.5155	8	High
Briceni	0.4406	0.2883	0.2268	0.5007	19	Medium
Dondușeni	0.4406	0.2696	0.2160	0.4981	23	Medium
Drochia	0.4636	0.3178	0.2176	0.5213	5	High
Edineț	0.4406	0.3213	0.2665	0.4984	22	Medium
Fălești	0.4531	0.3813	0.2282	0.5354	2	Very high
Florești	0.4440	0.2607	0.2387	0.4887	30	Low
Glodeni	0.4531	0.2544	0.1764	0.5104	14	Medium
Ocnița	0.4674	0.2787	0.2132	0.5110	13	Medium
Rîșcani	0.4674	0.2810	0.2587	0.4965	25	Medium
Sîngerei	0.4531	0.2660	0.1825	0.5122	11	High
Soroca	0.4636	0.3252	0.2477	0.5137	10	High
Chișinău municipality	0.4574	0.6769	0.6558	0.4922	26	Low
Anenii Noi	0.4574	0.2646	0.3409	0.4604	34	Very low
Călărași	0.4419	0.2436	0.1871	0.4995	21	Medium
Criuleni	0.4283	0.2562	0.2457	0.4796	32	Low
Dubăsari	0.4483	0.2296	0.1195	0.5195	7	High
Hîncești	0.4809	0.3589	0.1983	0.5472	1	Very high
Ialoveni	0.4574	0.1681	0.2493	0.4587	35	Very low
Nisporeni	0.4419	0.2278	0.1344	0.5118	12	High
Orhei	0.4483	0.2742	0.2309	0.4972	24	Medium

	E	S	AC	CVI	Rank	Climate vulnerability degree
Rezina	0.4440	0.3014	0.1612	0.5281	4	High
Strășeni	0.4283	0.2365	0.1908	0.4914	27	Low
Șoldănești	0.4440	0.2639	0.1626	0.5151	9	High
Telenești	0.4419	0.2417	0.1731	0.5035	16	Medium
Ungheni	0.4419	0.2864	0.2224	0.5020	18	Medium
Basarabeasca	0.4327	0.2735	0.1434	0.5209	6	High
Cahul	0.4025	0.2744	0.2413	0.4785	33	Low
Cantemir	0.4327	0.2415	0.1465	0.5092	15	Medium
Căușeni	0.4559	0.2479	0.1976	0.5021	17	Medium
Cimișlia	0.4809	0.2226	0.2356	0.4893	29	Low
Leova	0.4809	0.2373	0.1244	0.5313	3	Very high
Ștefan Vodă	0.4559	0.2407	0.1958	0.5002	20	Medium
Taraclia	0.4025	0.2615	0.1954	0.4895	28	Low
ATU Găgăuzia	0.4327	0.3549	0.3368	0.4836	31	Low

In the Northern Region, "very high degree of vulnerability" is attributed to Fălești district (0.5354), and "high degree of vulnerability" to the following territories: Drochia district (0.5213), Bălți municipality (0.5155), Soroca (0.5137) and Sângerei districts (0.5122), while "low degree of vulnerability" to climate risks is found in Florești district (0.4887).

In the Central Region, during the 2008-2022 period, the district with a "very high degree of vulnerability" to climate risks was Hîncești (0.5472), while districts of Rezina (0.5281), Dubăsari (0.5195), Soldănești (0.5151) and Nisporeni (0.5118) had a "high degree of vulnerability"; a "low degree of vulnerability" was found in districts of Criuleni (0.4796), Strășeni (0.4914) and Chișinău municipality (0.4922). The lowest degree of vulnerability to climate change in Moldova was registered by districts of the Central Region: Ialoveni (0.4587) and Anenii Noi (0.4604).

In the Southern Region, "very high degree of vulnerability" of territories was identified in Leova district (0.5313), and "high degree of vulnerability" - in Basarabeasca district (0.5209), while a "low degree of vulnerability" was found in districts Cahul (0.4785), ATU Gagauzia (0.4836), Cimișlia (0.4893) and Taraclia (0.4895).

3.2.3.2. Modelling water runoff under climate change impact

In the coming decades, the climate elements will continue to change, a fact that will also leave its mark on formation of water resources. To assess the climate change impact on water runoff, the "shared socioeconomic pathways" (SSP) scenarios SSP1-2.6, SSP2-4.5 and SSP5-8.5 were used for three distinct periods: 2021-2040, 2041-2060 and 2081-2100. Water runoff modelling was performed based on the water balance approach. Evapotranspiration, as a component of the approach used, was estimated using the equation proposed by Ivanov, as a function of temperature and humidity. The spatial distribution of temperature and precipitation, both for the reference period and for the later decades, was modelled on the basis of multiple regression, identifying the link between the mentioned elements and altitude, longitude and latitude. The temperature and precipitation values for the three scenarios SSP1-2.6, SSP2-4.5 and SSP5-8.5 and the three time periods, 2021-2040, 2041-2060 and 2081-2100, were taken from the NC5 of the RoM to UNFCCC (2023). For spatial modelling of humidity, necessary for the use of the evapotranspiration equation proposed by Ivanov, initially the connection between annual humidity, temperature and latitude was identified as well as for the four seasons of the reference period. The correlation coefficient amounts to 0.65-0.75, which shows a fairly good correlation between the considered elements. Finally, the obtained equations were used to model the humidity of the later decades, based on temperature maps prepared in the previous stage. As a result, spatial models of temperature and humidity were used to calculate evapotranspiration, which were afterwards, used, together with precipitation models, in the balance equation to simulate water runoff.

The results of water runoff modelling based on data from the reference period show a fairly good correlation between the modelled and observed annual runoff layer, the coefficient of determination reaching the value of 0.84. The chosen approach offered the possibility to model the water runoff also for four seasons: winter, spring, summer, autumn. The modelled values of spring and summer runoff correlate quite well with the observed ones, the modelling quality reaching 82%; for winter and autumn seasons the R^2 coefficient is 0.60. It should be noted, however, that the model used resulted in an overestimation of water runoff for winter and autumn period for the Southern region of the country.

The methodology approach verified on the example of the water runoff layer of the reference period was used to model water runoff according to scenarios SSP1-2.6, SSP2-4.5 and SSP5-8.5 for the periods 2021-2040, 2041-2060 and 2081-2100. The annual water runoff was modelled for the four seasons: winter, spring, summer, autumn, as well. The modelling results are presented below.

The modelled annual runoff values for the SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios were estimated for the periods 2021-2040, 2041-2060, and 2081-2100, the share of runoff changes can be found in Table 3-10.

Table 3-10: Change in modelled annual runoff under scenarios SSP1-2.6, SSP2-4.5 and SSP5-8.5 for the 2021-2040, 2041-2060 and 2081-2100 periods as compared to reference period, 1995-2014, %

DR	SSP	Water runoff, %			
		Reference period	2021-2040	2041-2060	2081-2100
North	SSP1-2.6	49.3	-22.1	-25.2	-29.1
	SSP2-4.5		-19.0	-36.7	-52.2
	SSP5-8.5		-20.0	-51.5	-76.6
Centre	SSP1-2.6	41.1	-22.1	-25.1	-27.9
	SSP2-4.5		-19.1	-36.5	-50.9
	SSP5-8.5		-19.2	-51.8	-77.1
South	SSP1-2.6	29.8	-23.6	-27.4	-27.0
	SSP2-4.5		-19.8	-38.9	-51.5
	SSP5-8.5		-19.5	-54.2	-80.6

Winter runoff maps for the scenarios and periods mentioned above are shown in Figures 3-09 – 3-20, while the climate change impact on the water resource sector is reflected in Table 3-11.

Table 3-11: Climate change impact on the water resource sector

Area	Climate event / exposure	Hydrological indicators	Associated climate change impact and risks	Type of impact
	Increase in air temperature, evaporation	**Medium annual flow / volume**	**General trend:** decrease **Large, medium and small rivers:** water resources will decrease	**Medium and small rivers** - high **Large rivers** - medium
	Reduction of the frequency and occurrence of the winter events features (snow cover, frost days, snow days, duration of cold period, etc.). Increase in frequency of maximum precipitation, heavy and very heavy precipitation days, extremely wet days	**Maximal flow**	**General trend**: decrease in the winter - spring period / increase in the summer and autumn period **Medium and small rivers**: as a result of the reduction in frequency of winter events occurrence, of the snow cover, the maximum flow in the winter-spring period will be reduced; on the other hand, in the context of the increase in frequency and volumes of torrential rains in the summer-autumn period, the maximum flow during this period will increase. In case of regularized rivers, additional measures will be necessary to comply with the maximum discharge flows stipulated in the operating regulations, especially during the warm period of the year. **Large rivers:** In a natural regime, the maximum flow in the winter-spring period will decrease and, in the summer-autumn period - it will increase. However, since the flow of large rivers is regulated by dams and reservoirs, and in their regulation a maximum discharge flow value is established, additional measures will be necessary to observe such value, especially during the warm period of the year.	**Medium and small rivers** - high **Large rivers** - medium
	Increase in air temperature, evaporation, duration of warm period, consecutive dry days.	**Minimum flow**	**General trend**: slight increase in the cold period / significant decrease in the warm period **Medium and small rivers**: high temperatures and droughts in the warm period will cause drying of small rivers and a significant reduction in the water flows of medium rivers, the lack of negative temperatures and the snow cover that stores important volumes of water in the cold period will cause a slight increase of the minimum flow rate. In case of regularized rivers, the minimum discharge flow from the reservoirs must be observed. Its duration will increase. **Large rivers:** the flow of large rivers is regulated by dams and reservoirs; in their regulation a minimum discharge flow is established and must be observed. Its duration will show a large increase. Phreatic/groundwater levels and reserves will decrease. Ecosystem services, water supply to the population, especially in rural areas, flora and fauna, the agricultural sector, etc. will be affected. It will also decrease water availability, increase the cost of drinking water treatment and wastewater treatment.	**Medium and small rivers** - high **Large rivers** - medium
	Increase in air temperature, evaporation, duration of warm period, consecutive dry days.	**Hydrological drought**	**General trend:** growth and intensification **Medium and small rivers:** under the action of meteorological drought, small rivers will dry up, medium ones will significantly reduce their water resources **Large rivers:** The minimum flow established in the regulations for operation of dams and discharge lakes will increase in duration. Phreatic/groundwater levels and reserves will decrease. Ecosystem services, water supply to the population, especially in rural areas, flora and fauna, the agricultural sector, etc. will be affected. It will also decrease water availability, increase the cost of drinking water treatment and wastewater treatment.	**Medium and small rivers** - high **Large rivers** - medium

Area	Climate event / exposure	Hydrological indicators	Associated climate change impact and risks	Type of impact
Environment	Increase in air temperature, evaporation, consecutive dry days. Reduction in frequency of occurrence and characteristics of winter events	**Healthy (ecological) flow**	**Large, medium and small regularized rivers:** under conditions of flow regulation by dams and reservoirs, it is mandatory to observe the discharge of the ecological flow necessary to maintain the life of biodiversity, the duration of this flow will be longer. Additional measures will be necessary to ensure discharge of the ecological flows stipulated in the operating regulations, taking into account the reduction of water resources during the warm period.	**Regulated large, medium and small rivers** - high
	Increase in frequency of maximum precipitation, heavy and very heavy precipitation days, extremely wet days	**Floods, flash floods (flow, volume, duration, frequency, flood zones)**	**The general trend**: increase **Large, medium and small rivers:** in the context of increase in frequency, intensity and volumes of torrential precipitation, all the parameters of rainwater floods, in particular, of flash floods, will also increase - maximum flow, volume, duration, frequency, flood zones, etc. In case of regularized rivers, additional measures will be necessary to regulate rainwater floods and to comply with the maximum discharge flows stipulated in regulations for operation of hydrotechnical facilities. Human life and activity will be affected, infrastructure, economic sectors, especially agriculture, will have higher costs of responding to hazards (evacuation of the population, rescue actions, protection against water-borne diseases, etc.). Soil erosion processes will intensify as a result of rivers sedimentation and water accumulation.	**Medium and small rivers** - high **Large rivers** - medium
	Increase in air temperatures, reduction in frequency of occurrence and features of winter phenomena (snow cover, frost days, snow days, duration of the cold period, etc.)	**High spring water (flow, volume, duration, frequency, flooded zones)**	**General trend:** decrease **Medium and small rivers**: the general trend of increase in air temperature during the cold period of the year will not allow for formation and accumulation and subsequent melting of snow - the main source that determines the appearance of high spring waters. In this sense, all parameters of high spring water - maximum and average flow, duration, frequency, flood areas - will decrease. The number of years without occurrence of high spring waters will increase. In case of regularized rivers, it is necessary to comply with the regulations for use of hydrotechnical facilities. **Large rivers**: in the natural regime the processes are the same as in case of small and medium rivers. Under conditions of water flow regularization, it will be necessary to plan for ecological spring floods to ensure the volumes of water necessary for development of biodiversity and fish reproduction. The fish spawning period will be affected, as well as the number of species and the stock of fish.	**Medium and small rivers** - high **Large rivers** - high
	Increase in air temperatures, evaporation	**Water temperature**	**The general trend**: increase **Large, medium and small rivers**: as air temperature increases, water temperature also increases in all seasons. This fact will change the water ecosystem, increase the degree of eutrophication, water pollution, disappearance of unadapted species, appearance of invasive species. It will also decrease water availability, increase the cost of drinking water treatment and waste water treatment.	**Medium and small rivers** - high **Large rivers** - medium
	Increase in air temperatures, evaporation, duration of warm period, consecutive dry days.	**Volume of sediment transported by rivers**	**General trend:** decrease **Large, medium and small rivers:** in the natural regime, in the context of reducing water flow, the water speed will decrease as well as the volume of sediments transported by rivers. In a regulated regime, rivers will show reduction of the sediment regime due to dams. The reduction of the water bed change processes, the stabilization of the beds will occur. It should be noted that the increase in frequency of torrential precipitation and lack of protective forest belts will increase slope erosion and the degree of clogging of rivers and water accumulation.	**Large, medium and small rivers** - high
	Increase in air temperatures, reduction in frequency of occurrence and features of winter phenomena	**Ice thickness, winter phenomena on rivers**	**General trend**: decrease **Large, medium and small rivers**: the increase of winter air temperatures above 0°C will not allow the occurrence of winter events and, respectively, snow and ice and other winter phenomena on rivers. The number of years without the occurrence of winter phenomena on rivers will increase	**Large, medium and small rivers** - high
	Increase in air temperatures, evaporation, duration of warm period, consecutive dry days.	**Water quality**	**General trend:** worsening **Large, medium and small rivers:** in the context of reducing water resources, the concentration of pollutants in rivers will increase, the degree of water pollution will increase; on the other hand, frequent floods and flash floods can worsen the water resource quality due to flooding of important sources of pollution and risk of pathogens proliferation. It will increase the cost of drinking water treatment and wastewater treatment.	**Medium and small rivers** - high **Large rivers** - medium
	Increase in air temperatures, evaporation, consecutive dry days. Precipitation instability and variability	**Groundwater (reserves, volumes, levels)**	**General trend:** decrease The basic source of groundwater supply is atmospheric precipitation and surface water in the supply areas of horizons and aquifer complexes. Taking into account the fact that surface water volumes tend to decrease, and the nature of precipitation is changing, the level, reserves, volumes of underground water will tend to decrease. Water availability will decrease, especially in rural areas.	**Medium**
	Increase in air temperatures, evaporation, consecutive dry days. Precipitation instability and variability	**Phreatic water (reserves, volumes, levels)**	**General trend:** decrease The basic source of the water table supply is atmospheric precipitation. Taking into account the fact that surface water volumes tend to decrease, and the nature of precipitation is changing, the level, reserves, volumes of phreatic water will tend to decrease, this being accentuated. Water availability will decrease, especially in rural areas	**High**

Area	Climate event / exposure	Hydrological indicators	Associated climate change impact and risks	Type of impact
Socio-economic	Increase in air temperatures, evaporation, consecutive dry days. Precipitation instability and variability	**Captured water (water needs)**	**General trend**: increase **Medium and small rivers**: in the context of climate aridification, the need for water will increase in all social and economic sectors, the volumes of captured water will increase, the risk of rivers drying up is a big fact that raises the need for the rational use and protection of rivers. It is not recommended to collect water from small and medium rivers. **Large rivers:** Large rivers are the main source of water for municipalities, agriculture (irrigation), etc. In the context of climate aridization, the need for water will increase in all social and economic sectors, the volume of captured water will increase, but taking into account the fact that large rivers are regulated and the minimum flow must be maintained according to regulations on operation of hydrotechnical facilities, the risk of water shortage will be medium. **Water reservoirs:** Large accumulation lakes are important sources of water for all economic sectors, they are meant to regulate the flow of large rivers, especially during flood and drought periods. In this sense, the volumes of captured water will increase, but additional measures will be needed to regulate the water flow, to maintain the minimum and ecological flow downstream of the hydrotechnical facilities. **Phreatic water/groundwater:** being the most important source of water in rural localities, water taken from the underground will increase significantly, the risk of mine wells drying up will increase. Water availability will decrease, especially in rural areas.	**Medium and small rivers** - high **Large rivers** - medium **Phreatic / underground waters** - high
	Increase in air temperature, evaporation, instability and variability of precipitation, natural hazards	**Water volumes used in** ▪ **Social protection** ▪ **Agriculture** ▪ **Livestock** ▪ **Industry** ▪ **Fish farming** ▪ **Forestry** ▪ **Tourism and leisure** ▪ **Transport – navigation** ▪ **Heat production**	**General trend:** increase ***Social protection*** – increased volumes of water will be needed for water supply to the population, in particular, during occurrence of natural hazards such as droughts and floods, as well as to address various hazards such as forest fires, the number of which will increase, etc. ***Agriculture*** - volumes of water captured and used for agricultural needs, including irrigation, will increase significantly, the need to provide to plants with sufficient water resources will increase significantly, particularly dangerous will be periods of drought that will affect the agricultural sector to a great extent ***Livestock*** - the need for water to provide water to livestock will increase ***Industry*** – industrial sectors will increase water consumption to maintain, develop and increase production of industrial units. ***Forestry*** – increasing forested areas, young forests, nurseries will determine use of larger volumes of water to ensure the growth of plantations ***Fish farming*** – In case of accumulation lakes, high air temperatures and increased evaporation will cause water volumes to decrease, which will increase the risk of losing large fish volumes. Accordingly, to maintain the sector, measures to provide water resources to the sector or to reorganize it will be necessary. Small rivers and small water bodies are not conducive to development of the sector, they being subject to a high risk of drought ***Tourism and leisure*** – the increase in air temperatures and the warm season will allow the development of types of tourism related to the water sector (especially in the warm season), which will contribute to increase in water demand. ***Transport - navigation*** - in the context of increase in periods with minimum flows due to high temperatures and evaporation, precipitation variability, the navigation capacity of large rivers will be reduced ***Heat production plants*** - without essential changes; in case of higher demand for energy, the need for water will also increase.	**Water volumes used in** ▪ **Social protection** - high ▪ **Agriculture** - high ▪ **Livestock** - medium ▪ **Industry** - medium ▪ **Fish farming** - medium ▪ **Forestry** - medium ▪ **Tourism and leisure** - medium ▪ **Transport – navigation** - medium ▪ **Heat production** - medium
	Increase in air temperatures, evaporation instability and precipitation variability	**Discharged wastewater**	**General trend:** increase **Medium and small rivers:** the volumes of water used and discharged within the localities will increase, due to increase in water needs and, respectively, of water capture, which will contribute to increase in water volumes of medium and small rivers, change in their hydrological regime, but it will also worsen the quality of the rivers if wastewater does not pass through treatment systems. **Large rivers:** volumes of discharged water will have a medium impact on the hydrological regime and quality regime of large rivers **Phreatic water/groundwater:** not discharged	**Medium and small rivers** - high **Large rivers** – medium **Phreatic/ underground water** - low
	Increase in air temperatures, evaporation, consecutive dry days, instability and variability of precipitation, droughts	**Water infrastructure**	**General trend**: increasing needs Taking into account the fact that about 90% of the population has access to water supply systems, and only 42% has access to sanitation systems, and the increasing volumes of captured and discharged water, the need to provide water supply and sanitation systems will increase. In the same context, for purification of the increasing volumes of water used it will be necessary to increase the number and capacity of purification plants. It will also be necessary to increase the quality of the water infrastructure in order to reduce transport losses. In agriculture, irrigation plays a major primary role for development of the sector; in this sense, the infrastructure need for development of irrigation will increase.	**Large needs**

The modelling of the annual water runoff for the **2021-2040** period shows that the water runoff layer will decrease by 20% on the average, for the entire territory of the country for all scenarios, without large regional changes.

The runoff layer for the **2041-2060** period differs from one scenario to another and from one region to another. Water runoff in the north and center of the country will decrease by about 25% in case of the SSP1-2.6 scenario, 37% - for SSP2-4.5 and 52% - for SSP5-8.5. The change in water runoff towards decrease in the south region is higher as compared to the others by about 2-3% for all scenarios.

For the **2081-2100** period, the most significant reductions in water runoff were obtained. In the north of the country, the decrease in water runoff will be about 29% in case of the SSP1-2.6 scenario, 52% - for SSP2-4.5 and 77% - for SSP5-8.5. In the center region the values are similar, while in the south region the decrease for the SSP5-8.5 scenario will reach even 80.6%.

Runoff modelling under the **SSP1-2.6** scenario shows the smallest changes in this feature. The decrease in water runoff will amount to about 22-29% for the North of the country, 22-28% - for the Centre and 23.6-27.0% - for the South of the country, with larger changes being specific for the end of the century.

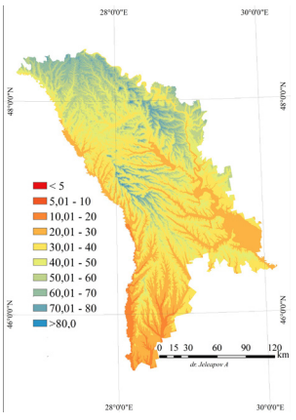


Figure 3-9: Annual water runoff, baseline period

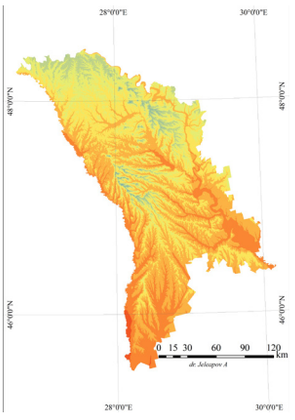


Figure 3-10: Annual water runoff, SSP1-2.6, 2021-2040

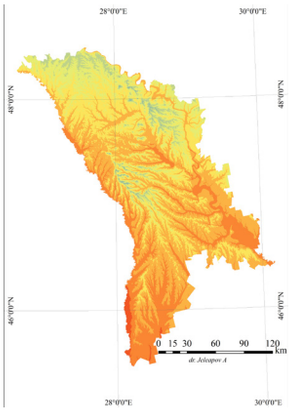


Figure 3-11: Annual water runoff, SSP1-2.6, 2041-2060

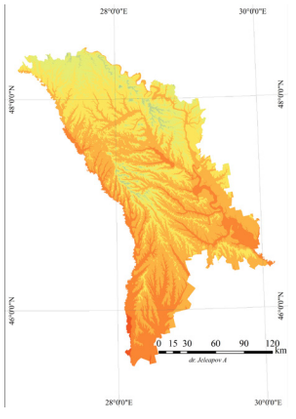


Figure 3-12: Annual water runoff, SSP1-2.6, 2081-2100

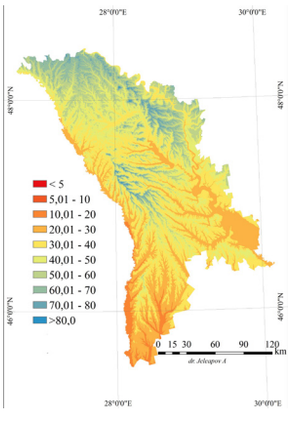


Figure 3-13: Annual water runoff, baseline period

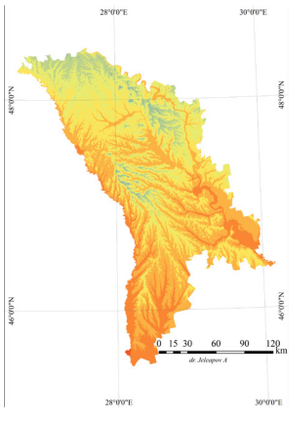


Figure 3-14: Annual water runoff, SSP2-4.5, 2021-2040

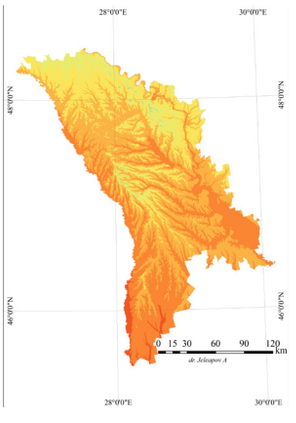


Figure 3-15: Annual water runoff, SSP2-4.5, 2041-2060

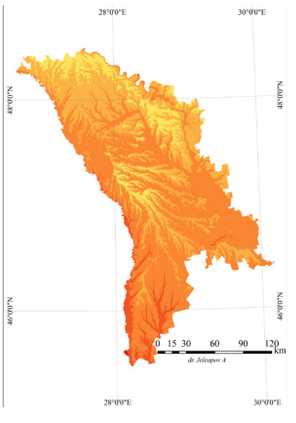


Figure 3-16: Annual water runoff, SSP2-4.5, 2081-2100

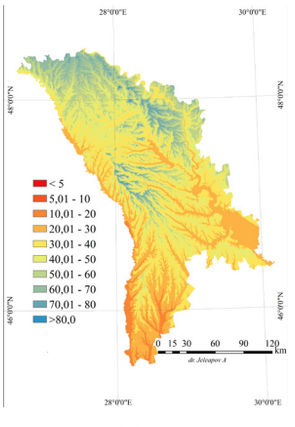


Figure 3-17: Annual water runoff, reference period

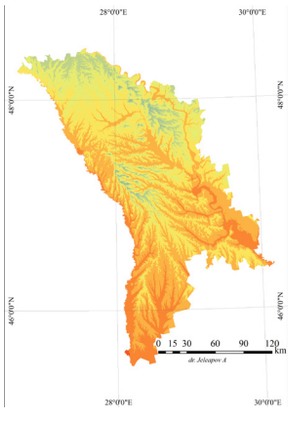


Figure 3-18: Annual water runoff, SSP5-8.5, 2021-2040

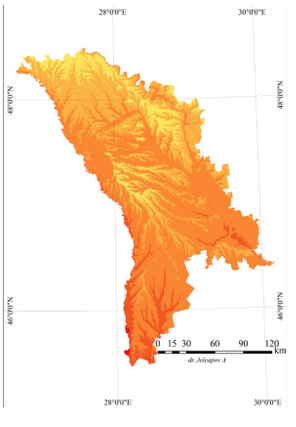


Figure 3-19: Annual water runoff, SSP5-8.5, 2041-2060

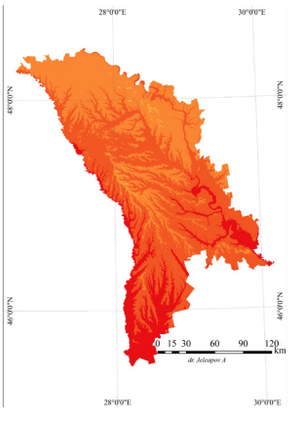


Figure 3-20: Annual water runoff, SSP5-8.5, 2081-2100

The runoff layer modelled under the **SSP2-4.5** scenario shows higher decrease for the three periods. Thus, for the 2021-2040 period, the decrease in water runoff will be about 19% for all development regions, for 2041-2060, the decrease will be already 36-39%, being higher in the South, and for the period 2081-2100, the runoff decrease will be about 50%.

Under the **SSP5-8.5** scenario, water runoff will show smaller changes, of around 20%, for the 2021-2040 period, larger changes, of around 51-54%, for the 2041-2060 period, and significant decrease towards the end of the century, the 2081-2100 period, of about 76-81%. Greater decrease is specific for the southern part of the country.

3.2.3.3. Vulnerability assessment of the agriculture sector to climate change

One of the sectors of strategic importance for the country - the agricultural sector is largely dependent on climate. Drought, floods and extreme weather events are the most recurring threats, exacerbated by climate change. In order to form the composite index and assess the vulnerability of the agricultural sector in the Republic of Moldova to climate change, a set of indicators was determined. The indicators were chosen based on previous studies in the field (Loi et al., 2022), (Choudhary & Sirohi, 2022), having been selected depending on the relevance for the specifics of the country and the availability of statistics on territories.

Climate vulnerability assessment involves identifying the negative impact of climate change on the agricultural sector. The calculation of specific indicators for evaluating "Sensitivity" and "Adaptive capacity" of the agricultural sector was carried out by districts of the Republic of Moldova for a period of 15 consecutive years (2008-2022), taking into account the availability of regional statistical data.

In order to evaluate the ***sensitivity pillar of the agricultural sector***, 57 indicators were used, grouped into nine sub-indices. The calculations results are presented in Figure 3-21.

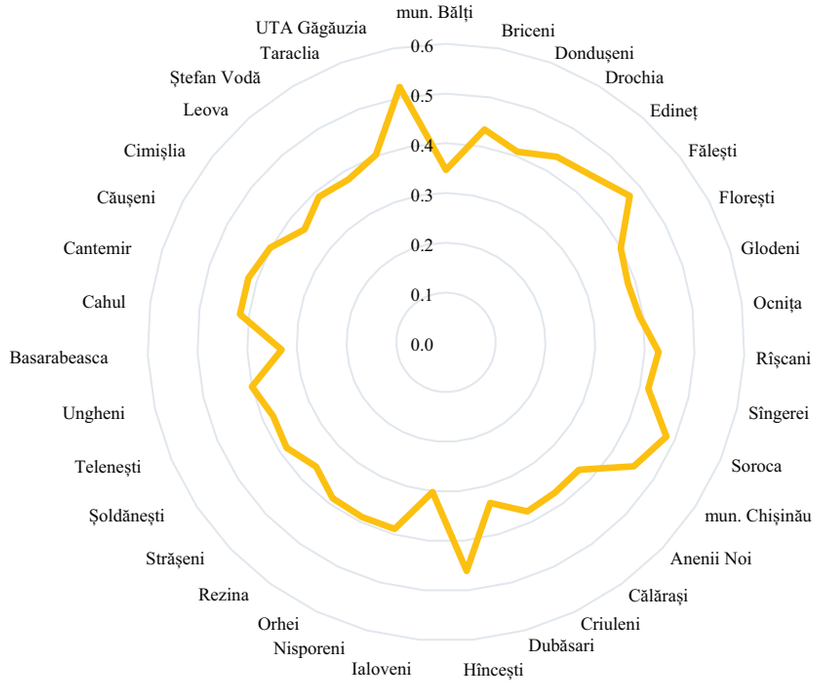


Figure 3-21: The "sensitivity" index of the agricultural sector in territories of the Republic of Moldova, average for the 2008-2022 period.

The analysis of the sensitivity index value of the agricultural sector in the Northern Region reveals that the districts of Soroca (0.4818), Fălești (0.4723) and Edineț (0.4450) are the most sensitive to climate change. In Soroca district the high sensitivity of the agricultural sector is conditioned by the low average yield per hectare of field vegetables, fruit plantations (nut trees, fruit trees), the relatively high herd of horses and cattle, insufficient water supply and sanitation systems in the rural space, high rate of ageing population in rural areas. In Fălești district, the high sensitivity is caused by the low average yield per hectare of fruit plantations, relatively high herd of horses and cattle, insufficient water supply and sanitation systems in the countryside, as well as large volume of waste generation from production and consumption. Also, the lowest level of agricultural sensitivity was registered by Bălți municipality (0.3465).

In the Central Region, the agricultural sector is most sensitive to climate change in Hâncești district (0.4610) and Chișinău municipality (0.4525). The high level of agricultural sensitivity in Hîncești district is determined by the relatively low average yield per hectare of cereal and leguminous crops, multi-year plantations (apple trees and vines), the relatively high herd of horses and cattle, insufficient sewage systems in the countryside, the high demographic load index in rural areas. Ialoveni (0.3021) has recorded the lowest level of agriculture sector sensitivity in the country, while Dubăsari (0.3344) registered the lowest level of agricultural sector sensitivity.

In the Southern Region, the highest level of the agricultural sector sensitivity is recorded in ATU Gagauzia (0.5212) (being the highest level in the country), as well as in Cahul (0.4181) and Cantemir (0.4176) districts. At the same time, Basarabeasca district (0.3311) has shown the lowest level of agriculture sector sensitivity in Southern region.

The ***adaptive capacity pillar of the agricultural sector*** to climate change consists of 33 indicators, grouped into seven sub-indices. The calculation results are presented in Figure 3-22.

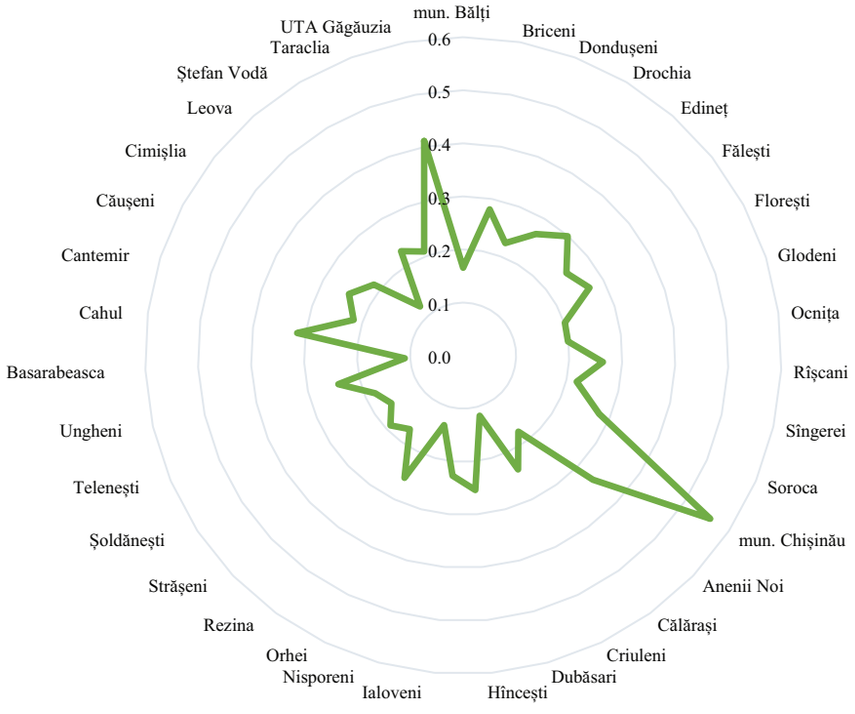


Figure 3-22: The "adaptive capacity" index of the agricultural sector in territories of the Republic of Moldova, average for the 2008-2022 period.

The level of the adaptive capacity of the agriculture sector to climate change is the highest in Chișinău municipality (0.5582), ATU Găgăuzia (0.4109), Anenii Noi (0.3387), Cahul (0.3161) and Edineț (0.2991). The lowest levels of adaptive capacity of the agricultural sector were recorded in Basarabeasca (0.1104), Dubăsari (0.1174) and Leova (0.1232) districts.

The review of the value of the adaptive capacity integral index in the agricultural sector in the districts of the North Region shows that the highest levels of adaptability were recorded in Edineț (0.2991), Briceni (0.2803) and Soroca (0.2791) districts, and the lowest level - in Bălți municipality (0.1655). The high level of adaptability in Edineț district is conditioned by the financial outcomes of the economic operators before taxes in agriculture, forestry and fishing sectors; relatively lower amounts of current and long-term debts of economic operators in agriculture, forestry and fishing sectors; production volume of vegetable and fruit juices, vegetable and fruit preserves; average annual high egg production per laying hen; average annual amount of milk per cow in agricultural enterprises and small household farms; the amount of subsidies authorized by AIPA for agricultural producers; the number of files authorized by AIPA for subsidizing agricultural producers; length of national roads, etc.

In the Central Region, the highest adaptive capacity of the agricultural sector was found in Chișinău municipality (0.5582) and Anenii Noi district (0.3387), while the lowest level was registered in Dubăsari (0.1174) and Nisporeni districts (0.1359). The high level of adaptability in Anenii Noi district is determined by the indicators: relatively high sales revenues of economic operators in agriculture, forestry and fishing sectors; relatively lower values of current and long-term debts of economic operators in agriculture, forestry and fishing sectors; meat production volume; livestock breeding in agricultural enterprises and small household farms; average annual amount of milk per cow, average annual amount of wool sheared per sheep, average annual production of eggs per laying hen in agricultural enterprises and small household farms, etc.

In the Southern Region, ATU Gagauzia (0.4109) and Cahul district (0.3161) showed the highest adaptive capacities of the agricultural sector. At the same time, Basarabeasca (0.1104) and Leova (0.1232) districts have the lowest level of adaptive capacity to climate change. The high level of adaptation of ATU Gagauzia is determined by high values of the following indicators: revenue from sales of economic operators in agriculture, forestry and fishing sector; financial results of economic operators before taxes in agriculture, forestry and fishing sector; number of enterprises in agriculture, forestry and fishing sector that obtained profit; own capital of economic operators in the agriculture, forestry and fishing sector; flour production volume; production volume of natural wines from grapes; amount of subsidies authorized by AIPA for agricultural producers; length of national roads, etc.

Climate vulnerability of the agricultural sector is assessed as a function of exposure, sensitivity and adaptive capacity. The analysis of the vulnerability index shows that agriculture sector is most vulnerable to climate change in the following districts: Leova (Southern Region), Nisporeni and Hîncești (Central Region), Fălești (Northern Region). The least vulnerable are Chișinău municipality, Anenii Noi (Central Region) and Cahul districts (Southern Region) (Figure 3-23).

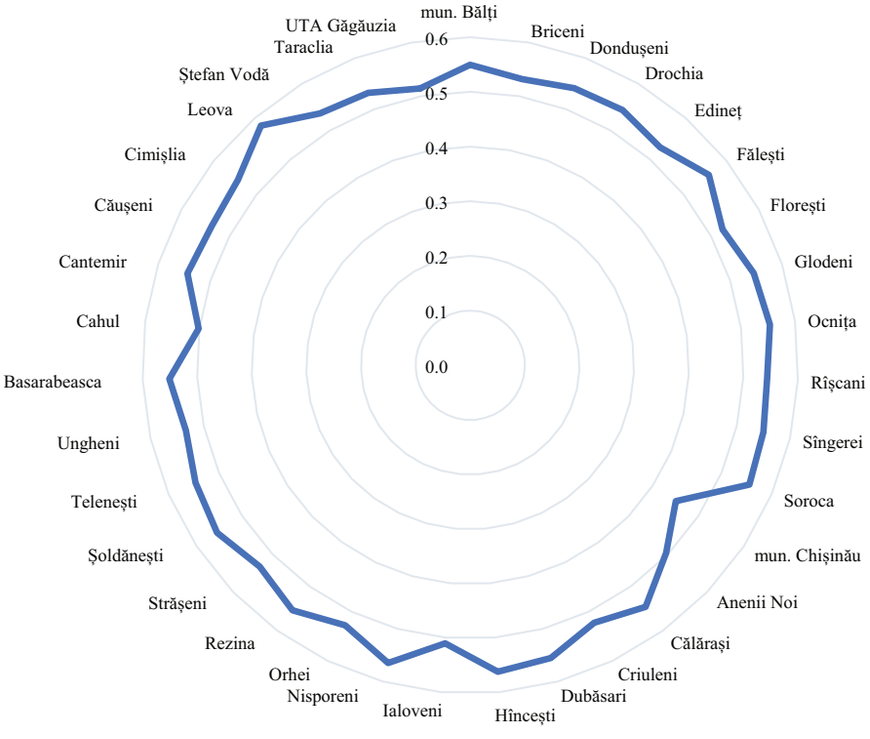


Figure 3-23: The Climate Vulnerability Index of the agricultural sector in territories of the Republic of Moldova, average for the 2008-2022 period

For the division of districts according to the degree of exposure (Table 3-5), sensitivity, adaptive capacity and vulnerability degree, the criterion described in Tables 3-12 – 3-14 was used, and obtained results are shown in Table 3-15.

Table 3-12: Division criterion by sensitivity degree of the agriculture sector

Range	Sensitivity degree (*S*)
$0.3021 \leq S_i < 0.3380$	Very low sensitivity degree
$0.3380 \leq S_i < 0.3740$	Low sensitivity degree
$0.3740 \leq S_i < 0.4099$	Medium sensitivity degree
$0.4099 \leq S_i < 0.4459$	High sensitivity degree
$0.4459 \leq S_i$	Very high sensitivity degree

Table 3-13: Division criterion by adaptive capacity of agriculture sector

Range	Adaptive capacity (*AC*)
$0.1104 \leq AC_i < 0.1705$	Very low adaptive capacity
$0.1705 \leq AC_i < 0.2306$	Low adaptive capacity
$0.2306 \leq AC_i < 0.2907$	Medium adaptive capacity
$0.2907 \leq AC_i < 0.3508$	High adaptive capacity
$0.3508 \leq AC_i$	Very high adaptive capacity

Table 3-14: Division criterion by vulnerability degree of agriculture sector

Range	Vulnerability degree
$0.4506 \leq CVI_i < 0.4769$	Very low vulnerability degree
$0.4769 \leq CVI_i < 0.5032$	Low vulnerability degree
$0.5032 \leq CVI_i < 0.5294$	Medium vulnerability degree
$0.5294 \leq CVI_i < 0.5557$	High vulnerability degree
$0.5557 \leq CVI_i < 0.5820$	Very high vulnerability degree

Table 3-15: Climate Vulnerability Index of the agriculture sector

	E	S	AC	CVI	Rank	Climate vulnerability degree
Balti municipality	0.4674	0.3465	0.1655	0.5495	12	High
Briceni	0.4406	0.4349	0.2803	0.5317	26	High
Dondușeni	0.4406	0.4089	0.2262	0.5411	20	High
Drochia	0.4636	0.4340	0.2666	0.5437	18	High
Edineț	0.4406	0.4450	0.2991	0.5288	27	Medium
Fălești	0.4531	0.4723	0.2491	0.5588	4	Very high
Florești	0.4440	0.3988	0.2702	0.5242	29	Medium
Glodeni	0.4531	0.3845	0.2013	0.5454	15	High
Ocnița	0.4674	0.3925	0.1995	0.5535	9	High
Rîșcani	0.4674	0.4278	0.2638	0.5438	17	High
Sîngerei	0.4531	0.4168	0.2198	0.5500	11	High
Soroca	0.4636	0.4818	0.2791	0.5554	5	High
Chișinău municipality	0.4574	0.4525	0.5582	0.4506	35	Very low
Anenii Noi	0.4574	0.3702	0.3387	0.4963	34	Low
Călărași	0.4419	0.3728	0.1768	0.5460	14	High
Criuleni	0.4283	0.3767	0.2378	0.5224	30	Medium
Dubăsari	0.4483	0.3344	0.1174	0.5551	7	High
Hîncești	0.4809	0.4610	0.2543	0.5625	3	Very high
Ialoveni	0.4574	0.3021	0.2272	0.5108	32	Medium
Nisporeni	0.4419	0.3888	0.1359	0.5649	2	Very high
Orhei	0.4483	0.3893	0.2555	0.5274	28	Medium
Rezina	0.4440	0.3875	0.1710	0.5535	8	High
Strășeni	0.4283	0.3611	0.1900	0.5331	24	High
Șoldănești	0.4440	0.3842	0.1625	0.5552	6	High
Telenești	0.4419	0.3780	0.1807	0.5464	13	High
Ungheni	0.4419	0.4002	0.2417	0.5335	23	High
Basarabeasca	0.4327	0.3311	0.1104	0.5511	10	High
Cahul	0.4025	0.4181	0.3161	0.5015	33	Low
Cantemir	0.4327	0.4176	0.2173	0.5443	16	High
Căușeni	0.4559	0.4011	0.2448	0.5374	21	High
Cimișlia	0.4809	0.3641	0.2150	0.5433	19	High
Leova	0.4809	0.3884	0.1232	0.5820	1	Very high
Ștefan Vodă	0.4559	0.3819	0.2289	0.5363	22	High
Taraclia	0.4025	0.4022	0.2094	0.5318	25	High
UTA Găgăuzia	0.4327	0.5212	0.4109	0.5143	31	Medium

Most districts of the Republic of Moldova registered a high (22 districts) or very high (4 districts) level of climate vulnerability of the agricultural sector. It should be noted that all districts in the North Region have proven to be vulnerable to climate change. It should also be noted that only one territory recorded a very low vulnerability degree (Chișinău municipality). Also, two districts recorded a low vulnerability degree (Anenii Noi, Cahul) and six districts – an average vulnerability degree. In general, we conclude that climate vulnerability of the agricultural sector is uneven territorially, primarily showing a high and very high level of climate vulnerability of the agricultural sector.

In the Northern Region, out of 12 districts, 10 (83%) recorded a "very high vulnerability degree" and "high vulnerability degree", while a "medium vulnerability degree" to climate risks was found in Edineț (0.5288) and Florești (0.5242) districts. In the Central Region, out of 14 districts, 9 (64%) recorded a "very high vulnerability

degree " and a "high vulnerability degree", while a "medium vulnerability degree" to climate risks was found in Orhei (0.5274), Criuleni (0.5224) and Ialoveni (0.5108) districts, and the one with a "low vulnerability degree" was Anenii Noi district (0.4963) and a "very low vulnerability degree" was found for Chișinău municipality (0.4506). In the Southern Region, out of 9 districts, 7 (78%) recorded a "very high vulnerability degree" and a "high vulnerability degree", while a "low vulnerability degree " was found in Cahul district (0.5015).

3.2.3.4. Vulnerability from the morbidity perspective of three classes of nosologies and dependence on air temperature and morbidity trends

In order to explain the multiannual dynamics of the number of diseases influenced by outdoor air temperature, the dynamics of average, maximum and minimum air temperatures was reviewed. Between 2004 and 2023, five peaks were recorded for all three air temperature features: the most pronounced peak was in 2023 and 2020 for all three elements, followed by 2019 for mean and maximum temperatures. Mean and minimum temperatures ranked third since 2007. The fourth year with all three high temperature features was the year of 2015. From the assessment, the increase in the frequency of high temperature years is observed, with 4 high temperature years over the last decade.

Prevalence of circulatory system diseases in adults registered a continuous upward trend with a significant coefficient of determination ($R^2 = 0.92$). During the 18 years analyzed (2004-2021), the prevalence increased 4.6 times and showed a pattern similar to the trend of mean, maximum and minimum temperatures. The highest peak for the prevalence of cardiovascular morbidity in adults begins in 2019 and increases further in 2020 and 2021 (Figure 3-24). The dynamics by linear regression between all three air temperature features and cardiovascular morbidity is obvious in Figure 3-25. Correlation analysis shows a strong positive correlation ($R^2 = 0.70$), scientifically significant ($p<0.001$) with mean and maximum temperatures and a medium positive correlation ($R^2 = 0.59$), scientifically significant ($p<0.05$) with mean temperature.

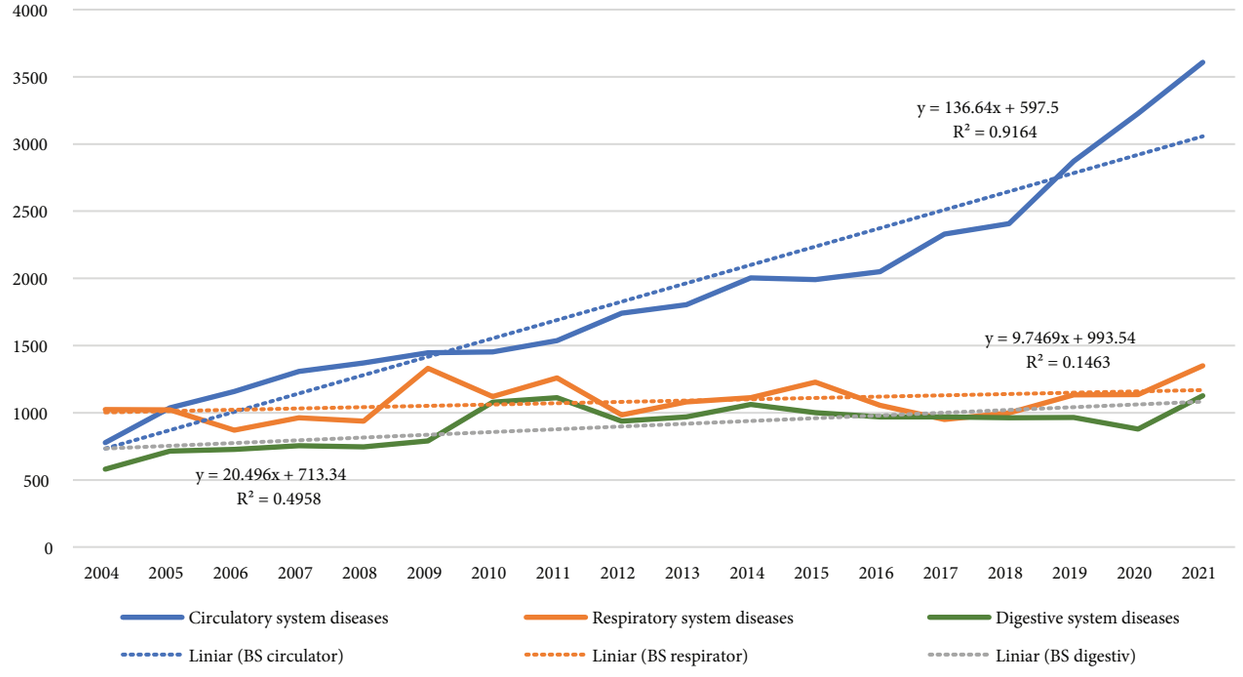


Figure 3-24: Dynamics of prevalence registered in adults (in 10,000 population).

Prevalence of respiratory system diseases in adults has shown a slowly increasing pattern, the number of cases in 2021 being only 1.3 times higher than in 2004 and even if it shows peaks in increase in number of disease cases in years 2009, 2011, 2015, 2019, 2020, 2021, the coefficient of determination is not significant ($R^2 = 0.15$) (Figure 3-24). In comparison to air temperature values, the respiratory system diseases follow the increase in the years 2015, 2019, 2020. Figure 3-26 shows that the peaks of increased morbidity due to respiratory system diseases do not completely coincide with warm years, especially the increased morbidity in years 2009 and 2011. Correlation analysis of respiratory system diseases and mean, maximum and minimum temperature shows a lack of correlation and statistical significance.

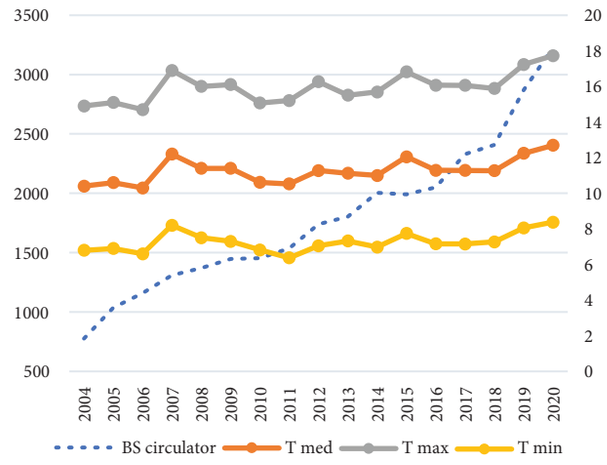


Figure 3-25: Dynamics and overlap of the prevalence of circulatory system diseases in adults and the mean, maximum and minimum air temperature.

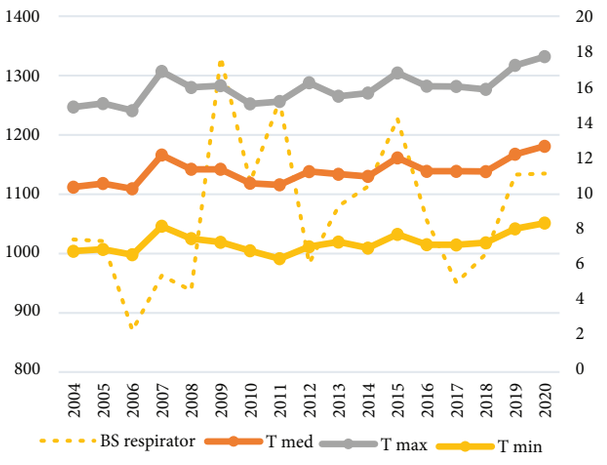


Figure 3-26: Dynamics and overlap of prevalence of respiratory system diseases in adults and mean, maximum and minimum air temperature.

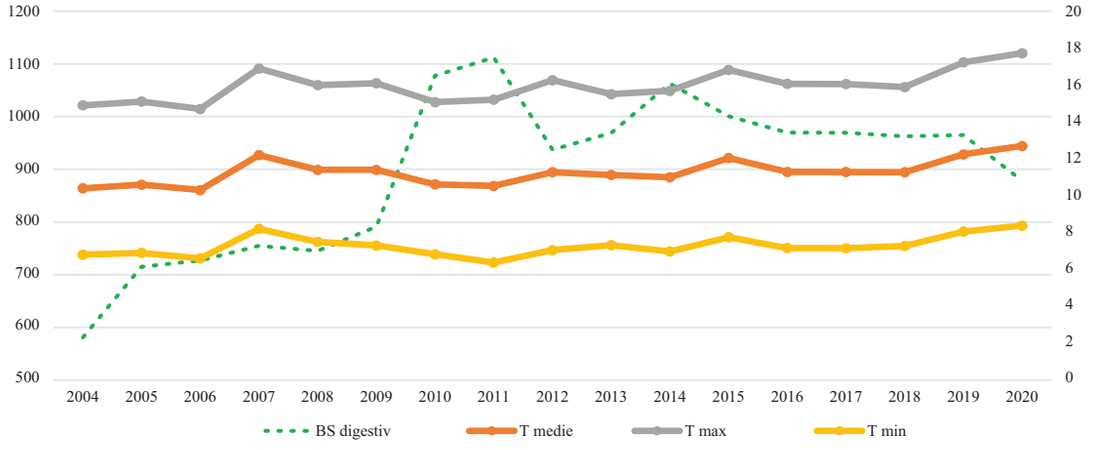


Figure 3-27: Dynamics and overlap of prevalence of digestive system diseases in adults and at mean, maximum and minimum air temperatures

During the 2004-2021 period, *prevalence of digestive system diseases in adults* showed a slow increase, practically doubling in number towards the year 2021 as compared to 2004, also confirmed by the coefficient of determination with a mean significance ($R^2 = 0.50$). During this period, most cases were registered in the years 2010, 2011, 2014, 2015 and 2021 (Figure 3-24). Analyzing the overlay graph with the temperature specifics, the non-coincidence between the temperature peaks and the years with a large number of cases of digestive system diseases can be observed (Figure 3-27). The correlation analysis shows a very strong correlation ($R^2 = 0.99$), scientifically significant ($p<0.001$) between the number of cases of digestive system diseases with the maximum temperature, while no correlation exists with mean and minimum temperatures.

Incidence of circulatory system diseases in adults registered a figure 1.5 times higher in 2021 than in 2004, but in 2012 and 2013 the number of new cases of diseases was higher than in 2021. The trend line shows an increase in the number of cases with an insignificant coefficient of determination ($R^2 = 0.14$) (Figure 3-28). In Figure 3-29, the incidence peaks in the years 2005, 2012-2013 and 2017 are obvious, which are not in line with the peaks of high temperature years. Correlation analysis also shows a lack of correlation of the incidence with all three temperature features.

Incidence of the respiratory system diseases in adults, during the studied period, shows a slightly increasing trend, but with an insignificant coefficient of determination. A 1.3-fold increase in incidence was found during the studied period (Figure 3-28). A greater number of new cases of respiratory diseases was registered in 2009, 2011, 2015 and 2019, thus the coincidence of the high number of disease cases and air temperatures is found in the years 2015 and 2019 (Figure 3-30), while the correlation link is missing.

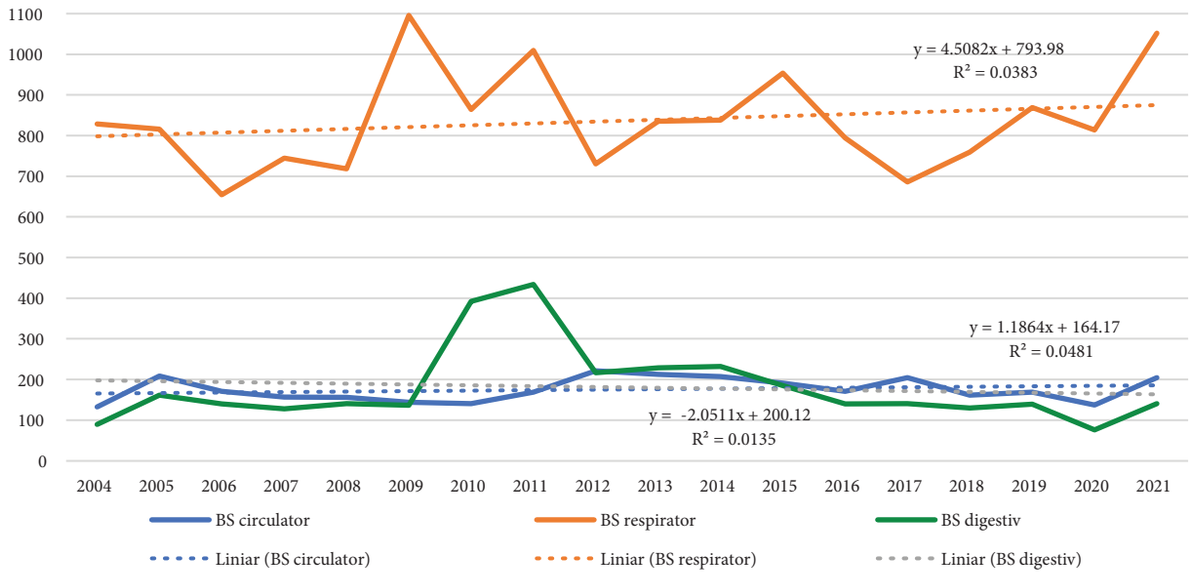


Figure 3-28: Dynamics of incidence recorded in adults

Incidence of the digestive system diseases in adults registered a most dramatic increase in 2010-2011, which can be assumed to have been strongly influenced by the floods of 2010, while the multi-year dynamics shows a decreasing trend (Figure 3-28). In 2021, the incidence was 1.6 times higher than in 2004, but the average number of new cases for an 18-year period was higher (171 cases) than in 2021 (141 cases) (Figure 3-31). The correlation analysis of the incidence with the maximum temperature, as in the case of prevalence of digestive system diseases, shows a very strong ($r=0.99$) and statistically significant ($p<0.001$) correlation. There is a medium correlation of incidence with mean and minimum temperatures; however, it is a statistically insignificant correlation ($p>0.05$) and of reverse direction, which has no value for this study.

In the *prevalence analysis of cases of circulatory system diseases in children*, a downward trend was recorded, with a significant determination index ($R^2 = 0.7$), while the correlation with all three characteristics of the ambient air temperature is inverse and statistically insignificant ($p>0.05$). The prevalence peaks were found in the years 2005-2006, 2010, 2014, which absolutely does not correspond to high temperature years.

A positive trend is registered in *prevalence of cases of respiratory system diseases in children* with a greater number of cases during the years 2009-2019, but the coefficient of determination is insignificant ($R^2 = 0.07$). There is no correlation between prevalence of cases of respiratory system diseases with the mean, maximum and minimum temperature of the atmospheric air.

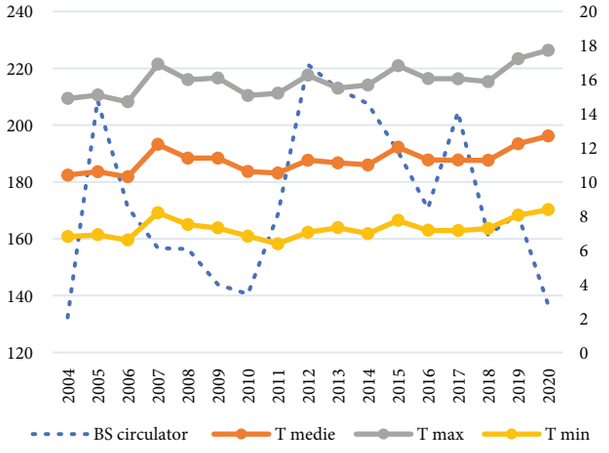


Figure 3-29: Dynamics and overlap of the incidence of circulatory system diseases in adults and of the mean, maximum and minimum air temperature.

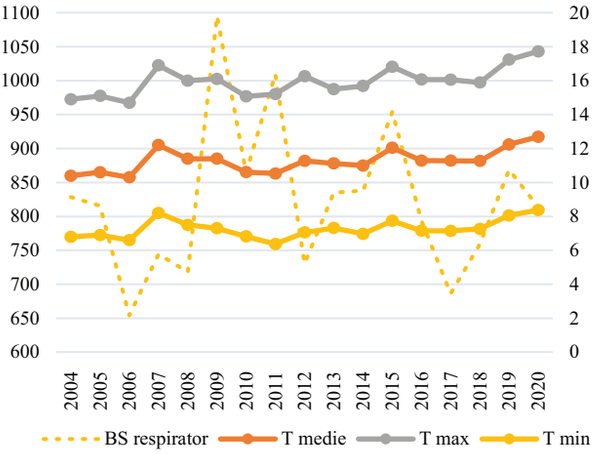


Figure 3-30: Dynamics and overlap of the incidence of respiratory system diseases in adults and of the mean, maximum and minimum air temperature.

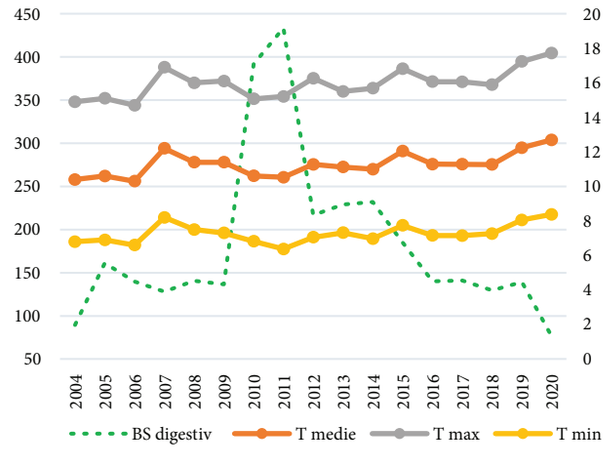


Figure 3-31: Dynamics and overlap of the incidence of digestive system diseases in adults and of the mean, maximum and minimum air temperatures.

Prevalence of the digestive system diseases in children shows a decreasing trend with a significant determination index ($R^2 = 0.6$). A slight increase in prevalence was recorded between 2010 and 2013, following the flood of 2010. As in the case of prevalence of the digestive system diseases in adults - in children, there is also a very strong correlation ($r = 0.99$, $p < 0.001$) of the number of cases with the maximum temperature, while no correlation is found with the mean and minimum temperatures (Table 3-16, Figure 3-32).

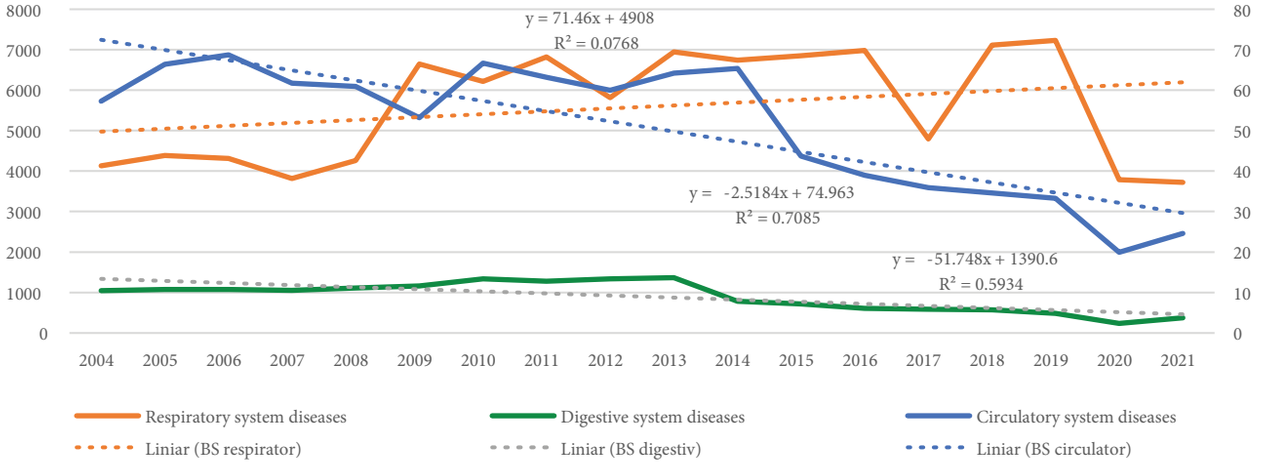


Figure 3-32: Prevalence pattern in children.

Table 3-16: Correlation of the circulatory, respiratory and digestive systems diseases with mean, maximum and minimum air temperatures

Indices	Coefficient of correlation (r)	Strength of correlation	Scientific significance
Prevalence in adults			
r(BScirc, Tmed)	0.70	Strong correlation	p<0.001
r(BScirc, Tmax)	0.74	Strong correlation	p<0.001
r(BScirc, Tmin)	0.59	Mean correlation	p<0.05
r(BSresp, Tmed)	0.20	No correlation	p>0.05
r(BSresp, Tmax)	0.22	No correlation	p>0.05
r(BSresp, Tmin)	0.07	No correlation	p>0.05
r(BSdig, Tmed)	0.11	No correlation	p>0.05
r(BSdig, Tmax)	0.99	Very strong correlation	p<0.001
r(BSdig, Tmin)	-0.08	No correlation	p>0.05
Incidence in adults			
r(BScirc, Tmed)	-0.12	No correlation	p>0.05
r(BScirc, Tmax)	-0.09	No correlation	p>0.05
r(BScirc, Tmin)	-0.20	No correlation	p>0.05
r(BSresp, Tmed)	0.06	No correlation	p>0.05
r(BSresp, Tmax)	0.07	No correlation	p>0.05
r(BSresp, Tmin)	-0.04	No correlation	p>0.05
r(BSdig, Tmed)	-0.43	Weak correlation	p>0.05

Indices	Coefficient of correlation (r)	Strength of correlation	Scientific significance
r(BSdig, Tmax)	0.99	Very strong correlation	p<0.001
r(BSdig, Tmin)	-0.53	Mean correlation	p>0.05
Prevalence in children			
r(BScirc, Tmed)	-0.69	Mean correlation	p>0.05
r(BScirc, Tmax)	-0.72	Strong correlation	p>0.05
r(BScirc, Tmin)	-0.60	Mean correlation	p>0.05
r(BSresp, Tmed)	-0.01	No correlation	p>0.05
r(BSresp, Tmax)	0.01	No correlation	p>0.05
r(BSresp, Tmin)	-0.15	No correlation	p>0.05
r(BSdig, Tmed)	-0.61	Mean correlation	p>0.05
r(BSdig, Tmax)	0.99	Very strong correlation	p<0.001
r(BSdig, Tmin)	-0.55	Mean correlation	p>0.05
Incidence in children			
r(BScirc, Tmed)	0.50	Weak correlation	p>0.05
r(BScirc, Tmax)	0.50	Mean correlation	p>0.05
r(BScirc, Tmin)	0.49	Weak correlation	p>0.05
r(BSresp, Tmed)	0.53	Mean correlation	p>0.05
r(BSresp, Tmax)	0.54	Mean correlation	p>0.05
r(BSresp, Tmin)	0.51	Mean correlation	p>0.05
r(BSdig, Tmed)	0.50	Weak correlation	p>0.05
r(BSdig, Tmax)	0.54	Mean correlation	p<0.05
r(BSdig, Tmin)	0.48	Weak correlation	p>0.05

The dynamics of *incidence recorded in children* repeats the prevalence trends of all examined nosologies (diseases of the circulatory, respiratory and digestive systems) with an increase in the respiratory system diseases and a downward trend for new cases of respiratory and digestive systems diseases. The determination index is significant for incidence of circulatory system diseases, $R^2 = 0.5$ and insignificant for two out of three nosologies, constituting $R^2 = 0.1$ (respiratory system) and $R^2 = 0.3$ (digestive system). Evaluating the degree of correlation between incidence of circulatory, respiratory and digestive systems diseases, even if it shows a medium or weak correlation, these links are not scientifically significant, except between incidence of digestive system diseases and the maximum air temperature ($r = 0.54$, $p < 0.05$ (Figure 3-33, Table 3-16).

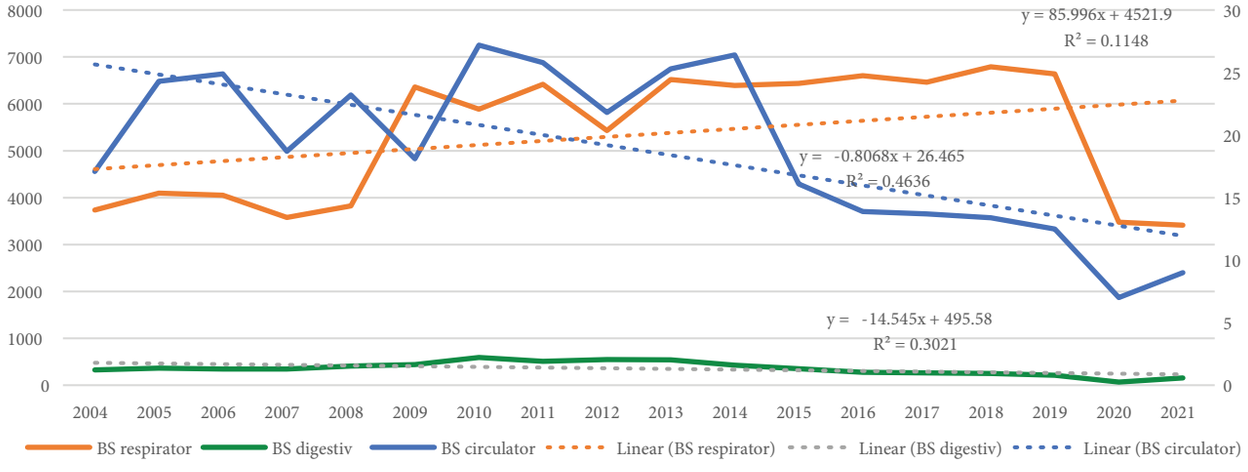


Figure 3-33: Incidence pattern for diseases of the circulatory, respiratory and digestive systems found in children.

3.3. Adaptation to climate change

3.3.1. Adaptation priorities and barriers

Water Resources

Climate change is significantly influencing *water resources*. In order to reduce the pressure of this factor but also to adapt to the new environmental conditions, sustainable management and rational use of these resources must be used at state and local level. In this sense, according to Parliament Decision no. 325/2003 on approval of the Concept

of the national policy in the field of water resources, the main objectives of the national policy in the field of water resources are: a) achieving a stable management of water as a natural component (resource) of the environment and as a social – economic category (commodity); b) creating healthy and harmless conditions for human life[137].

Adaptation priorities for the water resource sector are: improving water resource management, developing modern infrastructure for water capture, storage and distribution; increasing the resilience of hydrotechnical infrastructure, modernizing it to cope with floods and droughts; development of institutional capacities to ensure efficient water resource management; encouraging efficient water use by promoting efficient irrigation technologies and by educating the public about water saving; creation of a water resource monitoring system; investing in research on the impact of climate change on hydrological cycles.

The water resource sector is believed to be very vulnerable to climate change. The *main risks* established in the document refer to increased risk of drought and water shortage leading to increased demand for irrigation; increased flood frequency and intensity of flooding; changes in river flows – both increase and decrease; water pollution with pesticides and fertilizers due to higher runoff; water quality indices (mineralization, hardness, dissolved oxygen, etc.) affected by climatic and non-climatic factors, which will enhance through mutual effect.

The main *barriers* to adaptation of the water resources sector to climate change are: limited financial resources, which prevent implementation of adaptation measures; lack of data and information, which creates deficiencies in implementation monitoring of adaptation measures; limited capacity of institutions responsible for managing water resources; the water infrastructure is outdated and requires modernization; low awareness of the population on the need to save water resources.

Agriculture

Due to its close dependence on climate conditions and weather events, agriculture is one of the most vulnerable sectors to climate change. Droughts, floods and extreme weather events are the most frequent threats, being exacerbated by climate change.

The *adaptation priorities* of the agricultural sector are: development of agricultural technologies resistant to climate change, introduction of plant varieties and animal breeds more resistant to drought and diseases; modernization of irrigation and water storage systems; reducing soil erosion; strengthening institutional capacities and the legal framework to support adaptation of the agricultural sector to climate change.

Risks to the agricultural sector include water shortages for agricultural crops, extreme climatic events (such as hail storms and late spring frosts, major floods and droughts or changes in the plant disease condition following mass proliferation of pests and diseases), which can significantly influence agricultural productivity. Overall, five main risks were identified: high risk of droughts and water scarcity; increased irrigation needs; erosion, soil salinization and desertification; high risk of pests, diseases and weeds; reduction in wheat and corn production.

Also, the following *barriers and challenges* for implementation of climate change adaptation measures in agriculture are mentioned:

- lack of a single platform at government level for interaction between different sectors;
- lack of a sustainable agricultural system, in line with the ecological principles of agriculture intensification;
- lack of a development plan;
- need to restore the seed production system, with prevailing use of varieties and hybrids of local origin, adapted to climate and soil conditions;
- need for awareness building about organic production of agricultural crops, expansion of the market for organic products;
- need to find a balance between cropland, forest land, grassland, etc. in each settlement;
- insufficient systematic scientific research on agricultural production, with proactive participation of agricultural producers;
- increased emigration rates.

[137] <https://www.legis.md/cautare/getResults?doc_id=21445&lang=ro#>.

Energy

The energy sector is vulnerable to climate change, the demand and supply of energy resources is changing; therefore, it is necessary to adapt the sector to ensure the energy security of Moldova. The *adaptation priorities* of the energy sector are: diversification of energy sources, promotion of RES; increasing energy efficiency in all sectors of the national economy; modernization of the energy infrastructure to withstand extreme climate events; increase in investment in research and innovation in the energy sector; development of new energy storage technologies.

Risks of climate change impacts on the energy sector include: increase in energy intensity caused by increase in electricity consumption for air conditioning and irrigation; decrease in the production volume in agriculture, caused by the difficult weather conditions, which will lead to operation of existing equipment below the nominal load level; decrease in the efficiency of heating power plants, caused by increase in air temperature.

The *barriers* to adaptation of the energy sector are: Moldova's dependence on import of energy resources; limited access to funds for investments in new technologies and infrastructure modernization; a significant share of the energy infrastructure is outdated and inefficient; it is vulnerable to climate change impact.

Healthcare

Healthcare sector *adaptation priorities* include: adapting healthcare infrastructure, modernizing buildings and equipment to cope with extreme climate conditions; in the context of epidemic prevention and control, it is necessary to develop and implement effective surveillance and early warning systems for infectious diseases, such as vector (insect) - borne diseases, respiratory diseases; increasing access to healthcare services for all citizens of the country; continuous training of healthcare staff in diagnosis, prevention and treatment of conditions related to climate change.

The *healthcare sector has prioritized* technologies that are focused on beneficiaries and human resources in the healthcare system, ensuring their fundamental rights to health, quality healthcare services and safe and decent working conditions. At the same time, priority was given to technologies with the greatest adaptation impact of the health sector as well as to technology transfer and dissemination capacity, which define the role of central authorities and their relationship with other actors whose activities have an impact on health. This involves overseeing and guiding the entire healthcare system, both private and public, to protect the public interest:

- Development of an IT for surveillance of non-communicable diseases and their risk factors, including those conditioned by climate change;
- Development of operational procedures for early warning, prevention and response actions to mitigate or eliminate the effects of extreme weather events (heat waves, cold waves, floods, pollution of drinking water, atmospheric air, etc.) caused by climate change;
- Implementation in 30 rural healthcare and sanitary institutions of water supply, sanitation and waste management projects resulting from medical activity, in order to ensure infection control and increase the quality of healthcare services provided.

Barriers in adaptation of the healthcare sector to climate change are:

- *Financial barriers*: lack of funds for health activities; lack of financial mechanisms to motivate healthcare personnel; not allocating funds to study the impact of climate change on the public healthcare system.
- *Technology barriers:* lack of monitoring and response IT systems for implementation of public health and early warning measures; low observance of the regulatory framework and lack of national management regulations and guidelines; lack of or outdated quality of technical equipment and software.
- *Institutional and social barriers*: shortage of healthcare staff in territories, as well as the lack of personnel trained in climate change area; lack of intersectoral communication in the field of climate change; low remuneration of public health personnel.
- *Barriers related to the policy and regulatory framework*: low level of implementation of policy documents and regulatory framework in the field of public health; lack of a specific objective to regulate human health in relation to climate change; outdated legal and regulatory framework in the field of healthcare.

Barriers related to healthcare policy and regulatory framework are also closely related to shortage of experienced and highly qualified specialists who know modern processes and technologies. The economic impact also leads to migration of healthcare staff from the healthcare sector; thus, a pronounced shortage of highly qualified personnel is noticeable.

Access to IT systems and an early warning system is one of the most important public health issues in the context of climate change and monitoring of climate-related diseases; thus, the healthcare system cannot regulate and develop adequate and robust policies on assessment of public health and taking the necessary public health measures. Thus, it is noticeable that most of the policy documents that were developed to build awareness in governments and civil society, such as the fact that climate change has an enormous impact on health of the population, have either not been approved or are insufficiently prepared to comply with the international regulatory framework.

3.3.2. Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies

Water Resources

The Water Law no. 272/2011[138] is under constant improvement, the latest amendments entered into force late in January 2024; it partially transposes European directives such as those on establishment of a community policy framework in the field of water resources, on treatment of urban wastewater, on water protection from nitrate pollution from agricultural sources, on assessment and management of flood risks; on environment quality standards in the field of water, etc.

The Water Supply and Sanitation Strategy (2014 – 2030)[139] aims to present an updated and detailed roadmap for development of water supply and sanitation in both the medium and long term and to ensure the human right to safe drinking water as a fundamental right. The specific objectives proposed to be achieved are improvement of the management of public water supply and sanitation services, planning and development of public water supply and sanitation systems in order to increase the population's access to high quality services, harmonization of national legislation in the water supply and sanitation sector in accordance with community standards and international commitments. The measures consist mostly of development of technical documentation, methodologies, profile regulations, as well as construction, operation, maintenance of water supply and sanitation systems in different regions of the country, etc.

The National Program for implementation of the Protocol on Water and Health in the Republic of Moldova for the 2016-2025 period[140] was developed in order to carry out medium and long-term strategic actions to achieve the target indicators in accordance with obligations of the Republic of Moldova to the Protocol on Water and Health until the year 2025 by establishing and achieving national target indicators, by implementing appropriate measures to prevent water-related diseases, by ensuring drinking water quality and a more efficient and sustainable management of water resources. The program is implemented in two stages: stage I: the 2016-2020 period – focuses on development of the legal and regulatory framework, reform of the operational management of water and sanitation systems and strengthening of the operators' capacities for implementation of infrastructure projects, development of capacities of all partners involved in activities for reaching target indicators, strengthening the water quality monitoring and health protection capacities in relation to water quality and sanitation; stage II: the 2021-2025 period – focuses on actions to continue implementation of the actions initiated in the first stage, ensuring fair access to drinking water for all categories of the population, implementing European directives related to water, which will contribute to achieving planned targets.

The flood risk management plans[141] are developed for Dniester River Basin District and the Danube-Pruth and Black Sea Basin District to ensure effective flood risk management and in order to reduce the risk of the impact of this hazard on the population and the economy. The sets of measures include both structural and non-structural

[138] <https://www.legis.md/cautare/getResults?doc_id=23003&lang=ro>.
[139] <https://www.legis.md/cautare/getResults?doc_id=132532&lang=ro#>.
[140] <https://www.legis.md/cautare/getResults?doc_id=102596&lang=ro>.
[141] <https://www.legis.md/cautare/getResults?doc_id=122775&lang=ro>.

measures. *Structural measures* or primary measures are specific measures for construction or renovation of infrastructure elements or other elements that prevent or reduce the risk of flooding within the boundaries of a watershed district. *Non-structural measures* or secondary measures are institutional measures that provide for development or updating of regulatory documents, development of policies to ensure effective management of flood risk within the limits of hydrographic basin districts.

The Program for management of the Danube–Pruth and Black Sea hydrographic basin district, cycle II (2023-2028)[142] is the basic document that refers to the management of water resources within the above-mentioned district. The total area of the Danube - Pruth and Black Sea hydrographic basin district within the borders of Moldova is 14.77 thousand km^2, which accounts for 43.6% of the country's area. The management program consists of a general analysis of the basin, assessment of human impact on water bodies (impact of point and diffuse pollution sources, impact of hydromorphological pressures), monitoring of surface and underground waters, assessment of chemical and ecological condition of water bodies, of protected areas, development of general and specific objectives, costs, implementation risks, responsible authorities, reporting procedures. The most important component of the document is the action plan, developed for the years 2023-2028, cycle II. It includes measures on progressive reduction of pollution from point and diffuse sources, adaptation to climate change of water resources and reduction of pressure generated by hydromorphological alterations, minimization of human impact on water resources, reduction of drought and improvement of flood risk management, ensuring good governance in the field of integrated water resource management. The measures included in the Action Plan for implementation of the Danube - Pruth and Black Sea watershed management program will contribute to achieving good condition of surface and underground waters by preventing deterioration and ensuring long-term sustainability of water resource use.

Dniester River Basin District Management Plan (2024-2029)[143] is the basic document on water resource management within the Dniester District. The total area of the Dniester hydrographic basin district within the borders of the Republic of Moldova is 19.2 thousand km^2, which is 56.4% of the country's area. It consists of a description of natural and socio-economic condition within the basin, human impact on water bodies, vulnerable and protected areas, monitoring of surface and underground waters, economic analysis of water use, general and specific objectives, responsible authorities, etc. The basic problems identified within the boundaries of the Dniester basin are water pollution (from point, diffuse sources, etc.), hydrological and hydromorphological changes (caused by flow regulation, reservoirs, hydropower, flood protection, water capture and discharge, etc.), climate change. The document includes a component comprising a program of measures to improve the water resource conditions in the basin and the environment in general. Among them are measures to improve water resource quality by reducing the volume of pollutants discharged into water bodies, adapting water resources to climate change and reducing pressure generated by hydromorphological alterations for rational use of water resources, ensuring good governance conditions in order to achieve the efficient potential of integrated water resources management. As in the case of the *Danube–Pruth and Black Sea watershed district management program*, the measures will contribute to achieving a good condition of surface and ground water by preventing deterioration and ensuring long-term sustainability of water resource use.

Agriculture

According to Government Decision No. 1031/2023 on approval of the *National Development Plan for the 2024-2026 period,* within Specific Objective 1, "Accelerated growth of labour productivity", the action related to "Strengthening climate resilience of the agricultural sector by supporting agricultural producers for expansion of irrigation networks" is envisaged.

National Strategy for Agricultural and Rural Development for the 2023-2030 period (NSARD 2030), approved by Government Decision No. 56/2023 provides that dependence of agriculture on climate conditions and natural risks is one of the key barriers to agricultural and rural development of the country. In this context, a component of the strategic vision of NSARD 2030 is the development of an agri-food sector resilient to climate change. The

[142] <https://www.legis.md/cautare/getResults?doc_id=132734&lang=ro>.
[143] <https://cancelaria.gov.md/ro/content/cu-privire-la-aprobarea-planului-de-gestionare-districtului-bazinului-hidrografic-nistru>.

strategy defines four general objectives, aligned with the objectives of the Common Agricultural Policy of the European Union. One of the general objectives refers to "Strengthening the potential of the primary agricultural sector and promoting smart, sustainable and resilient agricultural practices to climate change". The priority directions include:

- Modernization of plant production sectors with emphasis on obtaining products with high added value by implementing climate resilience technologies;
- Modernization and strengthening of the wine sector, including through use of climate resilience technologies;
- Adoption of modern practices for efficient water resource use and management and expansion of irrigated areas to ensure climate resilience;
- Implementation of technologies and measures to promote implementation of bioeconomy and circular economy principles;
- Supporting and strengthening environmental protection by conserving biodiversity, protecting water, soil and promoting use of organic farming practices;
- Supporting use of renewable energy sources within agricultural holdings, including use of plant residue and animal waste;
- Development of agricultural and rural advisory services by creating an efficient system of technology transfer, consultancy and training of farmers, etc.

The Environmental Strategy for the 2024-2030 period, approved by the Government on June 12, 2024[144]*,* is a sectoral strategy for protection of the environment, climate change and natural resources that provides national objectives and priorities in several environmental subfields, including: good environmental governance, sustainable management and protection of soil resources, water resources, mitigation and adaptation to climate change effects, etc. The Strategy mentions that reducing agricultural emissions plays an important role in adapting to climate change. The agricultural sector is extremely vulnerable to climate change, especially to the impact of climate factors such as droughts, frosts, floods, hail, sudden temperature fluctuations, erosion. Major vulnerability challenges include water and irrigation scarcity, reduced crop production and yields, soil degradation and erosion, risks to animal health and productivity, and increased pest and disease pressure. Strengthening farmers' knowledge and promoting supportive policies are important to ensure resilience in the national agricultural sector.

Among the relevant priority directions in the context of climate change adaptation of the agricultural sector, it is envisaged to increase the capacity of preparedness and adaptation of the Republic of Moldova to climate change, which includes measures to adapt to climate change by sector, including the agricultural sector. Respectively, in the agricultural sector, the following are planned: systemic improvement of crops; development of drought and heat tolerant cultivars and hybrids; changing the composition of crops in accordance with the process of climatic aridization; development of an agricultural risk insurance system; use of irrigation technologies with low water consumption; planting forest strips with species adapted to local climate conditions.

Regulation on complementary subsidy measures and specific eligibility conditions for complementary subsidy from the National Fund for Development of Agriculture and Rural Environment, approved by GD no. 464/2023[145], regulates the specific measures and conditions for complementary subsidies and establishes the maximum annual ceiling of subsidies per subject. The implementation of the Regulation contributes to achievement of the general and specific objectives of the state policy for development of agriculture and rural environment, including by reducing the vulnerability of economic activities in the context of climate change, expanding the areas of irrigated cropland, implementing growth of land areas under organic farming, environmentally friendly production technologies, increase in the areas of insured agricultural crops and livestock, etc.

Regulation on specific eligibility measures and conditions for subsidizing investments from the National Fund for Development of Agriculture and Rural Environment, approved by GD no. 491/2023[146], regulates the specific eligibility measures and conditions for post-investment subsidy forms and staged investments. The

[144] <https://www.legis.md/cautare/getResults?doc_id=144295&lang=ro>.
[145] <https://www.legis.md/cautare/getResults?doc_id=144112&lang=ro>.
[146] <https://www.legis.md/cautare/getResults?doc_id=144219&lang=ro>.

implementation of the Regulation contributes to reaching the general state policy objectives in agriculture and rural environment, including by modernizing agricultural holdings, reducing the vulnerability of economic activities to climate change, by promoting smart, sustainable and resilient agricultural practices to climate change, efficient management of water resources and expansion of irrigation to ensure climate resilience, implementation of environmentally friendly production technologies, etc.

Regulation on granting direct payments in the livestock sector from the National Fund for Development of Agriculture and Rural Environment, approved by GD no. 492/2023[147], sets specific eligibility requirements, the order and procedure for granting direct payments to livestock breeders from the National Fund for Development of Agriculture and Rural Environment. The implementation of the Regulation contributes to several objectives. Among them the following are listed: revitalization of the livestock sector, adaptation to climate change and mitigation of its effects on agricultural production, etc. Direct payments are granted to livestock breeders for animals registered and used in livestock holdings - aged at least 3 months, maintained in a herd of minimum 5 heads of steers, 50 heads of sheep and goats for milk production, 30 heads of sheep and goats for meat production, 30 heads of goats and doe, 5 heads of mares, stallions and foals used in farms certified in the breeding category or registered in genealogical registers.

Land improvement program for ensuring sustainable management of soil resources for the 2021-2025 period and the Action Plan for the 2021-2023 period on its implementation, approved by GD no. 864/2020[148], aims to implement measures to fight soil degradation and increase soil fertility by modernizing and expanding the system of land improvement, implementing modern technologies and environmentally friendly agricultural practices. One of the factors affecting agricultural production is drought, which persists as a result of climate change. In order to ensure stable crop yields, it is necessary to optimize the soil moisture regime by using irrigation. Thus, among the actions of the Program, the following are listed: chemical improvement and water improvement (irrigation arrangements) of cropland, conservation and increase of soil fertility, prevention and fighting of soil erosion, as well as connection of the research and education system to the priorities of the area. The evaluation of the Action Plan implementation for the 2021-2023 period on implementation of the Program reveals that a number of actions were not carried out, which was taken into account in preparation of the Action Plan for the 2024-2025 period, approved on 31.01.2024.

Energy

The Energy Strategy of the Republic of Moldova until 2030 (ESM 2030), approved by GD no. 102/2013[149], provides clear objectives for diversifying energy sources, increasing energy efficiency and promoting development of renewable energy. The strategy includes measures to adapt the energy infrastructure to climate change impacts, such as modernization of distribution networks and development of energy storage capacities.

According to the concept of the *Energy Strategy of the Republic of Moldova until the year 2050 (ESM 2050)*[150], the solution of a series of problems is foreseen, one of them being creation of an energy sector, that ensures basic security and supports its sustainable development objectives, by developing innovative technologies to support increase in electrification of activities and adaptation to climate change challenges. In addition, ESM 2050 covers implementation of measures to increase the electrification of road and rail transport infrastructure (possibly coupled with subsidies or reduction of excise duties and/or VAT for electric and hybrid cars), as well as to increase use of biofuels that meet sustainability criteria. Domestic production of biofuels from waste, residues and biomass as well as green hydrogen will be encouraged.

Pursuant to Government Decision no. 659/2023 on approval of the *Low Emission Development Program of the Republic of Moldova until 2030*[151], in the context of promoting diversification of energy sources, the construction of 400 MW of wind sources and 200 MW of photovoltaic sources is foreseen; use of generator sets (50 MW) on biogas for production of electricity and heat; implementation of distributed electricity generation (20 MW); installation of 8,100 natural gas condensing boilers, with a power of 24 kW each; reduction of energy losses in the heat transport and distribution system and in its production (by 27.9 ktoe), etc. Within Specific Objective 1, Action 1.5, use of biogas for production of electricity and heat is foreseen, while within Specific Objective

[147] <https://www.legis.md/cautare/getResults?doc_id=138123&lang=ro>.
[148] <https://www.legis.md/cautare/getResults?doc_id=125027&lang=ro>.
[149] <https://www.legis.md/cautare/getResults?doc_id=68103&lang=ro>.
[150] <https://midr.gov.md/files/shares/Concept_Strategia_Enenergetica__act__.pdf>.
[151] <https://www.legis.md/cautare/getResults?doc_id=139980&lang=ro>.

3, Action 3.4 – use of biomass for energy purposes. Objective 2, Action 2.6 provides for promotion of vehicles with hybrid propulsion, e-mobility and other ecological mobility options – reducing fuel consumption used by registered vehicles by 0.1% or by 31.1 TJ until 2026.

Law no. 282/2023 on energy performance of buildings[152] provides for: addressing ways for substantial energy-related renovation of residential buildings by renovation of building envelopes, achieving an optimal cost-efficiency ratio and increasing the share of own funds to be used. Moreover, RES will be promoted through specialized actions, including through Energy Efficiency Fund in the residential buildings sector; assessing the feasibility and attractiveness of different renovation options to improve the energy performance of buildings, based on their costs and benefits; provision of a state IT system for collection, management and analysis of data on the energy performance of buildings, devices, vehicles and other end-use areas.

Healthcare

Pursuant to *Government Decision no. 387/2023 the National Healthcare Strategy "Health 2030"*[153] (NHS) was approved. Implementation of the NHS will ensure the stability of efficient and sustainable mechanisms for strengthening capacities of the public healthcare system to respond to public health emergencies. Under General Objective 1.3, Action 1.3.1, it is envisaged to increase the level of resilience and scalability of the healthcare system on prevention, preparedness and response to public health emergencies, natural disasters and humanitarian crises, including adaptation to climate change, and within the framework of General Objective 2.2, Action 2.2.1. - implementation of projects to optimize infrastructure and maintenance costs of buildings of public healthcare and sanitary institutions and the National Public Health Agency, energy and technical efficiency, use of renewable resources, adapted to climate change, etc., especially to make them more inclusive. The most important components for overcoming the barriers in healthcare will be achieved through implementing the respective measures by requesting at the initial stage a broad analysis of the regulatory and political barriers, but also a list of activities intended for solutions (developing and/or strengthening the institutional framework for adjusting regulatory framework, communication and digitization of surveillance IT systems, definition of roles and responsibilities of stakeholders, etc.), which will partially change approaches and the situation in the healthcare sector. The adaptation options identified include implementation of transfer and proliferation of a wide range of existing and new technologies in the healthcare sector of the Republic of Moldova. At the same time, the review of the regulatory framework on development/adaptation of clinical protocols for prevention and treatment of diseases related to climate change is foreseen, as well as establishment of an efficient IT system in the field of environment and health with climate change focus, for decision-making purposes and public access to information.

In addition, in April 2024 by GD no. 237/2024 on amending *Regulation on remuneration of employees in public healthcare and sanitary institutions covered by the system of mandatory healthcare insurance*[154], approved by GD no. 837/2016, the Mid-Term Budgetary Framework (MTBF) of the Ministry of Health on remuneration of employees in public healthcare and sanitary institutions covered by the mandatory healthcare insurance system was revised, with introduction of the personnel employed in public health services. It will have a direct impact on increasing the degree of employment of highly qualified staff and expertise in key areas in the public health sector, as well as contributing to continuous improvement of the healthcare staff, staff engagement in studies on the impact of climate change adaptation. Raising public awareness on the climate change risks and the importance of adaptation measures can also become an effective measure for proliferation of technologies, since currently, the healthcare system has an ambiguous approach to climate change adaptation and to potential impacts related to climate change on the health system. In this context, raising public awareness through implementation of a communication regulation remains a priority for the healthcare system.

3.3.3. Progress on implementation of adaptation

Water Resources

The program of measures of the first cycle of the *Dniester River Basin District Management Plan (2017-2022)*[155] focuses on improving the legal and informational framework in the field of water, but also on increasing capacities

[152] <https://www.legis.md/cautare/getResults?doc_id=139619&lang=ro>.
[153] <https://www.legis.md/cautare/getResults?doc_id=138493&lang=ro>.
[154] <https://www.legis.md/cautare/getResults?doc_id=142670&lang=ro>.
[155] <https://www.legis.md/cautare/getResults?doc_id=102659&lang=ro>.

and public awareness and information about the state of water, as well as about protection and restoration of natural ecosystems, prevention and progressive reduction of surface and underground water pollution. In total, of the 71 measures, 25 measures, or 35%, were implemented, 25 measures, or 35%, were partially implemented, 21 measures, or 30%, were not implemented.

Implemented measures mostly consist of those related to raising awareness, education, strengthening capacities, organizing scientific conferences, measures related to management of natural hazards, monitoring programs, planting, rehabilitation of springs, delineating borders of protected areas, climate change assessment, those related to the "Dniester Chior" riverbed, creation of a "Lower Dniester" National Park, activity of the Dniester River Basin District Committee, cooperation with the Ukrainian side in the field of protection and sustainable use of the Dniester River.

Partially implemented measures or on-going measures are made up in large numbers of those related to water treatment plants (preparation of technical projects, construction/modernization of water treatment plants). This category also includes some measures related to codification of water bodies, monitoring and inventory of point sources of pollution, improvement of the hydromorphological state of water bodies and the state of biodiversity, operation and completion of the IT system for water resources. Measures related to hydrological monitoring of waters are also included in this group.

Unimplemented measures refer to delineation of protection zones, identification of reference water bodies and of the heavily modified ones, development of various studies. Within this group are also measures related to development of a Program for planting and restoring the riparian strips for protection of water bodies in the Dniester District, a Program for improving the situation of the ichthyofauna in the Dniester River[156]. The rehabilitation of the Old Dniester area and the foundation of the "Lower Dniester" National Park (Law no. 71/2022) is the most important measure carried out to improve the hydromorphological, hydrological and ecological condition of the lower part of the Dniester River basin. Over the 2018-2019 period, the Ecological Society "Biotica" managed to rehabilitate important sectors of the riverbed of the "Nistru Chior", to build sluices to improve the hydrological connection between the old and current bed of Dniester River and conduct a number of seminars to raise awareness among the local population about the importance of environmental protection. Also, a part of the riverbed that joins the sluice with the Dniester Chior with a total length of approx. 250 m was cleaned and the volume of solid material of 5,500 m^3 was removed. In addition, works were carried out to clean some portions of the Dniester Chior from the bridge in the centre of Talmaza village with a length of 300 m and to remove two bridges leading from the village to the agricultural lands[157]. As a result, the region was enriched with water resources, biological resources, biological diversity has increased, a new tourist and leisure area was created, an area for development of important fish species was formed, etc. A major effort has been made in rehabilitation of small river beds. Dams, dykes and irregular crossings along the course of tributaries of the Dniester River (Bâc, Botna, etc.) were eliminated. The Regulation on the procedure for organizing works of cleaning the watercourse bed by removing excess alluvium was approved by Order of the Minister of the Environment no. 41/2022[158].

An important implemented measure was the rehabilitation of numerous springs. State institutions, local public authorities as well as the civil society and NGOs contributed to implementation of the measure. Major spring rehabilitation actions were reported by the Environmental Protection Inspectorate. On the other hand, environmental NGOs (National Environmental Centre, Eco-Tiras and other local NGOs) contributed to fitting up of a large number of springs in different districts: Dondușeni, Anenii Noi, Chișinău, Ialoveni, Călărași, Drochia, Florești, etc. The funding for these actions came from the state budget, but was provided mainly by international donors (the Austrian Development Agency, the Swiss Agency for Development and Cooperation, the German International Cooperation Agency, etc.).

Important actions were carried out to increase the areas planted with trees and to restore the protective riparian strips. Line institutions, local public authorities, economic operators, the civil society, including environmental

[156] <https://www.mediu.gov.md/ro/content/4496>.
[157] <http://margineanugabriel.blogspot.com/2018/12/apele-moldovei-biotica-ada-21122018.html, http://margineanugabriel.blogspot.com/2018/05/apele-molvoveiada-verificarea-starii.html>.
[158] <https://apelemoldovei.gov.md/libview.php?l=ro&idc=207&id=1232>.

NGOs, the Ministry of Environment and subordinate institutions, "Moldsilva" Agency, "Institute for Forestry Research and Development" state enterprise, Environmental Movement of Moldova, the National Environmental Centre, the Ecological Society "Biotica", AO "Hai Moldova" etc., participated in this action. The national action "Clean River from village to village", Autumn planting - Greening of the country, "A tree for our survival", are just a few of the events organized to restore and protect the environment. In course of such activities, small and medium-sized rivers were cleaned, protective riparian strips, forest areas were planted.

The main rivers and water basins, where works were carried out, are Botna, Cahul, Nîrnova, Ciulucul Mic and Ciulucul de Mijloc, Ciuhur, Căinari, Dniester, Răut, Ichel, etc. A series of measures carried out within the Management Plan of the Dniester River Basin District refer to improvement of water quality. In this sense, wastewater treatment plants of Purcari and Asconi Winery wineries have been modernized, while Soroca, Chisinau, Ciorescu, Rezina wastewater treatment plants are in the process of construction. A large number of conferences dedicated to water issues were organized to build public awareness as well as to inform public authorities on the country's water issues.

The first cycle of the *Danube-Pruth and Black Sea River Basin District Management Plan*[159] was implemented during the 2018-2022 period. This document comprises information on the state of water resources, risks related to natural hazards, assessment of human impact on water bodies, protected areas, monitoring program and network, economic analysis of water use, program of measures. Of the 28 component measures of the management plan, about 50% were implemented, another 29% were partially implemented and 21% were not implemented. Thus, a special emphasis was placed on improvement and implementation of a surface and underground water monitoring program. The delineation of riparian strips and the inventory of protection zones of water bodies were carried out, as well as activities to increase the areas of forests and forest belts. Actions related to development of policy documents were also carried out, the Flood Risk Management Plan was developed and approved, as well as the Action Plan on water supply and sanitation services. The drought management plan was developed, but later it was included in the second cycle of the district management plan. Activities were also carried out to strengthen the capacities of competent authorities and train staff on implementation of various projects in the water area.

Agriculture

The *National Strategy for Agricultural and Rural Development of the Republic of Moldova for the 2014-2020 period*[160], approved by GD no. 409/2014, included a number of targets and measures to respond to climate change challenges. They focused on increasing the resilience of the agricultural sector to adverse climate change effects and promoting sustainable agriculture. Progress was made in reaching the following specific objectives: 2.1. Supporting sustainable agricultural land and water management practices; 2.3. Supporting adaptation and mitigation of climate change effects on agricultural production[161]. The lowest degree of implementation was recorded in specific objective 2.2. Supporting environmentally friendly production technologies, organic products, including biodiversity. For example, from the 50 thousand ha of land envisaged to be protected by robust anti-erosion strips as provided in the Action Plan, over the 2013-2018 period, protected agricultural area increased by only 1,020 ha. Likewise, in case of land area intended for organic farming - although a 60% increase in areas was planned, there are only a number of 34 economic operators working in organic agriculture, which is a 9.4% increase of over the 2013-2018 period[162].

In the agriculture sector, the regulatory framework on adaptation to climate change is mainly related to land use, natural resource management, promoting use of organic farming practices and it regulates financial support for agricultural activities. Over the recent years, progress was made in implementation of agricultural practices that increase productivity, and strengthen capacities to adapt to climate change. Generalizing the information on sectoral policies in agriculture, we can conclude that the main measures that would contribute to adaptation of the agricultural sector to climate change are the following:

- ensuring crop rotation, scientifically proven rotations;

[159] <https://www.legis.md/cautare/getResults?doc_id=109895&lang=ro>.
[160] <https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>.
[161] <https://www.legis.md/cautare/getResults?doc_id=76222&lang=ro#>.
[162] <https://cancelaria.gov.md/sites/default/files/document/attachments/864_maia.pdf>.

- implementation of conservation agriculture, including "no-till" and "mini-till" practices;
- optimizing fertilizer use: use of green fertilizer and reduction of nitrogenous chemical fertilizer use;
- manure storage and composting;
- implementation of land improvement projects;
- development of varieties and hybrids resistant to drought and heat;
- development of irrigation systems;
- development of a risk insurance system in agriculture; etc.

It should be noted that Moldova has received funding and technical support from various international organizations, such as the UNDP (e.g. the project Promotion of climate and disaster risk reduction solution in the water and civil protection sectors for enhanced rural resilience), WB (Moldova Agriculture Competitiveness Project), the GCF, etc. The projects were focused on improving water management, introducing drought-resistant agricultural technologies and developing farmers' capacities to adapt to new climate conditions.

Although progress has been made in implementing adaptation actions in the agriculture sector, a number of activities planned in previous policy documents were not fully implemented. It is important to continue and expand efforts to reduce climate change risks in the agricultural sector, and ensure the long-term resilience of agriculture.

Energy

In the *Energy Strategy of the Republic of Moldova until 2030*[163], which is currently in force, three general objectives were established. General Objective 3 "Ensuring sustainability of the energy sector and combating climate change" is linked with adaptation to climate change.

The first two general objectives of the *Energy Strategy of the Republic of Moldova until 2030* and the first two proposed in the *Energy Strategy of the Republic of Moldova 2050*[164] are similar. The aim of both strategies is to ensure the sustainable development of the energy sector. The reason for the development of a new ESM 2050 is the essential change of the basic conditions, assumptions and scenarios used at the stage of developing ESM 2030, the accession of Moldova to the PA on fighting climate change and obtaining the status of candidate country for accession to the EU.

In the context of climate change adaptation in Moldova, specific strategic objective no. 4, "Improving energy efficiency and increasing use of renewable energy sources" for the period 2013-2020 (ESM 2030) was partially implemented. *Among the implemented actions, which were focused on climate change adaptation in the energy sector, improvement of electricity supply infrastructure to minimize losses caused by extreme climate events is prominent.*

It is worthwhile to mention that the targets set in the *National Energy Efficiency Program for 2011-2020*[165] were not fully achieved. According to the intermediate target, the share of renewable energy in the final energy consumption for the year 2015 was to reach 10%, while according to the established target for 2020 it had to reach 20%. However, the corresponding levels actually reached were 0.5% and 2.0%, respectively.

Healthcare

To develop climate-resilient healthcare systems, the functions of a healthcare system must be clearly defined, based on a common understanding. According to WHO recommendations, the healthcare sector must play a key role in protecting the health and well-being of the population against climate change impacts. It is essential that adaptation strategies should include direct control of prevention and treatment functions by the healthcare system, as well as policy guidance. The Ministry of Health or another national public health institution should undertake leadership and regulatory roles, cooperating with institutions in relevant sectors such as water resource management, emergency situations, urban planning, housing, transport, waste management, food industry and agriculture.

The Republic of Moldova is currently facing economic and social difficulties, and the burden of non-communicable diseases (NCDs) caused by climate change is putting pressure on the country's healthcare system and sustainable

[163] <https://www.legis.md/cautare/getResults?doc_id=68103&lang=ro>.
[164] <https://midr.gov.md/files/shares/Concept_Strategia_Enenergetica__act__.pdf>.
[165] <https://www.legis.md/cautare/getResults?doc_id=110334&lang=ro>.

development. Awareness of the climate change impact on public health and the adaptation of global and regional tools to the national context will support setting of national priorities and strengthening of public health policies for prevention and control of diseases caused directly or indirectly by climate change.

The documents adopted by Moldova in climate change area include the healthcare sector both as a vulnerable sector and as one that can significantly contribute to reducing of climate change effects, including in other sectors (water, agriculture, forestry, etc.). Among the most important documents addressing climate change impact on public health are the following:

1) National Healthcare Strategy "Health 2030", approved by GD no. 387/2023[166].
2) National Program for prevention and control of priority non-communicable diseases in the Republic of Moldova for the years 2023-2027, approved by GD no. 129/2023[167].
3) National Program for implementation of the Water and Health Protocol for the 2016-2025 period, approved by GD no. 1063/2016[168].

The respective documents emphasize that one of the specific objectives of the healthcare system is to ensure health protection by streamlining the control over behavioral and environmental risk factors. In order to achieve specific objective, the following tasks are outlined:

1) improving the legal and regulatory framework in the field of healthcare by aligning it with international regulations;
2) strengthening capacities of the State Public Health Surveillance Service for evaluation, management and communication of information on public health risks and establishing a mechanism for cooperation with other services in the field;
3) strengthening capacities to identify and manage health risks of other authorities with competences in healthcare (environmental health, occupational health, food safety).

Also, for prioritized measures in the health sector, the following are provided as preliminary objectives and targets:

1) Development of an IT System for statistical records on non-communicable diseases, allowing data collection on health indicators for the general population, and their disaggregation by male, female, age groups, children, adults, ethnic group, education level and income quintile. This system will allow to obtain real-time data for detailed analysis as well as arguments to justify actions to reduce prevalence of diseases and to influence the drivers of health in respect to the environment.
2) Reducing by 20% by 2027 the number of epidemic outbreaks of infectious diseases and incidence of water-borne diseases and those related to water quality. In addition, the Republic of Moldova must ensure by the year 2025 a 100% access of the population to improved sanitation systems, including up to 50% - to sewage systems, thus technology number 3 identified by the healthcare sector becomes a priority one and falls under the scope of this regulatory document.
3) Development of standard operating procedures (SOPs) that explicitly describe what to do in case of: cold waves, floods, high air pollution, etc. and who has such responsibilities. Also, the role of the State Hydrometeorological Service in informing all actors about risks of floods, air pollution, etc. should be clearly stipulated. To eliminate these deficiencies, SOPs will be developed on early warning, preventing and addressing floods, air pollution, etc.
4) Placement of medical waste incineration facilities in healthcare and sanitary institutions in order to reduce emissions caused by medical waste as well as ensuring a better control of infections in healthcare institutions.

3.3.4. Monitoring and evaluation of adaptation actions and processes

Water Resources

In 2015, UN member states committed to implement the 2030 Sustainable Development Agenda. According to GD no. 953/2022 on approval of the national framework for monitoring the implementation of the 2030

[166] <https://www.legis.md/cautare/getResults?doc_id=138493&lang=ro>.
[167] <https://www.legis.md/cautare/getResults?doc_id=138493&lang=ro>.
[168] <https://www.legis.md/cautare/getResults?doc_id=102596&lang=ro>.

Sustainable Development Agenda, the sustainable development goal in the field of water is called "Ensuring the availability and sustainable management of water and sanitation for all" (which reflects Goal 6 "Clean water and sanitation" from the 2030 Sustainable Development Agenda).

Comprehensive national reports on implementation of the 2030 Sustainable Development Agenda were developed in 2020 and 2023. According to the latest evaluation report, progress in the field of water reflected by the objective "Ensuring availability and sustainable management of water and sanitation for all" and the 17 specific indicators are rated as moderate. Currently, the degree of achievement is established as moderate for 8 indicators, limited - for 4 indicators, worsened - for 2 indicators, not evaluated - for 3 indicators. The progress score is estimated at 57 out of 100, the degree of reporting on the indicators is 71%. Important progress can be highlighted in different areas related to water supply to the population. Thus, the share of population with access to safe water supply sources increased from 73% in 2014 to 88.5% in 2022, and that which has access to a sanitation system - from 62.8% to 81.5% for the same reported years. The number of populations with access to various sectoral facilities has also increased: the share of population that has a sanitation unit and bathroom or shower inside the home has increased from 38.7% in 2014 to 64.6% in 2022, and that which uses a facility for washing hands with soap and water reached 92.5% in 2022, increasing by 2% as compared to 2014. Regarding such indicators as water consumption and the share of captured water, no changes are highlighted, the values being unchanged.

On the other hand, no significant progress was observed in improvement of water quality, the large rivers being noted by class II-III, and the medium and small ones - classes IV-V – polluted and very polluted. The share of sufficiently treated waste water from total discharged water, in the non-residential sector is only 18%, the share of drinking water supply sources that do not comply with sanitary standards on water quality (according to microbiological parameters) is increasing, for centralized underground sources from 11.6 % in 2014 to 20% in 2022, for surface water ones - from 10% in 2014 to 58.5% and for decentralized ones (wells) from 36.3% to 60% for the same reference years. It should be noted that, despite the increase in the population's access to water infrastructure and facilities, the quality of this type of resource does not change, an important factor being the anthropogenic impact expressed through pollution, another being climate change, which causes the reduction of water resources or even their depletion in certain areas of the country, the southern part being particularly prominent. In this respect, a set of projects for construction / expansion / rehabilitation / modernization of water supply, water purification and sewage systems, intended for public facilities of local significance as approved by GD no. 23/2022 on approval of a single program document for the 2022-2024 period is on-going.

The National Climate Change Adaptation Strategy to until 2020 (NCCAS 2020) and the Action Plan for its implementation (2014)[169], also addressed the water resources sector within Specific Objective no. 3. "Ensuring the development of climate resilience by reducing the risks of climate change by at least 50% by 2020 and facilitating adaptation to climate change in 6 priority sectors". Action Direction No. 2. "Risk reduction and adaptation to climate change in the water resources sector" comprises a number of measures on adaptation of the water resource sector to climate change. Among these are conducting of studies specific for the area, improvement of infrastructure related to water resources, ensuring adequate water management, managing floods and droughts risks. All of these 5 measures were achieved. In order to improve management of water and hydrological hazards, flood risk management plans were developed, approved and implemented for Dniester and Danube-Prut and Black Sea districts. Drought management plans were also developed, but they were later integrated into cycle II of the abovementioned district management plans. Regarding water infrastructure, water supply and sanitation systems were expanded, rainwater collection basins were created in different regions of the country, water transport to the recipient was made more efficient, reducing the share of water loss during transport. Studies on climate change impact on water resources were carried out and mainly included in the NCs of the RoM to UNFCCC.

Agriculture

The agriculture sector is not properly adapted to climate change. A number of policy documents address the issue with a view of determining measures to facilitate climate change adaptation. Also, it should be noted that not all activities planned in previous strategies were fully implemented.

[169] <https://www.legis.md/cautare/getResults?doc_id=114739&lang=ro>.

National Strategy for Agricultural and Rural Development for the 2014-2020 years (NSARD)[170] aims to create synergy between agri-food activities and the natural environment. The achievement of the general objective 2 of the NSARD provides for improvement of farmers' access to new drought-resistant varieties, to climate information especially related to extreme events, to anti-hail systems, non-destructive agricultural technologies[171]. The evaluation of the NSARD implementation and of the Action Plan on its implementation, reveals that the lowest level of implementation was recorded for the specific objective OS2.2 "Supporting environmentally friendly production technologies, organic products, including biodiversity" - 33.3%. In particular, this was caused by low values of establishing and restoring anti-erosion strips, as well as expanding the area of land included in the organic farming system.

The sectoral measures stipulated in the *of the National Climate Change Adaptation Strategy until 2020 (NCCAS 2020) and the Action Plan for its implementation*[172], referred to development of climate resilience by reducing climate change risks by at least 50% until 2020 and facilitating climate change adaptation in priority sectors. According to the NCCAS 2020 Implementation Evaluation Report[173], results with the greatest impact in the agricultural sector included: determining vulnerable areas and sub-sectors; assessing opportunities for climate change resistant crops and varieties; implementing measures to conserve water in soil through subsidized investments in relevant equipment, although no specific program has been developed; encouraging investment in irrigation equipment, although irrigation plans have not been developed in accordance with the balance between supply and demand; development of risk management tools for natural disasters of climate origin. In addition, the review on implementation of NCCAS 2020 revealed a low level of climate change adaptation of the agricultural sector in the Republic of Moldova. Insufficient attention was given to preventive adaptation measures, such as crop improvement to develop new varieties adapted to climate conditions. Also, a weak inter-institutional coordination was identified in the processes of planning, implementation and monitoring of measures to adapt the agricultural sector to climate change. Thus, better cooperation is needed in the decision-making process, both from a sectoral (multi-sectoral) and organizational (national-regional-local) perspective.

The Program for soil conservation and increase of soil fertility for 2011-2020[174] was developed in order to address the issues of accelerated degradation of soil resources and to increase soil fertility by modernizing and expanding the system of land improvements, implementing modern technologies and environmentally friendly agricultural practices. However, the evaluation of the level of implementation of planned actions showed that several targets were not achieved, most of the works carried out consisted in construction/cleaning of ponds, cleaning of small riverbeds, which does not directly contribute to stopping degradation and increasing soil fertility.

Also, the *Environmental Strategy for the 2014-2023 period and the Action Plan for its implementation*[175] were not fully implemented, due to several problems and challenges faced by the parties involved in implementation of actions, the fact having led to the need to develop a new environmental policy framework on all environmental components and to update policy documents.

For a series of policy documents in the area, implementation deadline was until the 2020s; hence, the need for developing new strategies, programs, regulations until the year 2030. Given the fact that some of these documents entered into force in the previous year, no information on their implementation is available yet.

Energy

The main problem in the Republic of Moldova is the inability to effectively plan and allocate resources for investment. Regarding the State Budget, Moldova suffers from a persistent and significant under-implementation of public investments, which leaves large volumes of resources unused. This is due to over-ambitious budgeting, combined with a lack of a proper process for evaluating and selecting capital investment projects.

The implementation evaluation of adaptation actions in the energy sector involves solving the existing critical problems that prevent the development of the entire renewable energy sector for the electricity component, in terms of energy use from renewables both in transport and for heating and cooling.

[170] <https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>.
[171] <https://www.legis.md/cautare/getResults?doc_id=76222&lang=ro#>.
[172] <https://www.legis.md/cautare/getResults?doc_id=114739&lang=ro>.
[173] <https://www.mediu.gov.md/ro/content/4-strategia-de-adaptare-la-schimbarea-climei-p%C3%A2n%C4%83-%C3%AEn-anul-2020-%C5%9Fi-planului-de-ac%C5%A3iuni-pentru>.
[174] <https://www.legis.md/cautare/getResults?doc_id=110149&lang=ro>.
[175] <https://www.legis.md/cautare/getResults?doc_id=114539&lang=ro>.

Thus, GD no. 401/2021[176] sets a maximum limit of 410 MW of energy capacity from RES, which must be reached by 2025. Of this, 165 MW of capacity for large producers has been set through tender *(capacity caps for large producers, by capacity categories in energy from renewable sources[177])*. The target set by the National Energy Efficiency Program for 2011-2020 for a 20%-share of energy from renewables in final energy consumption of the country (in 2020), was not reached even in 2023. In 2023, only 7% of total electricity consumption was energy produced from RES. Of the total renewable energy, 67.6% is electricity generated using wind power, 27.5% – photovoltaic energy and 4.9% – electricity produced from biogas.

Healthcare

As part of promotion of the *National Healthcare Strategy "Health 2030"*[178] in order to align the legal framework to international regulations, the legal and regulatory framework in the field of healthcare is being improved.

According to performance reports of the State Public Health Surveillance Service, the strengthening of capacities of the Service carried out within the National Program for prevention and control of priority non-communicable diseases in the Republic of Moldova for the years 2023-2027[179] has led to improvement of assessment, management and communication of public health risks.

Strengthening of capacities for identification and management of health risks, within the *National Program for implementation of the Water and Health Protocol for the 2016-2025 period*[180], resulted in an increase of efficiency of health risks management.

The implementation of prioritized measures in the healthcare sector ensures the following results:

- Development of an IT system for statistical records on non-communicable diseases allows for detailed data collection on the health of the population.
- Ensuring the population's access to improved sanitation systems will result in improved access to sanitation for 100% of the population by 2025.
- Placing medical waste incineration facilities will generate reduced emissions and improved infection control in healthcare institutions.

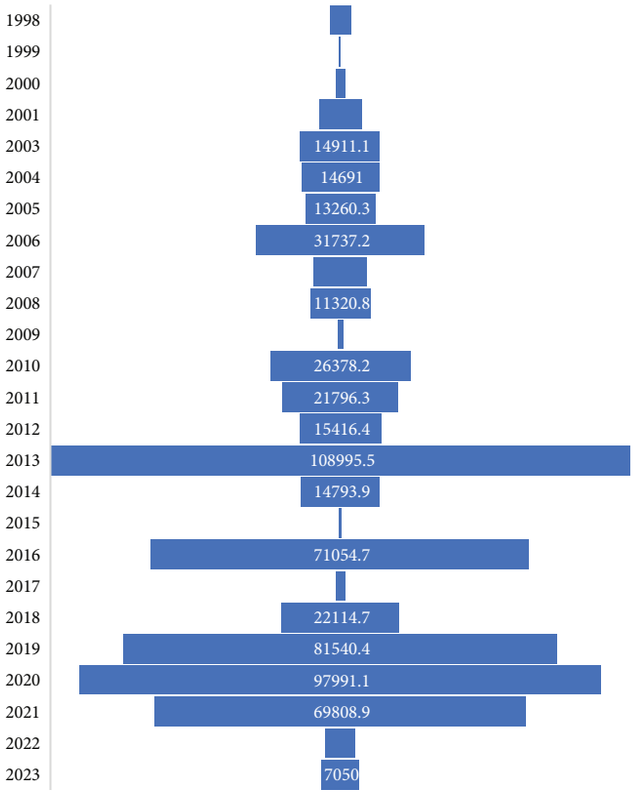
3.4. Information related to averting, minimizing and addressing loss and damage associated with climate change impacts

3.4.1. Descriptions of past losses and damages incurred as a result of climate change, and the losses and damages that are expected to be incurred in the future

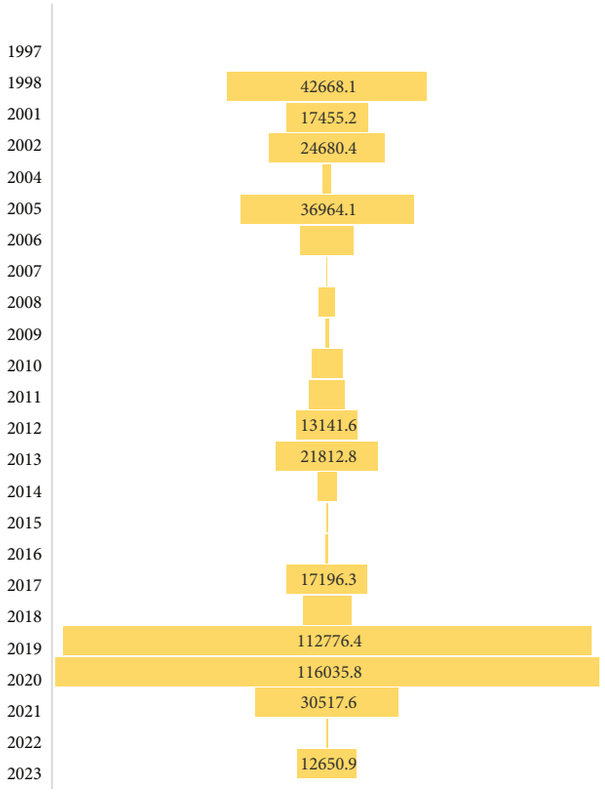
Moldova is the third most vulnerable ECA country to natural hazards,[181] partly due to its high reliance on a low-productivity agricultural sector, as well as the high exposure of its population. Moldova stands out among Central, Eastern and Southeastern Europe (CESEE)[182] countries and advanced economies (AE) in Europe due to the disproportionate economic costs it has borne from climate shocks, the largest toll in past three decades-close to 12% of 2019 GDP, cumulatively, compared to an average of 3% in the region (IFM, 2024[183]).

The Figure 3-34, is presenting the most significant damage (thousands MDL) during 1997-2023, registered in the Republic of Moldova for Heavy Rains, Heavy Rains with Wind, Heavy Rains with Wind and Hail, Hail, Floods, Droughts, Heavy Winds and Frosts, according to the Republic of Moldova General Inspectorate for Emergency Situations (IGSU) database (Taranu 2024[184]).

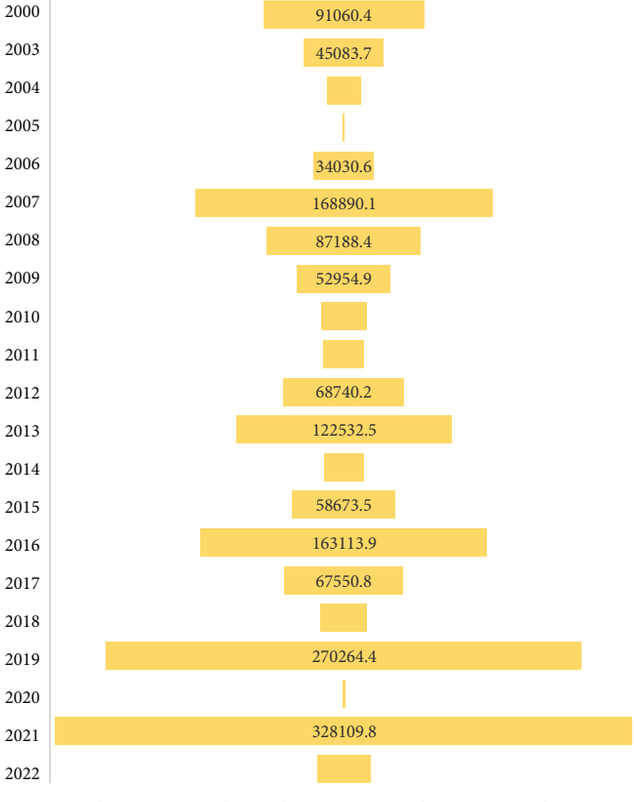
[176] <https://www.legis.md/cautare/getResults?doc_id=128987&lang=ro>.
[177] <https://www.legis.md/cautare/getResults?doc_id=128987&lang=ro>.
[178] <https://www.legis.md/cautare/getResults?doc_id=138493&lang=ro>.
[179] <https://www.legis.md/cautare/getResults?doc_id=136642&lang=ro>.
[180] <https://www.legis.md/cautare/getResults?doc_id=102596&lang=ro>.
[181] <https://gain.nd.edu/our-work/country-index/>.
[182] Central, Eastern and Southeastern Europe.
[183] Fouejieu, Armand (2024). Opportunities and Challenges of Climate Adaptation Policies, Republic of Moldova, Washington DC: International Monetary Fund, Selected Issues Paper, SIP/2024/002.
[184] Taranu L (2024), Information related to averting, minimizing and addressing loss and damage associated with climate change impacts. BTR1 Project.



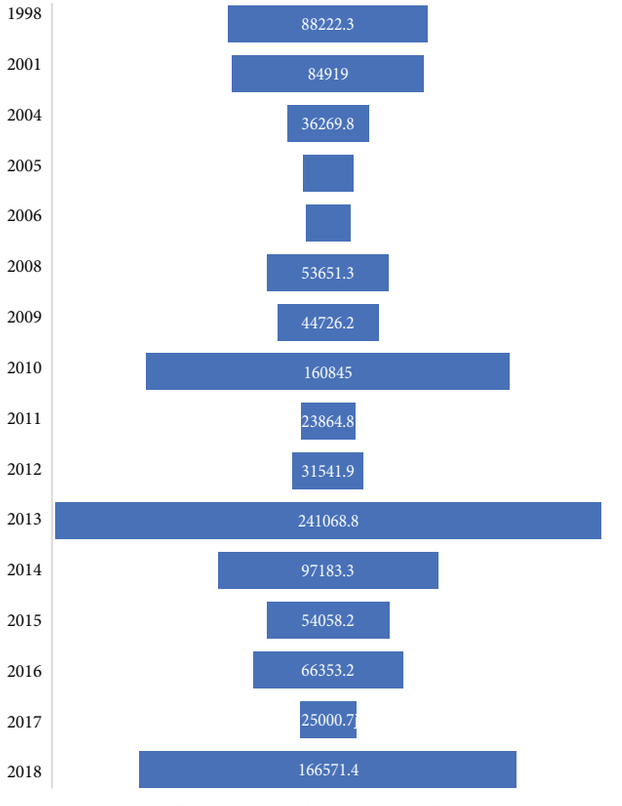
(A) Heavy rains



(B) Heavy rains with strong wind



(C) Heavy rains with strong wind and hail



(D) Heavy rains with hail

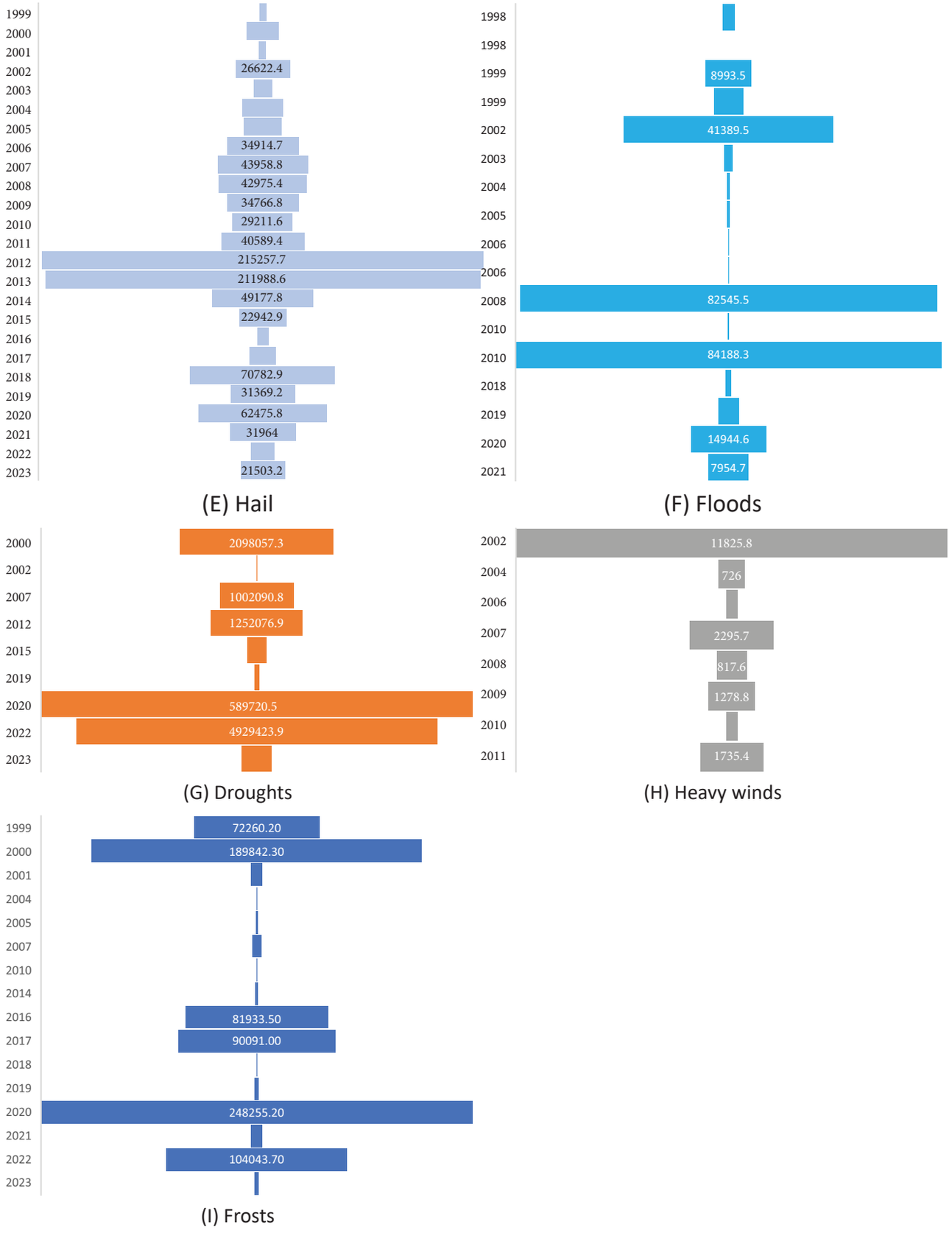


Figure 3-34: The most significant damage (thousands of lei) during 1997-2023, registered in the Republic of Moldova: (**A**) Heavy rains, (**B**) Heavy rains with strong wind, (**C**) Heavy rains with strong wind and hail, (**D**) Heavy rains with hail, (**E**) Hail, (**F**) Floods, **(G)** Droughts, **(H)** Heavy winds, **(I)** Frosts[185].

[185] Taranu L (2024), Information related to averting, minimizing and addressing loss and damage associated with climate change impacts. BTR1 Project.

In Moldova, 12.2% of the population is exposed to natural hazards, compared to the upper-middle-income country average of 2.1%, and the economy and households are highly dependent on natural capital, particularly through the agricultural sector. In 2018, natural capital accounted for over 12% of Moldova's wealth in 2018 - that is more than three times the average share among low- and middle- income Europe and Central Asia (ECA) countries - with cropland accounting for around 60% of the total, which is four times the ECA average (World Bank, 2021).

Agribusiness contributes 14.5% of Moldova's GDP, around 50% of all exports, and nearly 30% of jobs. Agricultural production is characterized by a dichotomy between a relatively small group of productive corporate farms and a large number of fragmented, undercapitalized, and unproductive family farms. The vast majority (98%) of Moldovans in agricultural are small-scale farmers owning 0.8–10.0 hectares, or (mostly informal) farmworkers (UNDP, 2020)[186]. Women-owned farms are on average 30% smaller than those held by men, highlighting persistent gender disparities.

Without adaptation measures, climate-related hazards, especially droughts, will have increasingly large impacts on growth. Moldova's sensitivity stems from its greater reliance on agriculture, with a significant portion of the labor force employed in this sector and agriculture representing, on average, 13% of overall GDP over the past 20 years. Climate-induced disruptions, such as extreme weather events and variations in precipitation patterns, directly impact agricultural production, resulting in substantial economic losses (IMF, 2023). While Moldova has experienced droughts on a regular basis throughout its history, particularly in the south, they have become more frequent and severe in the last two decades. Between 2000 and 2012, the country experienced four devastating droughts - in 2000, 2003, 2007, and 2012 - and further droughts in 2015, 2020, and 2022, with major impacts on agricultural output and incomes, particularly for small farmers. The 2007 drought, which affected 80% of the country's territory, led to a 23% decline in agricultural production and caused an estimated US$ 1 billion in economic losses overall (World Bank, 2007[187], 2021[188]; Government of the Republic of Moldova, 2015[189]), Figure 3-35.

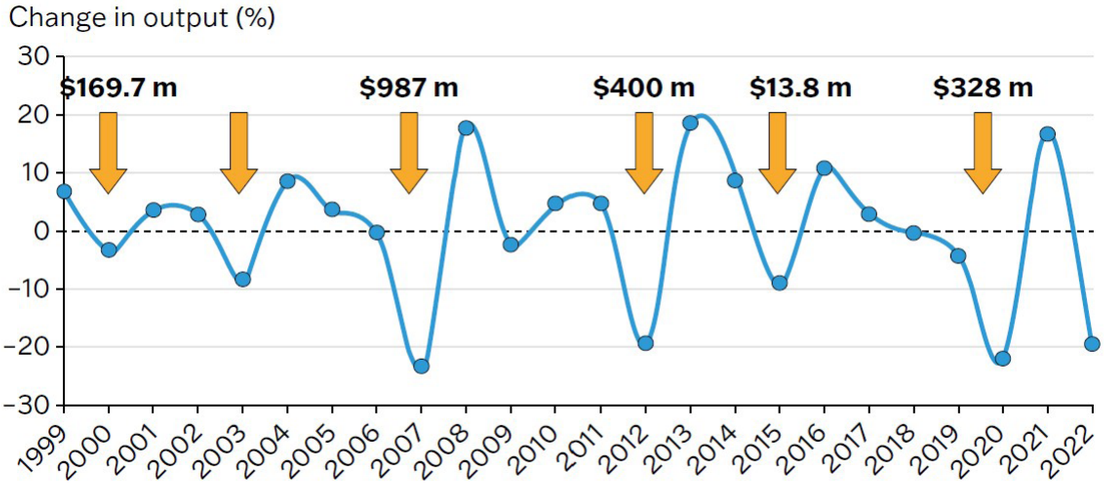


Figure 3-35: Drought impacts on agricultural output and associated economic losses.

Source: WB, 2024, Country Climate and Development Report: Moldova.

Severe flooding is also common. In 2008, torrential rains, together with releases from upstream in Ukraine, led to flooding in the north and south, resulting in US$ 120 million in losses. *In 2021, multi hazard average annual*

[186] UNDP. 2020. National Human Development Report 2020: Moldova. New York. <https://hdr.undp.org/content/national -human-development-report-2020-moldova>.
[187] World Bank, 2007. Rural Productivity in Moldova – Managing Natural Vulnerability. <https://documents1.worldbank.org /curated/pt/510961468046135528/pdf/421380Moldova01uctivityEng01PUBLIC1.pdf>.
[188] World Bank. 2021b. Moldova Special Focus Note: Moldova's Vulnerability to Natural Disasters and Climate Risks. <https:// thedocs.worldbank.org/en/doc/7bf12b95f10a3daf7b570718b2100e15-0080012021/related/MEU-DRM-Special-Topic -May-2021-FINAL-eng-Copy.pdf>.
[189] Government of the Republic of Moldova. 2015. Republic of Moldova's Intended National Determined Contribution. <https:// www4.unfccc.int/sites/submissions/INDC/Published%20Documents/Republic%20of%20Moldova/1/INDC_Republic _of_Moldova_25.09.2015.pdf>.

losses are estimated at around US$ 164 million (DRF, 2022)[190], or 1.3% of GDP. In the absence of adaptation actions, annual GDP losses are estimated to be over 2.8% by 2050, Figure 3-36.

About 30% of the country's labor force works in agriculture, with 98% of these working as small-scale farmers on fragmented, undercapitalized, and inefficient family farms. In Moldova about 9% of arable land (217,000 hectares) is technically could be used for irrigation, only about 0.2% is actually irrigated.[191] A hotter, drier climate could lead to a 41% decrease in sugar beet production, 33% decrease in maize, and 29% decrease in wheat[192]. Irrigation and water storage investment are no-regret measures that would could almost fully mitigate yield losses due to climate change, and could result in substantial (around 12%) yield gains in a moderate climate scenario (WB, 2024).

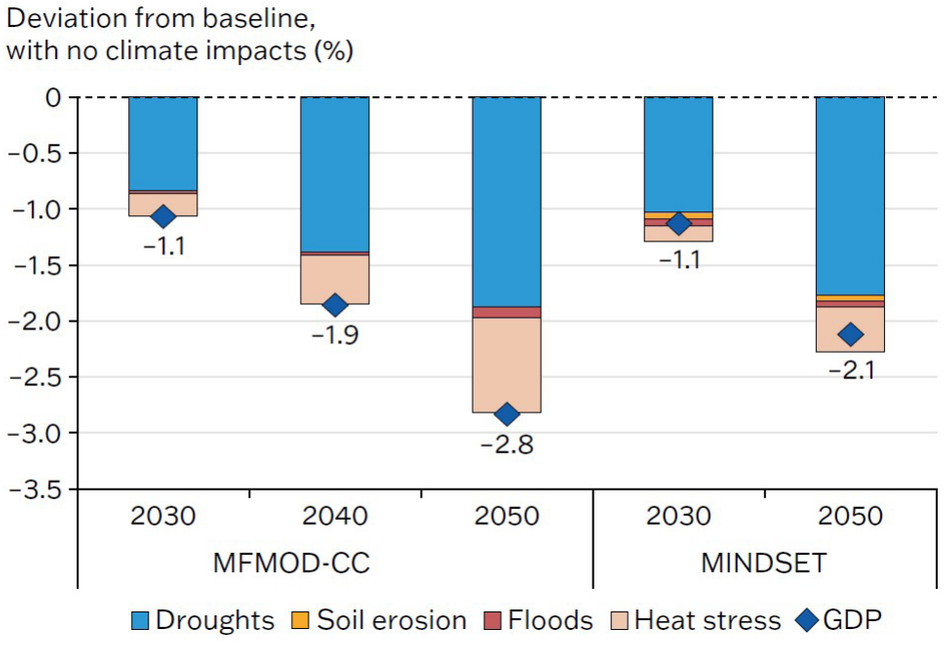


Figure 3-36: Climate change impacts on GDP in the absence of adaptation measures.

Source: WB, 2024, Country Climate and Development Report: Moldova.

Extremes and climate change disproportionately impact poor and marginalized communities. Districts in the Southern and Central AEZ with high poverty rates also have the higher extreme and drought risks exposure (Taranu et al., 2023). Diminishing water reserves due to prolonged dry seasons can further limit access to clean water and sanitation services and increase the price of water - a critical development for poor and vulnerable communities, and particularly women, due to the gender division of labor around prevailing (WB, 2024).

Without adaptation, the scale of crop losses that Moldova experiences in drought years today could be a normal feature by 2050. Most crops are expected to experience large declines in yields through 2050 due to temperature and, especially, precipitation changes. A dry/hot future is projected to result in average declines of 41%, 33%, and 29%, respectively, in sugar beet, maize, and wheat production in 2041-2050. Projected losses in export crops such as sunflowers and grapes are somewhat lower, at 15% and 13%, respectively (WB, 2024).

Soil erosion from future climate change is not expected to contribute to large additional losses in agricultural output, extensive land degradation is already having a major impact in Moldova. Estimates indicate that up to 29% of all land, and 43% of agricultural land (WB & CIAT, 2016), is degraded, with areas in the Center and North most affected. An analysis of expected topsoil loss through excess erosion[193] under future climate scenarios identifies minimal impacts on crop yields by 2050. On average, less than 0.1% loss is projected in a wet/warm future (driven by increases in extreme precipitation) and even smaller impacts in a dry/hot future (WB, 2024)[194]. However, RoM's

[190] DRF. 2022. Funding Gap Analysis.
[191] Source: Cadaster Agency.
[192] Although the overall effects of heat on crop yields is expected to be limited (less than a 1 percent decline), in some districts in the north—notably Donduseni, but also Briceni, Edinet, and Ocnita—it could reach up to 13 percent. Yield decline from precipitation changes in the dry/hot scenario is more severe and spread out across the country, ranging from 9 percent to 17 percent.
[193] Changes in the erosion of topsoil caused by climate change are estimated using the Revised Universal Soil Loss Equation (RUSLE).
[194] World Bank Group, 2024. Moldova Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. <http://hdl.handle.net/10986/42381>.

fertile soils face anthropogenic threats, including land fragmentation; low land management capacity; inadequate practices that affect soil health (especially tillage); overgrazing; poor forestland management, including illegal logging of protective forest belts and extensive use of low climate–adapted exotic species; and inefficiencies in land use planning, including crop rotation (WB & CIAT, 2016)[195].

The ecosystem benefits of RoM's forests are at risk from climate change, exacerbated by management practices. The share of forested land in Moldova (11.8%[196]) is among the lowest in the ECA region, and forest cover is highly fragmented. An analysis of high conservation–value forests shows that Moldova has no intact forest landscapes and only a few small forest bodies of medium integrity; the majority has a low forest integrity index (EU4Environment, 2023)[197] and needs more shelterbelts to protect cropland from wind and water erosion. The RoM's forests due to climate change will be very susceptible to wildfires, particularly in Central and Southern AEZ, where forests are classified as wildfire hazard level 4, indicating high susceptibility (Taranu et al., 2018).

Floods already cause substantial damage, and climate change is expected to further exacerbate and shift current exposure patterns. A flood hazard analysis shows that more than 10% of the population (about 400,000 people) live in high-risk flood zones. About 185,000 people could experience flooding of over 0.5 meters in a 1-in-100-year flood event. Flood impacts on roads, buildings, and agricultural land cost Moldova about 0.8% of GDP annually in asset damages alone, primarily to roads, followed by buildings. These costs are distributed unevenly across the country, with the most flood-exposed districts (relative to district GDP) located along the Dniester River. In the southwest, several districts including Stefan Voda, Cantemir, Causeni, and Cahul - face a combination of above-average flood exposure and poverty, highlighting the socioeconomic vulnerability of flood-exposed people.

The impact of heat on labor productivity is projected to increase in all climate scenarios and all sectors. In a dry/hot future, average productivity losses over 2041–2050 could reach 1.7% in the agriculture sector, 0.6% in industry, and 0.4% in services. Impacts are lower, but still significant, in a wet/warm future. These effects only capture the impact of average temperature and not the effects of severe heatwaves, which can be a particular threat to RoM given its large elderly population[198] and limited availability of air conditioning[199].

Climate change will affect the functionality of critical infrastructure and public service systems, such as energy, information and communication technology, transport, water, health, and education. Infrastructure disruptions are estimated to cost RoM's businesses about US$ 55.7 million in losses each year, driven by power outages and transport disruptions (Hallegatte, Rentschler, and Rozenberg 2020)[200].

There is a lack of systematic and up-to-date risk assessments on the exposure and vulnerability of infrastructure assets and public buildings, including schools and hospitals. The lack of spatially disaggregated data on the location and condition of critical assets is a key bottleneck for assessing the climate risk to public infrastructure and prioritizing investments. Similarly, despite significant seismic risk, Moldova does not have a national program to assess and reduce earthquake risk in public and residential buildings.

Implementing an up-to-date building registry and risk assessments would help provide important information for calculating the costs of resilient reconstruction-such as flood proofing and heat mitigation - and determine insurance premiums in support of crisis preparedness and risk reduction. Developing and rolling out a national spatial data infrastructure is key for identifying climate shocks on lifeline infrastructure and public services (WB, 2024).

The national transportation network experiences mounting damages from climate shocks, particularly floods. A countrywide flood risk assessment identified about 47,000 kilometers of roads (7% primary, 8% secondary, and 85% tertiary roads). During a 1-in-100-year flood event, about 3,360 kilometers (7%) are estimated to be exposed to flood depths of at least 25 centimeters, with the eastern and central-western districts most susceptible

[195] World Bank & CIAT, 2016. Climate-Smart Agriculture in Moldova. CSA Country Profiles for Africa, Asia, Europe and Latin America and the Caribbean Series. Washington DC: The World Bank Group.
[196] <https://data.worldbank.org/indicator/AG.LND.FRST.ZS?locations=MD-RO-UA-BG-HU>.
[197] World Bank, EU4Environment, 2023. Identification of High Conservation Value Forests in the Republic of Moldova. Washington DC: World Bank. <https://www.eu4environment.org/identification-of-high-conservation-value-forests-in-the-republic-of -moldova/>.
[198] In 2023, about 600,000 people (24 percent of the population) were ages 60 and over, 60 percent of them women. By 2040, the share of the elderly is expected to rise to 33 percent of the population.
[199] According to household survey data, just 6.1 percent of households have air conditioning.
[200] Hallegatte, S., Renstschler, J., and Rozenberg, J. 2020. Lifelines - The Resilient Infrastructure Opportunity. Washington DC: World Bank.

to flood-related road damage. The average annual damages to road assets are estimated at around $82 million (WB, 2024)[201].

Over 1,000 kilometers of city roads are directly located in high-risk flood zones, which could cause wide-ranging urban mobility disruptions. A flood exposure analysis of four Moldovan cities (including the capital, Chisinau) shows that 1,029 kilometers (16%) of urban roads are directly exposed to at least 20 centimeters of flooding in a 1-in-100-year flood scenario. For more intense flood scenarios, with higher return periods, the extent of the exposed road network increases systematically.

The analysis shows that these indirect mobility impacts, proxied by failed trips, can far exceed direct network exposure. During a 1-in-100-year flood event, RoM's cities could see up to 20% of their road network flooded, leading to mobility disruptions of 60–70% (WB, 2024).

Moldova's energy sector infrastructure is likely to be affected by climate shocks and stresses in at least three ways. First, rising temperatures will trigger demand surges for electricity during summer months and heatwaves to meet the need for air conditioning and industrial cooling. Increased electricity demand also implies increased fuel use for generation, primarily natural gas. Insufficient heat loading will also reduce electricity-generating capacities. Second, sustained reduction in water availability will increase the need for substantial expansion of energy-intensive irrigation systems in arid regions. Reduced precipitation volumes may also decrease water flows in the Pruth and Dniester Rivers, affecting power plant electricity generation capacity.

An increase in RES generation and demand reductions through energy efficiency can mitigate such pressures. Third, the increased frequency of extreme weather events, such as heatwaves, frost, floods, storms, and severe drought, will cause recurring direct damages to energy assets, with vegetation debris damaging transmission and distribution lines, or floods or wildfires damaging transmission substations. Such damages increase the need for capital expenditure and higher operations and maintenance costs (Filiutsich, 2022)[202].

RES are very sensitive to extreme weather events. According to the updated NDC (2020), the value of climate-dependent renewable energy production in the Republic of Moldova is estimated at only US$ 286,000 annually (mainly hydroelectric energy), while the lost energy production is estimated at only around US$ 150 million annually.

However, climate change also offers opportunities. For example, reduced cloud cover and increased wind speed would increase the potential of photovoltaic and wind power plants, thus providing an opportunity to diversify renewable energy supply. Therefore, climate change considerations need to be integrated into energy sector development and investment planning at the earliest possible (programming) stage (NCCAP, 2023).

Moldova's flood protection infrastructure is inadequate for future needs and poorly maintained. Comprising ponds, dams, canals, and over 1,200 kilometers of flood defenses, a lack of maintenance means that these measures provide neither dependable flood protection nor adequate water storage during droughts. Substantial upgrades and repairs are needed to ensure their adequacy for future economic growth, infrastructure expansion, and climate change. Such measures are also key for improving compliance with EU legislation, including the EU Flood Directive.

The EIB has developed a countrywide flood management masterplan and investment program, which identifies measures to reduce flood risks and develops a phased investment program with an overall cost of around EUR 325 million for structural measures and EUR 120 million for nonstructural measures, including maintenance, over a 20-year period. Current annual flood damage in Moldova is estimated at US$ 61– 96 million, including US$ 12 million in damage to buildings. This is significantly higher than the cost of the proposed program of flood protection measures, implying that the benefits of flood protection measures exceed costs by a factor of 4.6 to 7.3.

Climate-related hazards - including floods and droughts - and earthquakes have the potential to disrupt health service delivery by impacting health facilities, infrastructure, and essential lifelines that support their functionality. Disasters also

[201] World Bank Group, 2024. Moldova Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. <http://hdl.handle.net/10986/42381>.
[202] Filiutsich, I. 2022. Consolidated Recommendations for Mainstreaming Climate Change Considerations into the Energy Policy of Moldova and Further Development of National Practices of Greenhouse Gases Emissions Measurement and Reporting in the Energy Sector Taking into Consideration the Best Practices. EU4Climate Project. <https://euneighbourseast.eu/wpcontent/uploads/2022/05/moldova_mainstreaming20cc_energy_v4_final.pdf>.

typically increase short-term demand for health services, specifically emergency services, and can increase long-term demand. An analysis of the Moldovan health system's resilience to climate shocks revealed the following action areas with the potential to significantly increase disaster risk management (DRM) capabilities:

- *Exposure of health and other key public facilities.* A risk exposure analysis for a 1-in-100-year flood event revealed that 47 (14%) of the country's public health care facilities are at risk of flooding. Nisporeni municipality has the most health facilities located in flood zones (four), while Cantemir and Ungheni each have one exposed facility.
- *Gaps in emergency preparedness of health facilities, especially in rural areas.* Based on results from the World Health Organization's 2016 Hospital Safety Index, 88.7% of the 66 evaluated health facilities were found to have a high level of structural safety. But implementing mandated redundancies in the health sector and supporting lifelines infrastructure - such as backup generator capacities and fuel storage as fail-safes in case of service disruptions caused by disasters - and developing multi-hazard contingency plans would further strengthen the climate resilience of health assets.
- *Gaps in health system staff capacities to respond to climate shocks and stressors. Sufficient and well-trained staff are essential for effective disaster preparedness and response.* Yet, the Moldovan health system has experienced a continuous decline in the rural health care workforce in recent years. Staff trainings for emergency preparedness and the use of telemedicine can counteract such trends, increasing efficiency and freeing up scarce human resources, thus increasing service coverage during surge demand events and service accessibility in remote and underserved areas. While some emergency preparedness trainings exist for health staff and emergency coordinators, organized by government agencies or through international cooperation—e.g., with Japan's Disaster Medical Assistance Team (DMAT)—these should be further strengthened and institutionalized.
- *Gaps in integration with national emergency response coordination.* Following recent reforms, the health system has become better integrated into broader national disaster response frameworks and health staff from ministries and health facilities are represented in emergency commissions at both national and local administrative levels. But gaps remain in integrating the Ministry of Health, municipal authorities responsible for hospitals, and emergency coordinators at health facilities into regular, hazard-specific, inter-agency training and joint crisis exercises, and neither the Ministry of Health nor the Ministry of the Interior Affairs, which supervises the General Inspectorate of Emergency Situations, has enough consistent annual funding available for such activities. Developing hazard-specific plans for health facilities and their supporting lifelines infrastructure would also help better incorporate the health system into the country's larger disaster response network.

3.4.2. Institutional arrangements to facilitate the implementation of the activities referred to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change

The Government of Moldova has been strengthening its institutions to better prepare for, and respond to, disasters in recent years. Moldova has improved its ability to forecast severe weather, including at the local level, through improved hydrometeorological services[203]; it has reduced the agricultural sector's vulnerability to climate change by improving irrigation services, strengthening the existing agriculture insurance scheme, and promoting climate-smart agriculture practices; it has also strengthened its emergency response; and— importantly in light of the small size of the country—it has strengthened regional collaboration and knowledge sharing on DRM. However, much remains to be done, and the social and economic costs of disasters cannot be underestimated: over the past decade alone, floods and droughts caused US$ 1.2 billion in damage; a major earthquake today could affect 60% of the country's gross domestic product (GDP).

- *The Ministry of Internal Affairs is responsible for Disaster Risk Management (DRM).* Operating under the Ministry, the General Inspectorate for Emergency Situations is the main civil protection agency.

[203] Better weather forecasting and warnings save lives and property – Insights from Moldova (blog Daniel Kull, 2019).

- *The roles and responsibilities of different institutions/entities in all disaster risk management* cycle phases have not been clearly defined, especially as concerns risk assessment, prevention and recovery activities related to different hazard-types.
- *The National Commission for Emergency and Exceptional Situations* is well structured, involves all key ministries, and has demonstrated a good level of administrative efficiency during recent emergencies.
- No overall legal act clarifies roles and responsibilities of institutions in Disaster Risk Management Cycle (DRMC) phases for different hazards.

The institutional framework lacks a clear distinction and detailed specification of the competences/ responsibilities of entities for the full DRMC and for the different hazards. The legal and institutional DRM framework is mainly organized for emergency response rather than for prevention, preparedness and recovery. The existing institutional arrangements for DRM in Moldova are shown in Figure 3-37.

The ministry responsible for DRM is the Ministry Internal Affairs (MoIA). The General Inspectorate for Emergency Situations (IGSU) operates under the MoIA, and is regulated by GD no. 137/2019. As such, it is the main civil protection agency, responsible for all hazard emergency response and for overseeing planning, coordinating and managing of disaster preparedness and emergency management. ISGU coordinates the activities at the national and regional (district) levels, through 19 sub-divisions.

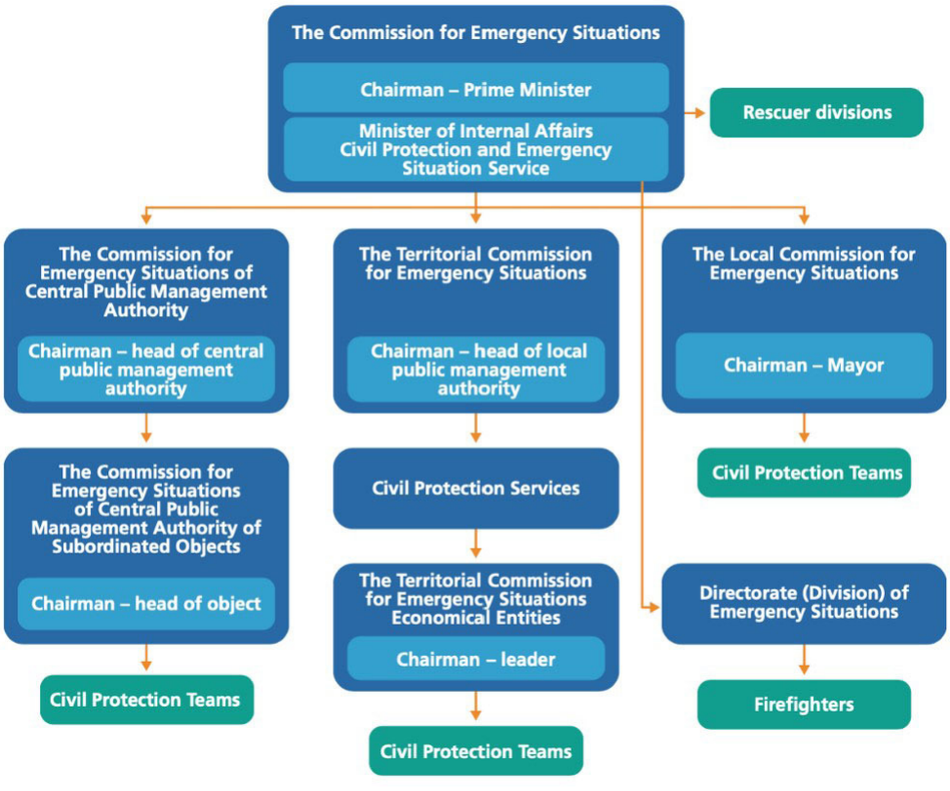


Figure 3-37: Institutional arrangements for Disaster Risk Management in Moldova.

Source: Alfonso, et al 2023, UCPM Peer review report: Republic of Moldova 2023.

The ISGU subunits include rescue units and firefighting stations in cities, towns, and rural areas. At the regional (district) level, disaster management is conducted by heads of civil protection, while at the local (municipality) level, civil protection is under the responsibility of local authorities, even though ISGU also has offices at this level, as some fire stations respond to local authorities while others work under the central administration. ISGU's mandate is regulated by Law no. 93/2007, but due to a lack of details on ISGU's role in different types of emergencies, Article 8 of this legislation needs to be clarified.

Another body operating in DRM is the National Commission. It manages the activities of state executive organs during major emergencies and during the implementation of prevention actions through long-term programmes, such as risk awareness campaigns.

The National Commission is made up of representatives of key ministries and sectors (including private companies managing essential services) and is headed by the Prime Minister of Moldova, who is the chair of the National Commission, while the Deputy Prime Minister, the State Secretaries of the MoIA, and the head of ISGU are deputy chairs. The National Commission is a permanently operating entity that meets twice a year and is activated in case of large-scale emergencies affecting two or more regions. The tasks of the National Commission generally include: verifying the intervention capacity of the management structures, including the training and use of their forces and their necessary resources; and ensuring the protection of the population, territory, environment and heritage in case of danger or emergency. The basic operational document of the National Commission is the Civil Protection Plan.

The structure and tasks of the National Commission is mirrored at sub-national (district) and local levels. Sub-national and local level commissions are also permanent bodies that are activated in the response phase to coordinate activities, respectively headed by the district chief and mayor, both elected officials, and made up of ISGU representatives at each level, together with representatives of other institutions and economic operators involved in DRM. Because of a lack of financial resources necessary for a proper risk management governance, territorial and local commissions are dependent on the support received from the national government (Figure 3-37)[204].

Moldova needs to implement a comprehensive reform program focused on strengthening disaster risk preparedness, investing in risk reduction, and further strengthening disaster response. A comprehensive DRM and climate resilience agenda would need to comprise multiple short- to medium-term reform and investment programs, including improving Moldova's risk identification, investing in better risk reduction – both in terms of structural and non-structural interventions, enhancing disaster preparedness and providing stronger financial protection mechanisms and upgrading resilient recovery and reconstruction policies.

Such a framework would need to gradually move the focus of DRM from "reactive", ex-post responses to "proactive", ex-ante risk management. Given the limited financial resources, it would also need to ensure that risk mitigation priorities are adequately mainstreamed within the existing national programs (agriculture, infrastructure, urban planning, flood risk management, among others) and include financial protection measures for those risks that cannot be fully mitigated[205].

3.4.3. Activities related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change

Although RoM's governance quality has improved in recent years, some key governance indicators (political stability, control of corruption, respect of the rule of law, regulatory quality) remain below CESEE and EU averages, stressing significant scope for further improvement. RoM also lags behind peers in Europe regarding its social readiness for strong adaptation measures. Finally, a less-favorable business environment may curtail private sector involvement/investment in adaptation infrastructure, and/or limit the potential to catalyze private investment for adaptation action (Fouejieu Armand, 2024)[206].

The estimated value of the financial resources needed to ensure the implementation of the NCCAP's Action Plan for the period 2023-2027 is MDL 1,836,354,272, of which MDL 275,453,140.8 (15%) from the state budget and MDL 1,560,901,131.2 (85%) from the development partners sources (external sources - World Bank, EIB, EBRD, UNDP, FAO, GIZ, NAP-2, NAP-3, NDA, FPI, LIFE Programme, Embassy of Sweden, etc.) (NCCAP, 2023).

In the absence of adaptive measures, climate change is projected to reduce Moldova's GDP by up to 2.8% by 2050, relative to the reference scenario. Investing in climate resilience and adaptation is essential to boost productivity in

[204] Alfonso, L., Ķevers, U., Ridder, T., Stoian, S., Torring, K., Wiśniewski, A., Casartelli, V., Marengo, A., Monteleone, L., Mysiak, J., Zuccaro, G., Brailescu, C., Sørensen, J., & Rouvier, E. (2023). UCPM Peer review report: Republic of Moldova 2023. <https://doi.org/10.25424/CMCC-SJWF-KJ38>.
[205] <https://thedocs.worldbank.org/en/doc/7bf12b95f10a3daf7b570718b2100e15-0080012021/related/MEU-DRM-Special-Topic-May-2021-FINAL-eng-Copy.pdf>.
[206] Fouejieu, Armand (2024), Opportunities and Challenges of Climate Adaptation Policies, Republic of Moldova, Washington DC: International Monetary Fund, Selected Issues Paper, SIP/2024/002.

the agricultural sector and protect livelihoods from climate change. Faster growth will significantly strengthen resilience to climate change at the economy and household levels, but further action is required to strengthen adaptation, especially in vulnerable key economic sectors such as agriculture, infrastructure, and health systems, which while necessitating substantial investment, should yield large net benefits for the economy.

Adaptation investments in transport, health systems, and other critical public infrastructure can protect communities against shocks and enhance service quality. Priorities include retrofitting and upgrading public buildings and infrastructure, starting with schools and health facilities, to ensure their safety and functionality in the aftermath of climate and seismic shocks. The resilience of lifeline infrastructure, including energy, transport, and water, can be improved through better design, maintenance, deployment of nature-based and grey infrastructure, and risk-assessing new investments. Expanding, upgrading, and properly maintaining flood protection infrastructure, including dikes and drainage systems, and implementing the Flood Management Master Plan and Investment Program developed with the EIB would help improve flood protection.

The effect of disasters and climate extremes can be mitigated by investing in emergency preparedness, including upgraded early warning systems and civil protection. While Moldova has made significant progress and has joined the EU Civil Protection Mechanism, it still faces challenges to ensure effective and efficient disaster responses. Priorities include developing policy and institutional mechanisms to strengthen emergency preparedness in health facilities and systems, improve disaster response capacity, and enhance civil protection capacity. This includes acquiring modern emergency response equipment for search, rescue, and firefighting, and improving management, logistics, and communication protocols.

To meet regular disaster response and recovery needs and protect against the financial unpredictability of more severe climate change effects, a disaster risk financing strategy is crucial. The government retains most of the climate and disaster risk on its balance sheet, making little use of catastrophe insurance or other sovereign risk transfer mechanisms. As a result, the country is estimated to face an annual average disaster response funding gap of about US$ 146 million. Its contingency funds require larger budget allocations and more efficient last-mile disbursement mechanisms to ensure they can effectively respond to regular crises, such as seasonal floods and droughts. Adopting contingent financing instruments would enable the government to rapidly mobilize funds in response to the extreme events that exceed the capacity of regular contingency reserves (WB, 2024).

Building climate and disaster resilience is essential for protecting Moldova's recent socioeconomic gains and ensuring its development efforts are sustainable. Despite adopting a comprehensive DRM institutional framework, working to harmonize Moldovan legislation with EU standards, and joining the EU Civil Protection Mechanism, Moldova faces significant challenges to ensure effective and efficient disaster response. The government has been strengthening institutions to better prepare for and respond to disasters, but much remains to be done. Strengthening its DRM institutional architecture will enable Moldova to better respond not just to climatic hazards but also to other shocks, crises, and pressures. Key issues that require attention include:

- An inadequate legal and strategic DRM framework, which does not adequately address disaster risk identification, prevention, reduction, and recovery
- A lack of integration and linkages between climate adaptation and DRM, as separate processes or frameworks address these interlinked areas
- The climate adaptation framework's inadequate attention to critical sectors, such as construction, in terms of seismic resilience, energy conservation, and climate-resilient construction norms, particularly in the most affected urban areas
- A lack of risk reduction investments (such as flood protection) to address known risks: despite investment plans, seismic audits, investments into critical public infrastructure, and the operationalization of climate adaptation services provision, Moldova lacks a robust recovery framework.

Moldova's emergency response capacity is substandard, and its crisis response equipment is absent or outdated. The lack of modern search and rescue, firefighting, and other crucial response equipment can lead to inefficient resource

allocation and loss of life. So, addressing these challenges is crucial for effective emergency response. Developing an integrated concept for warning systems for various hazards and prioritizing earthquakes due to their potentially devastating effects would improve outcomes, while improving management, logistics, and communication protocols between local, regional, and national response teams would strengthen Moldova's technical rescue operational capacities within its existing DRM framework. Emergency response services, government buildings that provide critical public services, such as health and education, and critical infrastructure must continue to function in emergencies, with alternative energy and communications. But most of the country's fire and emergency equipment is outdated, ill-fitted for current needs, and prone to failure [207].

Although Moldova has made significant progress in terms of civil protection and DRM, stronger institutional cross-coordination is required. The country joined the Union Civil Protection Mechanism in September 2023, and its sectoral development action plan, adopted in December 2022, outlines priorities and encourages participation in the mechanism's exercises and training. But Moldova should continue strengthening its civil protection and DRM system, particularly in disaster prevention and preparedness, boosting its operational capacity, infrastructure, early warning systems, and hydrometeorological service to increase resilience (World Bank, 2020)[208]. Establishing secure trans-European services for telematics between administrations would facilitate coordinated communication with the European Commission's Emergency Response Coordination Centre. Moldova actively participates in regional and international initiatives, promoting knowledge sharing and technical assistance. But to strengthen cross-coordination and build a more efficient and effective civil protection and DRM system, Moldova could establish a national disaster management platform (World Bank, 2020), invest in communication infrastructure, conduct regular joint exercises and training, and build community-based DRM initiatives. These measures will ultimately protect citizens and infrastructure from natural disasters and other emergencies[209].

Emergency communication and early warning systems are inadequate, especially in isolated rural areas. Data collection tools and DRM information systems are outdated, hindering accurate risk assessments and timely responses. There is no modern public warning system in place in Moldova, and technologies such as cell phone alarms/alerts are not used. Limited access to information and outdated equipment also contribute to communication gaps during emergencies, resulting in delayed responses, which increase vulnerability, misinformation, and panic (World Bank, 2021)[210]. Global best practices show that marginalized populations, such as women, children, the elderly, and people with disabilities, are often overlooked in DRM strategies. Developing multisectoral partnerships between disaster management agencies, national hydrometeorological services, critical infrastructure operators, and civil society organizations would strengthen links between preparedness efforts and end users. Reliable, effective, and inclusive early warning systems are essential DRM tools for saving lives and protecting livelihoods (WB, 2024)[211].

Risk financing and social protection system reform can enhance Moldova's resilience against future disasters. The government currently retains most of the climate and disaster risk on its balance sheet and has almost no catastrophe insurance or other risk transfer mechanisms in place. To bolster financial resilience, it must tackle the estimated annual US$ 146 million funding gap for disaster recovery. Risk financing strategies-including through insurance or risk transfers are necessary for cost effective management of government contingent liabilities due to disasters (WB, 2024).

Enhancing resilience also requires clear loss and damage assessments and readily available contingency funds, and to this end, the government can reform emergency funds, expand insurance schemes, and establish a system for tracking budget allocations for DRM. The agricultural insurance system, plagued by low uptake and inefficiency, needs revamping and alternative insurance options made available to farmers. The government can also consider disaster risk insurance mechanisms for nonagricultural disasters, such as floods and earthquakes. Finally, social

[207] World Bank Group, 2024. Moldova Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. <http://hdl.handle.net/10986/42381>.
[208] World Bank. 2020a. Strengthening Moldova's Disaster Risk Management and Climate Resilience Facing Current Issues and Future Challenges. https://documents1.worldbank.org/curated/en/767811616046683526/pdf/Strengthening-Moldova-s-Disaster-Risk-Management-and-Climate-Resilience-Facing-Current-Issues-and-Future-Challenges.pdf.
[209] World Bank Group, 2024. Moldova Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. <http://hdl.handle.net/10986/42381>.
[210] World Bank. 2021c. Moldova Water Security and Sanitation Project (P173076): Project Information Document (PID). https:// documents1.worldbank.org/curated/en/235481615608255143/pdf/Project-Information-Document-Moldova-Water -Security-and-Sanitation-Project-P173076.pdf.
[211] World Bank. 2024. Country Climate and Development Report: Moldova.

protection system reforms will aid emergency response and recovery, protect vulnerable groups, and support workers unable to transition to greener roles.

Mainstreaming climate change mitigation and adaptation considerations into the country's planning and public financial management systems through climate risk screening and climate budgeting would improve the transparency, efficiency, and impact of public spending on climate actions. Despite progress in public financial management, challenges remain in fully integrating climate change into the budget process. Moldova does not use specific climate-related expenditure forecasts in its medium-term budget planning or consider climate change measures in its intergovernmental fiscal relations. Fiscal risks from climate change and natural disasters are not assessed or included in fiscal risk statements. Moldova can use such measures, combined with a gender budgeting lens, to improve the sustainability and equity of fiscal planning, ensuring that budgetary decisions support both environmental goals and the needs of disadvantaged groups (WB, 2024)[212].

The Ministry of Finance's annual budget circular, which will include climate change recommendations, could help guide agencies to align their budget proposals with climate strategies. In collaboration with the Ministry of Environment, it is developing a methodology for tagging climate-related expenditures and will need to carefully assess how the climate information will be used before launching its new expenditure management tool. Starting with a spending review could lay the groundwork for incorporating climate budget tagging within the broader budgetary framework. The existing budget program classification is well designed, and its structure could be used to identify and tag climate-related expenditures.

Moldova's public investment management (PIM) framework has seen substantial improvements, presenting an opportunity to incorporate climate-related impacts and strengthen climate policy. Public investments are pivotal in realizing climate goals, serving as a catalyst for private sector green investments by addressing market failures and underpinning essential infrastructure development. In October 2022, Moldova took a decisive step by instituting a new regulation that standardizes the process for identifying, selecting, and appraising all public investment projects, regardless of funding source. This single project pipeline approach ensures a unified and transparent framework for public investments. The PIM framework now mandates environmental and climate impact assessments during feasibility studies and project appraisals (IMF, 2023)[213].

Not all disaster risks can be eliminated, so a coherent disaster risk financing strategy is crucial to complement adaptation investments. The country is estimated to face an average annual funding gap in disaster response of about US$ 146 million. A disaster risk financing strategy would ensure the country can meet regular disaster response and recovery needs, and protect against the uncertainty of more variable and extreme financial losses due to climate change. With proper financial planning, Moldova can ensure the availability of adequate and timely financing and manage the fiscal and debt impacts of disasters, financing the overall expenditures required for the recovery of households, firms, and farms after a disaster, reducing the impact on the most vulnerable, and safeguarding jobs and the economy.

Moldova's contingency funds are underfunded and lack effective last-mile delivery mechanisms to offer targeted support to communities affected by seasonal climate shocks. The Ministry of Finance manages two contingency funds to provide immediate liquidity for financing post-disaster relief and recovery: the Intervention Fund, for an immediate emergency response, including to natural disasters; and the Reserve Fund, for disaster reconstruction and recovery needs. But with limited financial resources, disaster victims rarely receive financial compensation. Larger budget allocations would ensure these contingency funds can effectively respond to regular crises, such as seasonal floods and droughts, while more efficient last-mile disbursement mechanisms would ensure post-disaster assistance reaches affected districts and communities - for example, delivered through a shock-responsive social protection system (WB, 2024).

Contingency funds need to be complemented by risk financing instruments that enable the rapid mobilization of funds in the aftermath of more extreme events. Moldova has minimal catastrophe insurance or other risk transfer

[212] World Bank Group, 2024. Moldova Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. <http://hdl.handle.net/10986/42381>.
[213] IMF. 2023. High-Level Summary Technical Assistance Report. Republic of Moldova. Climate Module of the Public Investment Management Assessment. <https://www.imf.org/en/Publications/high-level-summary-technical -assistance-reports/Issues/2023/11/13/Republic-of-Moldova-Climate-Module-of-the-Public-Investment-Management -Assessment-541400>.

mechanisms, and instead retains most of the disaster risk on its balance sheet. But with insufficient contingency funds, it has to rely on appeals to the international community for post-disaster support. And in the absence of up-to-date data and clear mechanisms for calculating loss and damage, estimating its contingent liabilities and post-disaster needs is difficult. Adopting contingent financing instruments would allow it to rapidly mobilize disaster response financing and hedge against more extreme events for which regular contingency reserve funds are insufficient. Moldova could prepare contingent credit lines, which can be released immediately following a disaster complementing them with sovereign risk transfer solutions, such as market-based instruments (catastrophe bonds), which transfer risks to international capital markets, or a national catastrophe risk insurance program to protect national and local government agencies[214].

The private sector can also play a crucial role in supporting adaptation measures in Moldova through three main channels: financing, adapting its own operation, and providing goods and services that facilitate adaptation for others. Moldovan banks can collaborate with multilateral development banks and the government to create credit lines that encourage investments in adaptation. Financing mechanisms might include traditional debt instruments, such as bonds and loans, and innovative instruments with environmental performance incentives, such as green, sustainable, and sustainability-linked bonds and loans. Such incentives can support purely private projects-such as a firm investing in irrigation for its own operations—and hybrid projects that involve both public and private investments (that is, public infrastructure projects funded and implemented by PPPs).

Moldova's climate-resilient green transition will require substantial investment. The World Bank 2024 Country Climate and Development Report (CCDR)[215] estimates that the 'National Energy and Climate Plan' (NECP 2030) scenario will require a total investment of US $ 31 billion over the next 30 years, considering a 6% discount rate to arrive at a net present value (NPV), or 13.2% of the cumulative GDP (also discounted). The 'Net Zero by 2050' scenario requires an additional US$ 8.0 billion, or 3.6% of GDP. This compares to the US$ 15.4 billion, or 6.6% of GDP, required under the reference scenario. But, while total investment expenses are significantly higher under the 'NECP 2030' and 'Net Zero by 2050' scenarios, operational expenses decline due to lower fuel import needs. To fund these investments, Moldova can implement progressive tax reforms, improve public spending, introduce carbon pricing, and mainstream climate change in public finance. Funding the mitigation measures partially through public resources would result in a higher public debt-to-GDP ratio compared to the reference scenario (WB, 2024).

3.5. Cooperation, good practice, experience gained and lessons learned

3.5.1. Efforts to share information, best practices, experience and lessons learned

A notable example is participation of the Republic of Moldova in the UNFCCC Eastern Europe, Caucasus and Central Asia Initiative[216], which facilitates exchange of information, experience and best practices among member countries. This covers development and implementation of the following:

- NCCAP 2030[217];
- NDC of the Republic of Moldova to Paris Agreement[218].

NDC 2.0 (2020) was developed with the support of the EU4Climate Regional Project, funded by the European Union and implemented by UNDP in six countries of the Eastern Partnership (Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova and Ukraine).

According to NDC 2.0, the Republic of Moldova intends to reach more ambitious goals than those stated in the intended Nationally Determined Contribution (NDC 1.0, 2015). The unconditional objective of NDC 2.0, which covers the entire economy of the country, provides for reduction of greenhouse gas emissions by 70% in 2030 as compared to the level of the reference year, 1990, instead of 64-67% undertaken in NDC 1.0.

[214] World Bank Group, 2024. Moldova Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. <http://hdl.handle.net/10986/42381>.
[215] World Bank Group, 2024. Moldova Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. <http://hdl.handle.net/10986/42381>.
[216] <https://www.legis.md/cautare/getResults?doc_id=60740&lang=ro>.
[217] <https://www.legis.md/cautare/getResults?doc_id=140163&lang=ro>.
[218] <https://unfccc.int/sites/default/files/NDC/2022-06/MD_Updated_NDC_final_version_EN.pdf>.

The legal and regulatory framework in the field of climate change adaptation (CCA) includes:

- Law no. 78/2017 on ratification of the Paris Agreement[219]. The Paris Agreement explicitly addresses the establishment of a global goal of "increasing adaptive capacity, strengthening resilience and reducing vulnerability to climate change to contribute to sustainable development". The Republic of Moldova submitted to UNFCCC its NC4 in 2018[220] and the updated NDC (NDC 2.0) in 2020. Both documents comprise information on climate change adaptation based on the experience gained from implementation of the NCCAS 2020[221];
- Law no. 74/2024 on climate action[222], which establishes the legal framework in the field of climate actions aimed at reaching climate neutrality by the year 2050, in order to meet the long-term target on global temperature provided for in the Paris Agreement, ratified by Law no. 78/2017, as well as the regulatory framework for making progress in order to achieve the global targets in terms of adaptation to climate change; given that the purpose of the law is to ensure gradual and irreversible reduction of greenhouse gas emissions in order to protect human health, the integrity of ecosystems and biodiversity against climate change risks, to strengthen the adaptive capacity, to reduce the vulnerability of society to climate change and to increase climate resilience by applying the financial mechanism for setting a price on carbon dioxide emissions and the "polluter pays" principle;
- GD no. 1277/2018 on establishment and operation of the National System for Monitoring and Reporting GHG emissions and other information relevant to climate change[223];
- GD no. 425/2024 on the organization and operation of the National Commission on Climate Change[224].

3.5.1.1. Science, planning of adaptation-relevant policies

Climate change adaptation (CCA) is a significant challenge for Moldova, determining the need for an integrated approach involving science, strategic planning and formulation of relevant policies. This need is exacerbated by the country's specific vulnerabilities, such as dependence on agriculture, limited water resources and insufficiently developed infrastructure to cope with extreme weather events.

Role of science in understanding climate change

In Moldova, scientific research has played a crucial role in mapping climate change impacts, as well as in identifying vulnerabilities and adaptive capacities. Climatological studies, risk analyses and modelling of future scenarios provided the necessary knowledge basis for planning and implementing adaptation measures. For example, modelling changes in temperature and precipitation has guided the development of climate-resilient agricultural practices.

Strategic planning for adaptation

Strategic planning involved the development of tools and frameworks, such as NCCAP 2030[225] and NDC 2.0[226], which integrate climate change adaptation goals into national development plans. These plans are based on rigorous scientific assessments and are designed to be dynamic and able to respond to new climate change information and scenarios. A key aspect of strategic planning is the inclusion of a multi-sectoral approach, ensuring consistency and synergy between different policy areas affected by climate change

Formulation of relevant policies

Policy formulation in Moldova has been guided by the need to address both climate change mitigation and adaptation. Relevant policies had aimed at improving the natural resource management, promoting energy efficiency and renewable energy, as well as strengthening resilience of communities and ecosystems. Implementing specific laws and regulations, such as climate-resilient building standards, promoting climate-smart agriculture,

[219] <https://www.legis.md/cautare/getResults?doc_id=99251&lang=ro>.
[220] <https://unfccc.int/sites/default/files/resource/Moldova_CN4_En_web_070218.pdf>.
[221] <https://www.legis.md/cautare/getResults?doc_id=114739&lang=ro>.
[222] <https://www.legis.md/cautare/getResults?doc_id=143228&lang=ro>.
[223] <https://www.legis.md/cautare/getResults?doc_id=142177&lang=ro>.
[224] <https://www.legis.md/cautare/getResults?doc_id=143648&lang=ro>.
[225] <https://www.legis.md/cautare/getResults?doc_id=140163&lang=ro>.
[226] <https://unfccc.int/sites/default/files/NDC/2022-06/MD_Updated_NDC_final_version_EN.pdf>.

including promoting agricultural crops that have the potential to withstand climate change (drought, high temperatures), and identifying health risks associated with climate change, environmental and climate-related factors in the country, were essential in ensuring efficient adaptation.

According to paragraph 139 of NCCAP 2030: *"The transition to higher standards in construction which are more relevant to the constantly changing climate conditions will be beneficial in the medium and long term for the transport infrastructure of the Republic of Moldova. However, these standards must be applied during the entire life cycle of the infrastructure - from design to construction, including the maintenance process".*

According to paragraph 187 of NCCAP 2030: *"In the energy sector, climate change adaptation measures aim at reducing energy loss. In the transport sector, some adaptation measures are included, for example in road construction. In forestry, adaptation measures aim to increase forested areas to mitigate climate change and increase biological diversity".*

Mainstreaming adaptation at all governance levels

A key aspect of adaptation efforts in Moldova has been integration of climate change considerations in all levels of governance, from national - to local. This included development of capacities and mechanisms for implementation of adaptation strategies at the level of local authorities, as well as involvement of communities in the planning and decision-making process.

Adaptation to climate change in Moldova is a complex process that requires an integrated approach, based on science, strategic planning and relevant policies. The efforts of the country to improve scientific knowledge, develop effective plans and policies, and engage in international cooperation are critical to building long-term resilience to climate change impacts. However, the success of adaptation will also depend on the ability to innovate, mobilize the necessary resources and involve all stakeholders in this vital process.

3.5.1.2. Innovation reflected in policies and pilot and demonstration projects on climate change adaptation

In the context of climate change adaptation, the Republic of Moldova has acknowledged the need to innovate in terms of policies and implementation of pilot and demonstration projects for adaptation to climate change. This innovative approach aims to test and showcase effective solutions that can be scaled up to increase the country's ecological, economic and social resilience.

Innovation in national policies

The Republic of Moldova has adopted innovative policies that incorporate climate change adaptation as an essential component of national development. A notable example is integration of climate change adaptation objectives into sectoral policies, such as agriculture, water management and urban planning. This includes developing rules and regulations that promote sustainable and climate-resilient practices, such as efficient irrigation technologies and green buildings.

Pilot and demonstration projects

Moldova has implemented a number of pilot and demonstration projects aimed at testing innovative approaches for adaptation to climate change. These projects cover a wide range of fields (Table 3-17). NCCAP 2030 was developed with the support of the UNDP Project "Promoting the national process of planning the adaptation of the Republic of Moldova to climate change" (NAP-2), financed by the Green Climate Fund (GCF).

Table 3-17: Areas of pilot and demonstration projects on adaptation to climate change (case of the Republic of Moldova)

Area	Pilot and demonstration projects
Sustainable agriculture	Implementing climate-resilient agricultural techniques such as crop rotation, conservation agriculture and agroforestry systems to improve food security and reduce soil erosion. In accordance with NPACC 2030, drought-resistant plant species are promoted, protection measures against frost and hail are implemented, the purchase of anti-hail nets is incentivized[227]
Water resource management	Installing innovative rainwater harvesting and efficient irrigation systems to better manage water resources under climate change. For example, reservoirs were restored in Sîngerei and Călărași districts, to ensure irrigation of agricultural land and address the effects of drought. These reservoirs collect water from precipitation and snow, helping to reduce soil erosion[228]. According to NPACC 2030, the reuse of water for domestic and industrial use is encouraged.

[227] <https://www.undp.org/ro/moldova/press-releases/moldova-are-un-program-national-de-adaptare-la-schimbarile-climatice-pana-2030-elaborat-cu-sprijinul-pnud-moldova>.
[228] <https://moldova.un.org/ro/12582-cu-rezervoarele-restaurate-afacerile-%C3%AEnfloresc-%C3%AEn-zonele-rurale-ale-moldovei>.

Area	Pilot and demonstration projects
Restoring forestry ecosystems	The Pilot Project "Clima East Moldova: Mitigation of climate change and adaptation at the ecosystem level in the Orhei National Park" was carried out. The project envisages the development of innovative systems for management of community grassland and forests throughout the territory of the park, including rehabilitation of 500 ha of pastures and afforestation of 150 ha of eroded and non-productive land, as well as a comprehensive inventory of communal grassland (5890.92 ha) within the Orhei National Park and development of management plans[229]. In accordance with NPACC 2030, forested areas are being expanded to increase climate resilience.
Human health	According to NPACC 2030, medical protocols are adjusted to address diseases caused by climate change.
Renewable energy	Promoting the use of renewable energy sources such as solar energy and biomass to reduce dependence on fossil fuels and reduce greenhouse gas emissions. NPACC 2030 provides for improvement of electricity supply infrastructure to minimize loss caused by extreme climatic events.

Four innovational projects will be implemented by November 2024 due to the support of the Czech Innovation Fund and the UNDP, with financial support from the Czech Ministry of Foreign Affairs. According to UNDP, each project will receive up to US$ 40,000[230]:

- The Czech non-governmental organization Caritas, in cooperation with authorities of Bilicenii Vechi village, Sângerei district, will develop and install a rainwater collection system to increase the village's resilience to natural disasters and promote sustainable development;
- The Czech company, Big Terra, in cooperation with the National Association for Rural Development of Moldova, will test regenerative vine cultivation in Moldova and increase its resistance to climate challenges;
- The Czech NGO, Arnika, in partnership with NGO Biotica, will take care of solving the problems of managing protected territories with limited resources, modernizing networks and promoting ecological management;
- The Institute for Experimental Botany of the Czech Academy of Sciences, together with colleagues from the State University of Moldova, will conduct research on tomato diseases and addressing them.

One of the main barriers identified was the need for additional funding to scale up and replicate successful projects. In this sense, strengthening partnerships with international organizations and accessing global climate funds are essential steps.

Policy innovation and implementation of pilot and demonstration projects have played a key role in Moldova's efforts to adapt to climate change. The experience gained in these initiatives provides a solid foundation for development of scalable and effective adaptation strategies that can be applied nationally and internationally. To maximize the impact of such efforts, it is crucial to continue investing in research and development, as well as to foster a collaborative framework.

3.5.1.3. Mainstreaming climate change adaptation actions into planning at different levels

Mainstreaming of climate change adaptation actions into planning at different levels is a strategic priority for Moldova, a country significantly affected by climate change effects, such as drought, floods, soil erosion, etc. This multi-dimensional approach involves adapting development policies, strategies and plans at all levels, including government and sectoral levels, to improve the socio-economic and ecological resilience of the country.

Mainstreaming at national level

At the national level, Moldova has incorporated climate change adaptation into its legal framework and key policies. The development of NCCAS 2020, respectively of NCCAP 2030 and the consideration of the adaptation component in NDC 1.0 and NDC 2.0 to the Paris Agreement, represent major initiatives that guide adaptation actions in the Republic of Moldova. These strategic documents establish a framework for mainstreaming climate change adaptation in all relevant sectors such as agriculture, water resource management, healthcare and infrastructure. It also promotes the use of innovative technologies and sustainable practices to minimize vulnerabilities and increase the country's adaptive capacity.

Mainstreaming at sector level

In addition to mainstreaming at the national level, Moldova has placed a special emphasis on sectoral adaptation, recognizing the specificities and needs of different economic sectors. In agriculture, for example, sustainable soil

[229] <https://icas.com.md/activitati-2/proiecte-internationale-in-derulare/proiectul-pilot-clima-east-moldova-atenuarea-schimbarilor-climatice-si-adaptarea-la-nivel-de-ecosistem-in-parcul-national-orhei/>.
[230] <https://www.infotag.md/economics-ro/313653/>.

management practices and efficient irrigation techniques have been introduced to address erosion and drought. In the water resource management sector, strategies have been developed to improve the quality and efficiency of water use, including rainwater harvesting systems and improved flood prevention infrastructure. As mentioned above in section 3.5.1.2. *"The Czech non-governmental organization Caritas, in cooperation with the authorities of Bilicenii Vechi village, Sîngerei district, is installing a rainwater collection system to increase the village's resilience to natural disasters and promote sustainable development".*

Mainstreaming at local level

Mainstreaming of adaptation actions at the local level is essential for effective implementation of national and sectoral strategies. Local initiatives such as community-based reforestation projects and climate change awareness and education programs are vital to increasing communities' resilience to climate impacts. In this context, the involvement of local authorities and communities in planning and implementation of adaptation actions is crucial for the success of such initiatives. As mentioned above in section 3.5.1.2. *"The Pilot Project "Clima East Moldova: climate change mitigation and adaptation at the ecosystem level in the Orhei National Park" was carried out.*

Challenges and opportunities

Efficient integration of climate change adaptation actions into planning entails challenges, including the need for consistent funding, development of specialized skills and knowledge, and strengthening cooperation between different levels of government and sectors. However, this approach also provides significant opportunities for sustainable development of Moldova, by promoting innovation, increasing economic efficiency and protecting the environment.

Mainstreaming climate change adaptation actions into planning at different levels is an essential step for Moldova in its effort to navigate the climate change challenges by adopting a comprehensive and coordinated approach involving both national and international levels.

3.5.1.4. Cooperation to share information and strengthen science, institutions and adaptation to climate change

Moldova is facing significant climate change challenges, including extreme weather events and vulnerabilities of key sectors, such as agriculture and water resource management; thus, the country acknowledges the importance of international and regional cooperation in sharing information, strengthening science and institutions, and promoting efficient adaptation. This necessity stems from the understanding that climate change is a global problem, requiring coordinated and knowledge-based responses.

International and regional cooperation focused on information sharing

Moldova has engaged in a number of international and regional initiatives that facilitate the exchange of relevant data and information for adaptation to climate change. By participating in regional programs and projects, as well as by cooperating within the "Eastern Partnership" and the "EU Strategy for the Danube Region", Moldova has accessed valuable platforms for exchange of best practices, lessons learned and innovative technologies. This involvement has facilitated the country's integration into global and regional knowledge networks, thereby improving national capacity to respond to climate challenges.

Strengthening science and institutions

While acknowledging that a solid research base is essential for formulating effective adaptation policies, Moldova has invested in strengthening its research and institutional capacities. Cooperation with international organizations, such as the UNDP and the WB, have supported conducting of studies and research that address the country's climate specific circumstances. These efforts are complemented by training and capacity-building programs for climate and environmental professionals, aiming to increase the skills needed to implement adaptation strategies.

Promotion of climate change adaptation

In the context of adaptation to climate change, cooperation has played a crucial role in development and implementation of adaptation measures and projects. By cooperating with international and regional partners,

Moldova has obtained technical and financial support for pilot projects that address issues such as sustainable water management, agriculture adapted to climate change, and strengthening infrastructure to reduce vulnerability to extreme weather events. These projects not only demonstrated the viability of innovative adaptation solutions, but also provided replicable models for other regions of the country and neighboring states.

Bilateral cooperation

Bilateral cooperation with countries such as Romania, Germany and France was also significant. These partnerships included projects to improve water resource management, promote sustainable agriculture and implement renewable energy technologies. For example, with the financial support of the German Government, Moldova has developed and implemented projects to restore irrigation systems to reduce drought-related vulnerability.

Attracting external assistance for development and modernization of the agri-food sector included the ratification of the Loan Agreement with the International Bank for Reconstruction and Development for the "Agriculture Governance, Growth and Resilience Investment (AGGRI)" project in the amount of 55 million US dollars, for strengthening institutional capacities, restoring irrigation systems, development of the livestock sector.

Also, a grant agreement with the Government of Japan for "Provision of fertilizer to farmers" Project was signed, the eligible activities within the "Moldovan Orchard" Project were expanded, the feasibility study on restoring irrigation systems was initiated with the support of the French Development Agency. The Agri-Food Partnership Platform was launched with EU support[231].

According to the "Report on the Government's activity in 2023", the main measures undertaken by the executive in the agri-food sector, in the context of adaptation to climate change, were as follows:

- through the Agency for Development and Modernization of Agriculture (ADMA), within 7 projects intended to finance farmers, 45 agricultural producers were financed for the development of irrigation systems and an increase of the total irrigated area by over 1,060 ha;
- in order to accelerate the process of harmonizing policies in line with EU legislation, changes were made to the legal framework. For example:
  - the Parliament adopted, on February 15, 2024, the new Land Code, which aims to create a new legal framework for the regulation of land relations adapted to existing realities, and changes in the regulatory framework on management of cropland to ensure use of centralized irrigation systems[232];
  - Law no. 305/2023 was approved on amending some regulatory acts (management of pastures and grassland and ensuring use of centralized irrigation systems transferred for use through a bailment contract)[233].

The Loan Agreement between the Republic of Moldova and the IBRD for implementation of the "Agriculture Governance, Growth and Resilience Investment" Project[234], amounting to US$ 55 million, was ratified. One of the priority fields and directions of intervention for sustainable development of agriculture is the rehabilitation of centralized irrigation systems - indispensable to increase the resilience of the agricultural sector to climate change.

With the support of the French Development Agency (about EUR 40 million), the development of a feasibility study on rehabilitation of centralized irrigation systems was initiated, with two investment components established for:

- Centralized irrigation systems;
- Water storage for development of small-scale irrigation.

Cooperation with international organizations such as the World Bank, the UNDP and the GEF facilitated access to financial resources and technical expertise. These partnerships supported energy efficiency projects, disaster

[231] <https://gov.md/sites/default/files/document/attachments/raport_consolidat_guvern_2023_final1.pdf>.
[232] <https://www.infotag.md/populis-ru/313917/>.
[233] <https://www.legis.md/cautare/getResults?doc_id=139929&lang=ro>.
[234] <https://monitorul.gov.md/ro/monitorul/view/pdf/2756/part/1#page=6>.

risk management and biodiversity conservation. For example, a project implemented with UNDP and GEF support is expected to improve the capacity of local communities to manage flood risks through construction of dams and early warning systems.

In Moldova, the MD-Alert warning system will be introduced, similar to the one in Romania, RO-Alert. On February 18, 2024, the first stage of the feasibility project was launched. The system allows for dissemination of warning and alarm messages to the population in case of natural hazards that seriously threaten life and health of citizens.

In addition, Moldova is active in regional initiatives, such as the EU Strategy for Danube Region, which promotes cooperation in the field of adaptation to climate change between countries of the Danube basin. This includes transboundary water management and aquatic ecosystem conservation projects.

To ensure the sustainability of these efforts, Moldova has placed a special emphasis on strengthening institutional capacities and on involving civil society in the process of climate change adaptation. Education and public awareness initiatives are essential to increase community involvement and accountability.

To review the above, we conclude that cooperation of Moldova with other countries and international organizations in the field of climate change adaptation is a vital issue for managing the adverse effects of this global phenomenon. These partnerships facilitated the exchange of knowledge, access to financial and technology resources, and supported implementation of efficient climate change adaptation solutions at the national and local levels. The continuation of cooperation of the Republic of Moldova with other countries in the field of climate change adaptation and extension of such cooperation are vital for Moldova.

Mainstreaming of climate change adaptation actions into planning at different levels in Moldova highlights an effective model of international and regional cooperation in information sharing, strengthening science and institutions, and promoting adaptation. Through its commitment to multidimensional collaboration, Moldova has made significant progress in improving national resilience to climate change impact. Continuation and extending these cooperative efforts will be essential to ensure sustainable and efficient adaptation.

3.5.1.5. Scope, extent and types of cooperation and best practices on climate change adaptation

Adaptation to climate change is a global priority that requires coordinated efforts at all levels of government and across all sectors of society. Moldova, a country significantly affected by climate change, has recognized the importance of international, regional and local cooperation in addressing this phenomenon. The scope and extent of cooperation related to climate change adaptation in Moldova covers a wide range of initiatives, partnerships and good practices, aimed at improving the ecological, economic and social resilience of the country.

Scope of cooperation

Cooperation in the field of climate change adaptation in Moldova covers several key sectors, including agriculture, water resource management, environmental protection, energy and infrastructure. This broad scope reflects the recognition that climate change has cross-cutting effects, requiring integrated and multifaceted responses.

Extent of cooperation

International Cooperation: Moldova cooperates with various international organizations and foreign governments to access funding, technical expertise and support for implementation of adaptation projects. This includes participating in global conventions such as UNFCCC and accessing international climate funds such as the GCF.

Regional Cooperation: At the regional level, Moldova participates in initiatives such as the "EU Strategy for the Danube Region" and the "Eastern Partnership", which promote sharing of knowledge and best practices in adaptation to climate change between member countries. Moldova is involved in several regional programs and cross-border initiatives that address adaptation to climate change and other environmental issues. Below are examples of completed programs, including an ongoing one, and a draft plan for the next five years:

- *Romania-Republic of Moldova Joint Operational Program 2014-2020*: This cross-border program, financed by the EU through the European Neighborhood Instrument, includes 78 projects in the fields of education,

healthcare, infrastructure and emergency prevention. The aim of the projects is to improve cooperation and development in border areas[235].

- *Interreg NEXT Program Romania-Republic of Moldova 2021-2027*[236]: this program, which was approved by the European Commission, aims to improve education, healthcare and nature conservation. The Program provides funding for projects that benefit communities on both sides of the border.
- *Project for an Integrated National Plan for Energy and Climate 2025-2030*[237], which is a roadmap for reaching decarbonization goals of the territory on the right bank of the Dniester River. This plan foresees increasing the share of renewable sources in the energy mix, improving energy efficiency and reducing GHG emissions. It is supported by the EU and UNDP and aims to decarbonize the energy sector and to support transition to a green economy.

Moldova cooperates with the European Committee of the Regions (CoR), which supports the EU's climate change adaptation strategies and promotes local solutions to improve resilience of local communities. The CoR facilitates exchange of best practices between regions and local authorities to adapt to extreme climate conditions. Moldova also cooperates with the Romanian National Environmental Guard to exchange best practices in waste management, to improve waste monitoring and traceability[238]. This cooperation includes study tours and meetings to learn from Romania's experiences in managing waste flows and in use of IT applications to simplify waste notification procedures.

Local Cooperation: At the local level, cooperation is manifested through partnerships between the Government, communities, non-governmental organizations and the private sector, to develop and implement adaptation solutions that meet the specific needs of local communities.

Types of cooperation and good practice

Pilot and demonstration projects: The implementation of pilot and demonstration projects is a recognized good practice, allowing for testing and evaluation of innovative adaptation solutions under real life conditions. These projects provide valuable opportunities for learning and replication, both within the country and in the regional context (examples are provided above in section 3.5.1.2.).

Knowledge sharing: The organization of workshops, seminars and training programs is a central element of cooperation, facilitating dissemination of knowledge, experience and good practices in the field of adaptation to climate change. At the "Ion Creangă" State Pedagogical University in Chisinau within the sub-project *"Ensuring quality and relevance of professional training of future teachers through innovative education programs and programs related to the labor market"* (2023), three thematic modules were developed: Education for health; Ecological education; and Climate change and adaptation measures; to be included in the curriculum in the field of "Educational Sciences" starting with the 2024-2025 academic year.

Technologies and innovations: Technology cooperation involves adoption and adaptation of innovative and sustainable technologies, such as efficient irrigation systems, renewable energy solutions and green building technologies, to reduce vulnerability to climate change (examples are provided above in section 3.5.1.2.).

3.5.1.6. Improving sustainability and effectiveness of adaptation actions

The Republic of Moldova has improved the sustainability and effectiveness of climate change adaptation actions through various measures and initiatives, supported by both international organizations and national policies:

1) ***Development and implementation of specific national programs in the context of adaptation to climate change***: NCCAP 2030 was developed and is under implementation. It was developed with the support of the NAP-2 project financed by GCF and implemented by UNDP. NCCAP 2030 sets clear objectives for increasing climate resilience in six key sectors: agriculture, healthcare, transport, energy, water and forestry

[235] <https://ogpae.gov.md/poc-ro-md-2014-2020/>.
[236] <https://ogpae.gov.md/poc-ro-md-2021-2027/>.
[237] <https://energie.gov.md/ro/content/planul-national-integrat-pentru-energie-si-clima-o-foaie-de-parcurs-pentru-economie-si>.
[238] <https://am.gov.md/ro/content/schimb-de-experien%C8%9B%C4%83-%C8%99i-bune-practici-%C3%AEn-domeniul-gestion%C4%83rii-de%C5%9Feurilor-dintre-garda>.

sectors. Actions include specific measures such as promoting drought-resistant crops, increasing forested areas and improving energy infrastructure (Table 3.1.8).

2) ***Cross-border projects and international cooperation***: The Interreg NEXT Romania-Republic of Moldova 2021-2027 Program was developed and is on-going. Through this program, the country has participated and continues to participate in projects that facilitate sharing of best practices and technologies with other countries. These projects are funded by the European Union and target various fields, including education, healthcare and nature conservation, contributing to sustainable development and adaptation to climate change[239].

3) ***Investment in renewable energy and energy efficiency***: In accordance with point 34 par. 9) of the Regulation on planning, development, approval, implementation, monitoring and evaluation of public policy documents, approved by GD no. 386/2020[240], the Ministry of Energy presented for public consultation, on February 16, 2024, the draft National Energy and Climate Plan (NECP) of the Republic of Moldova for the 2025-2030 period[241]. The document was developed by the Ministry of Energy, with the support of the European Union, provided through Program "Addressing the impacts of the energy crisis in the Republic of Moldova", implemented by UNDP Moldova, respectively with the support of the USAID-funded "Energy Security of the Republic of Moldova" (MESA). NECP 2025-2030 provides for increasing the share of renewable sources in the energy mix and improving energy efficiency. Actions include installing photovoltaic panels, promoting smart chargers for electric cars and diversifying energy sources to reduce greenhouse gas emissions.

4) ***Partnerships and knowledge sharing***: Moldova cooperates with various international and regional organizations to share experiences and best practices. For example, cooperation with the Romanian National Environmental Guard in the field of waste management allowed for knowledge sharing and implementation of effective IT systems for waste monitoring and traceability[242].

5) ***Education and public awareness***: Events such as "Sun Dă-i Fest 2024" and other awareness building campaigns organized by UNDP Moldova promote an ecological lifestyle and educate the public about the importance of energy efficiency and adaptation to climate change[243].

These efforts contribute to strengthening the sustainability and effectiveness of climate change adaptation actions in the Republic of Moldova.

3.5.2. Strengthening research and knowledge

3.5.2.1. Climate, including systematic research and observation and early warning systems to inform climate services and decision-making

In the current climate change context, research, systematic observation and development of early warning systems are essential elements in informing climate services and improving decision-making. These components are crucial to efficiently anticipate and respond to climate change impacts, as well as to minimize risks associated with extreme weather events. Moldova has begun to pay more attention to the development and implementation of such systems.

Research and Systematic Observation in Moldova

Climate research and systematic observations are fundamental to understanding climate patterns and long-term trends in Moldova. The country has begun to improve its observation infrastructure, including upgrading weather stations and installing new monitoring equipment, to collect more accurate and representative data. For example, on November 18, 2021, a new weather station was launched in the village of Bălțata, Criuleni district. In Bălțata there was an old weather station built in the 80s, but since the building required major renovation, the station was preserved. A new modular station was built near the old weather station built in the 80s and preserved. Its place

[239] <https://ogpae.gov.md/poc-ro-md-2021-2027/>.
[240] <https://www.legis.md/cautare/getResults?doc_id=121921&lang=ro>.
[241] <https://energie.gov.md/ro/content/planul-national-integrat-pentru-energie-si-clima-o-foaie-de-parcurs-pentru-economie-si>.
[242] <https://am.gov.md/ro/content/schimb-de-experien%C8%9B%C4%83-%C8%99i-bune-practici-%C3%AEn-domeniul-gestion%C4%83rii-de%C5%9Feurilor-dintre-garda>.
[243] <https://www.undp.org/ro/moldova/press-releases/sun-da-i-fest-2024-festivalul-tehnologiilor-verzi-si-al-unui-trai-sustenabil>.

can be changed depending on changing weather conditions. The observation points are mobile and equipped with modern machinery and equipment. Thus, due to the flexibility of these sources that provide weather data, the weather forecasts can be developed with greater accuracy[244]. These efforts are essential for climate modelling and for assessing climate change impacts on various sectors, such as agriculture, water management and public health.

Early Warning Systems

Moldova participated in the TEAWAS cross-border early warning 14-months project (December 2017 – February 2019), which aimed to reduce the negative ecological, economic and social impacts in the event of natural disasters and calamities, such as flooding on the Pruth River, by creating a unique mechanism for early warning and alerting citizens and public authorities[245].

In 2024 Moldova started to implement a national early warning system (EWS) for emergency situations. This system is called MD-Alert, and is similar to the one in Romania, RO-Alert. The MD-ALERT-STUDY project provides for conducting a feasibility study and preparing specific documentation for implementation of the National System for warning the population in case of emergency/exceptional situations[246]. The implementation of the EWS is a priority for Moldova, the country acknowledging its capacity to save lives and reduce economic loss through early warning of the population and the authorities about extreme weather events. The EWS focuses on various risks, including floods, drought and heat waves, and relies on integration of observational data with projection models to provide accurate and timely warnings.

Informing climate services and decision-making

Data obtained through research and observations, along with information generated by EWS, are vital for informing climate services. These services provide essential climate information and forecasts for planning and implementation of adaptation and mitigation measures in various sectors. For example, farmers can use climate information to choose the most appropriate types of crops and irrigation practices, while authorities can develop more efficient disaster risk management plans. Integrating these data into the decision-making process contributes to creating of a more resilient society adapted to climate change. Decisions based on sound data and scientific analysis can lead to more efficient allocation of resources and implementation of policies and measures that minimize the negative climate change impacts.

Challenges and prospects

However, Moldova faces challenges in strengthening its research, observation and early warning systems, including a need for additional funding, a need for continuous training and professional development of professional in the field, as well as improving international cooperation and data sharing. To overcome these challenges, close cooperation between the government, research institutions, the private sector and local communities, as well as international partners, is essential.

In conclusion, improving the sustainability and effectiveness of climate change adaptation actions in Moldova requires an integrated approach that combines advanced research, systematic observations and early warning systems. These components are crucial to underpinning climate decisions and policies with accurate scientific data and analysis. By strengthening these systems, Moldova can improve its ability to respond to extreme weather events and long-term climate change impacts, thus protecting vulnerable communities and ecosystems. Cross-sectoral and international cooperation, along with investment in technology and training, will be essential to ensure continued progress towards a resilient society adapted to new climate realities. Thus, Moldova can become a model of best practices in the region for climate change management through innovation and cooperation.

3.5.2.2. Climate change vulnerability and adaptation to climate change

The Republic of Moldova has undertaken several actions to increase the country's knowledge and adaptation to climate change vulnerabilities. One of the major initiatives is the NCCAP 2030, approved by the Government

[244] <https://www.mediu.gov.md/ro/content/3601>.
[245] <https://dse.md/teawas/index.php>.
[246] <https://dse.md/content/studiu-de-fezabilitate-%C8%99i-documenta%C8%9Bie-specific%C4%83-pentru-implementarea-sistemului-na%C8%9Bional-de>.

on August 30, 2023. The program aims to integrate climate change adaptation measures into sectoral policies and disaster risk management. The NCCAP 2030 targets six priority sectors: agriculture, healthcare, transport, energy, water and forestry. Key actions within the program include:

1) ***Forestry***: Increase forested area from the current 11.0%, up to 16% by 2030, to mitigate climate change effects. For comparison, the European Union afforestation average is 30-45%.
2) ***Agriculture***: Promotion of drought-resistant species, use of anti-hail nets and implementation of measures to protect crops from early frosts.
3) ***Transport***: Update standards for building and maintaining road infrastructure to withstand climate change damage.
4) ***Healthcare***: Adjust or develop new clinical protocols for prevention and treatment of diseases caused or exacerbated by climate change.
5) ***Energy***: Improve electricity supply infrastructure to reduce loss caused by extreme weather events.
6) ***Water Resources***: Encourage water reuse in households and industry[247].

Also, the "National Adaptation Planning" (NAP) process is an essential part of Moldova's strategy, focusing on mainstreaming of climate change adaptation (CCA) into national policies, budgets and sectoral development plans. This process involves development of a comprehensive CCA monitoring and evaluation system and launch of a climate change information and knowledge management portal[248]. These efforts are part of a wider commitment of the Republic of Moldova to align its environmental policies to the EU standards and to achieve the targets set forth in the Paris Agreement. The country has also received international support, including partnerships with the Austrian Development Agency (ADA), the EU and other international partners, to strengthen its institutional capacities and increase its resilience to climate change impacts.

3.5.2.3. Monitoring and evaluation of adaptation

The experience gained by Moldova in managing challenges caused by natural disasters, such as drought, soil erosion and extreme weather events, led to skills development (as a result of lessons learned) to establish objectives for future efforts to adapt to climate change both at the national level, as well as internationally (Table 3-18).

The experience of Moldova in climate change adaptation offers valuable lessons on the importance of integrated planning, multi-sector cooperation, investment in knowledge, use of innovative technologies and nature-based solutions, continuous monitoring and evaluation.

Table 3-18: Experience of Moldova in the field of climate change adaptation

Lessons learnt	Experience
Importance of strategic planning and mainstreaming	The Republic of Moldova has recognized the need to integrate climate change adaptation in development policies and plans at all levels. The approval and implementation of the NPACC 2030 and the updated NDC (NDC 2.0) highlighted the importance of a strategic approach, which includes vulnerability assessments and prioritization of adaptation actions. The lesson learned is that strategic planning and integration facilitate better allocation of resources and improve the effectiveness of interventions.
Major role of multisectoral cooperation	The experience of the Republic of Moldova underlines the value of cooperation between the Government, the private sector, NGOs and communities. Successful projects have involved stakeholders from various sectors, including agriculture, water resource, forestry, energy, transport and healthcare. This multi-sectoral and participatory approach encourages knowledge sharing and ensures that adaptation measures are relevant and efficient for all affected parties.
Need to invest in knowledge	Education and training were essential in increasing awareness and understanding of climate change. Education programs and awareness building campaigns have helped to increase the capacity of local communities to respond to climate risks. Moldova has learned that investment in human capital and institutional development is crucial for the sustainability of adaptation efforts.
Importance of using innovational technologies and nature-based solutions	Use of innovative technologies and nature-based solutions has shown significant potential in improving resilience to climate change. Examples include: energy-efficient irrigation systems; reforestation; creation of natural barriers for erosion control, etc. Use of innovative technologies and nature-based solutions have provided multiple benefits, including biodiversity protection.
Continuous monitoring and evaluation	Monitoring the impact of climate change and periodically evaluating the effectiveness of adaptation measures are essential for the continuous adjustment and improvement of promoted national strategies. The Republic of Moldova has recognized the need for robust monitoring and evaluation systems to ensure that climate change adaptation actions remain relevant and effective.

[247] <https://www.undp.org/ro/moldova/press-releases/moldova-are-un-program-national-de-adaptare-la-schimbarile-climatice-pana-2030-elaborat-cu-sprijinul-pnud-moldova>.
[248] <https://www.undp.org/moldova/projects/advancing-moldovas-national-climate-change-adaptation-planning-phase-2>.

Moldova has implemented several actions to improve the monitoring and assessment methodologies of climate change adaptation:

1) The following legal and regulatory documents and methodologies were developed and approved:
   - Law no. 74 of April 11, 2024 on climate actions establishes the regulatory framework in the field of climate actions aimed at reaching the climate neutrality target by 2050, in order to meet the long-term global temperature target provided for in the Paris Agreement, as well as the regulatory framework for making progress in order to meet the global goal in terms of adaptation to climate change[249].
   - Law no. 368 of November 30, 2023 on hydrological and meteorological activity provides for establishment, at the national level, of a meteorological and hydrological monitoring system for monitoring meteorological and hydrological conditions, events and processes of interest for Moldova[250]. The system will comprise a National Network and an Additional Network for Weather and Hydrological Observations. In order to benefit from a wide range of meteorological and hydrological services, as well as in addressing climate-related issues, the Law provides for international cooperation by ensuring meteorological and hydrological data and information sharing at the international level.
   - The methodology for calculating rates for services provided, the Nomenclature and rates for services provided against pay, and the Regulation on formation and use of revenues collected by SHS were recently approved by the Government (GD no. 494 of July 12, 2023)[251].
2) The climate change information and knowledge management portal was launched to support the NAP process and the integration of CCA considerations. The portal was developed as a single access point for all climate information it has integrated GIS and MPay systems, for accessing and procuring climate and hydrometeorological services[252].
3) Two guidelines were developed (in line with IPCC AR5/ IPCC AR6) for assessment of impact, vulnerability and systemic risks in key sectors (transport, energy, water, forestry and healthcare), at local and organization level. The proposed assessment mechanism takes into account the correlation between hazard, exposure, vulnerability and adaptive capacity – leading to the use of a more advanced and comprehensive risk assessment method.
4) Five technology needs assessment reports were developed for key sectors (energy, transport, water resource, healthcare and forestry).
5) Within the UNDP/GCF project "Promoting the national process of planning the adaptation of the Republic of Moldova to climate change (NAP-2)" (2020-2025), it is envisaged to develop a monitoring and evaluation system with improved data review for supporting the CCA-related decision-making process.
6) The close cooperation of Moldova with international partners (EU, UNDP, ADA, GCF) takes place to ensure alignment of national adaptation objectives to international ones and to benefit from the expertise and resources available globally.

These actions show the commitment of Moldova to improve monitoring and assessment of climate change adaptation through development and implementation of efficient methodologies and tools, as well as through international cooperation in the CCA area.

[249] <https://www.legis.md/cautare/getResults?doc_id=143228&lang=ro>.
[250] <https://monitorul.gov.md/ro/monitor/2830>.
[251] <https://gov.md/sites/default/files/document/attachments/subiect-18-nu-202-mm-2023.pdf>.
[252] <https://www.undp.org/moldova/projects/advancing-moldovas-national-climate-change-adaptation-planning-phase-2>.

CHAPTER 4. INFORMATION ON FINANCIAL, TECHNOLOGY DEVELOPMENT AND TRANSFER AND CAPACITY-BUILDING SUPPORT NEEDED AND RECEIVED UNDER ARTICLES 9–11 OF THE PARIS AGREEMENT

4.1. National circumstances and institutional arrangements related to the receipt of external assistance

External assistance provided by the international community continues to play an important role in the social and economic development of the Republic of Moldova, contributing to the achievement of the priority objectives set out in the national strategic documents. So far, the Republic of Moldova has benefited from such assistance, but the need for it has not been exhausted, especially at sector level.

In order to receive it in a motivational and transparent way, the Government of the Republic of Moldova passed the GD no. 377/2018 on regulation of the institutional framework and mechanism for external assistance coordination and management.

The Regulation approved by this Decision sets out the principles and procedures that define:

1. the institutional framework for external assistance;
2. external assistance coordination and management mechanism.

The above Government Decision aims to ensure better coordination and synergy in the process of programming, implementation, monitoring and evaluation of external assistance by establishing a wide consultative process and dialogue between the Government, the private sector and civil society.

The Government also ensures affiliation (underwriting) to international commitments regarding external assistance efficiency, such as the Paris Declaration (2005), the Accra Agenda for Action (2008), the Bussan Commitments (2011) and the Mexico Communiqué (2014).

During the coordination process, especially at the programming stage, the Government ensures, in a coordinated and coherent manner, the concordance between the external assistance, the established sectoral priorities and the budgetary calendar approved in accordance with the provisions of Law no.181/2014 on public finances and fiscal budgetary responsibilities.

During the process of programming external assistance, the Government is guided by Law no. 181/2014 on public finances and fiscal budgetary responsibility and Law no. 419/2006 on public sector debt, state guarantees and state re-crediting.

The technical assistance coordination mechanism consists of a number of stages, each of which is the responsibility of the respective entity within the established appropriate institutional framework. The latter is represented in Figure 4-1.

The programming stage consists of the following phases:

1. identifying priorities;
2. identifying project ideas and formulating project proposals, sheets and terms of reference;

3. negotiation and signing of external assistance agreements.

Sector priorities are approved within the *Sector Council* and submitted to *the National Coordinating Authority* by the *Sector Coordinator*.

External assistance priorities are formulated by the National Coordinating Authority, based on proposals submitted by Sector Coordinators, ensuring compliance with the following policy documents:

1. The National Development Strategy "European Moldova 2030" and the related Action Plan;
2. Commitments made to the international community, in particular, to the European Union;
3. The Government's Work Programme;
4. Other programs and strategies, including LEDP 2030 and NCCAP 2030.

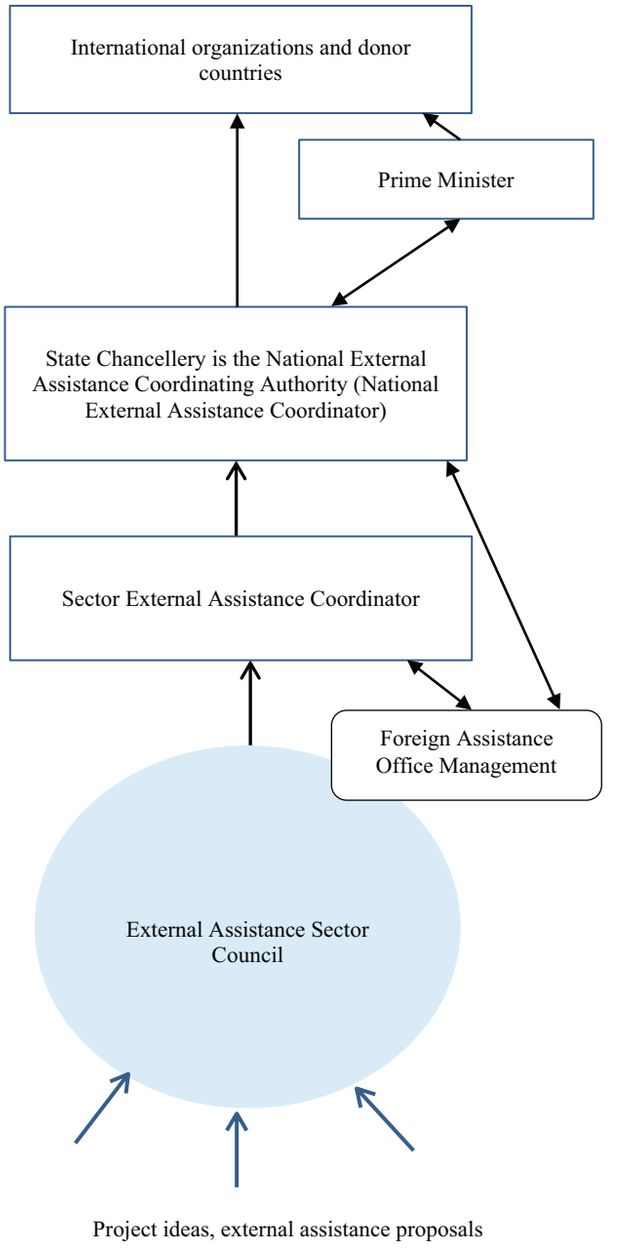


Figure 4-1: Institutional arrangements regarding external assistance to the Republic of Moldova.

The State Chancellery is responsible for the external assistance coordination and management mechanism and performs the role *of single point of contact/control* in relation to external development partners and public authorities on external assistance project/programme proposals.

The State Chancellery exercises, inter alia, the following duties:

1. identifies and defines external assistance needs in accordance with national development priorities and proposals for external assistance projects/programs submitted by external assistance sector councils, and submits them for approval to the Inter-Ministerial Strategic Planning Committee;
2. after prior coordination with the Ministry of Finance and within the limits of the available budgetary-fiscal limits, submits the external assistance projects/programs financing proposals to the Government for approval;
3. coordinates the development and negotiation of external assistance agreements;
4. leads the negotiation group of external assistance agreements for budget support programs and other projects/programs, as appropriate;
5. coordinates the external assistance projects/programs implementation monitoring process at national level, including continuous analysis of the external assistance absorption rate;
6. ensures decision-making transparency in the external assistance coordination and management process;
7. prepares and submits the annual external assistance report for examination to the Strategic Planning Inter-Ministerial Committee[253];
8. ensures the organization, in the medium term, of the external assistance projects/programs evaluation process;
9. coordinates the cross-sectoral interaction between external assistance projects and programs;
10. is designated as the owner of the External Assistance Management Platform (AMP)[254] and designates the Public Institution Information Technology and Cyber Security Service as the technical and technological operator of the External Assistance Management Platform (AMP).

The function of *National Coordinator* of external assistance is exercised by the Prime Minister, who has the following duties:

1. promote, among external development partners, external assistance priorities and projects/programs approved by the Inter-ministerial Committee for Strategic Planning;
2. sign external assistance agreements;
3. examine the progress in capitalizing on external assistance, monitoring reports on the external assistance projects/programs implementation.

Within the external assistance coordination and management mechanism managed by the National Coordinating Authority, the Sector External Assistance Coordinator (hereinafter – Sector Coordinator) is the central public authority responsible for the sector policy.

Among other responsibilities, the *Sector Coordinator* has the following duties:

1. develop, within the deadlines established by the budget calendar, quality proposals for sector projects/programs, in accordance with the sector priorities established by the Government;
2. lead the agreement negotiation group for external assistance project/sectoral program, except for budget support programs;
3. ensure the proper implementation and monitoring process of the projects/programs launched in the coordinated sector;
4. lead the oversight committees of projects/programs in the coordinated sector and ensure their efficient and transparent operation;

[253] Government Decision no. 838/2008 on establishment of the Strategic Planning Inter-Ministerial Committee, <https://www.legis.md/cautare/getResults?doc_id=141342&lang=ro#>.
[254] <https://amp.gov.md/portal/>.

5. lead the External Assistance Sector Council;
6. inform the National Coordinating Authority about the status of the programming stage, any problems encountered and the proposed solutions, as well as about the stages of implementing external assistance projects in the coordinated sector.

The External Assistance Sector Council (hereinafter – Sector Council) is the consultative body, created on the basis of the partnership principle and empowered with sectoral external assistance projects and programs programming and monitoring functions.

The Sector Council has, among other things, the following basic duties:

1. participate in developing/improving, at sector level, policy documents, sector spending strategies related to the integration of the actions and financial means to be supported externally in the national public budget;
2. provide support in monitoring external assistance projects and programs;
3. examine the reports on external assistance projects and programs implemented in the sector.

Foreign State Loan Agreements shall be concluded in accordance with the provisions of the Law no. 419/2006 on public sector debt, state guarantees and state re-crediting, as well as GD no. 1136/2007 on certain measures for the enforcement of the Law no. 419/2006.

The external assistance project/program implementation is the responsibility of the primary beneficiary and/or the implementer under the leadership of the Sector Coordinator.

The external assistance projects/programs implementation monitoring to assess their efficiency, effectiveness, impact and sustainability, shall be carried out by means of reports provided in the Operational Guide on external assistance coordination and management.

The annual external assistance report shall be submitted to the Government and the donor/creditor community.

In compliance with the GD no. 338/2020, the External Assistance Management Office[255] was created with the mandate to *program the initiatives aimed at implementing public policies* according to the attributions provided by law, as follows:

- contributing, based on relevant experience, to formulation of proposals in the course of the cross-border and transnational cooperation programmes programming process;
- ensuring support to national institutions in undertaking the necessary actions to designate and implement, at all stages, the national management and control system related to cross-border and transnational cooperation programmes;
- ensuring support to national beneficiaries in the process of submitting the application for funding within the calls for proposals under cross-border and transnational cooperation programmes, but also at the implementation and monitoring stage;
- ensuring organization of trainings for beneficiaries, auditors/controllers and national institutions on the rules of cross-border and transnational cooperation programs;
- implementing external assistance projects/programs according to the provisions of the normative acts or external assistance agreements concluded with the external development partners.

This system aims to strengthen the institutional framework, the purpose of which is to establish a centralized mechanism for the administration by the relevant central public institutions, of the external assistance provided by donors under cross-border and transnational cooperation programmes.

The normative framework on external assistance in the Republic of Moldova includes other normative acts such as:

– Law no. 595/1999 on international treaties to which the Republic of Moldova is a party, GD no. 442/2015 on approval of the Regulation on the mechanism for concluding, applying and terminating international treaties;

[255] <https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro>

- Government Decision no. 576/2017 approving the Regulation on the implementation of cross-border and transnational cooperation programmes financed by the EU;
- Government Decision no. 246/2010 on the application of tax and customs facilities related to the implementation of ongoing technical and investment assistance projects, which fall under the scope of international treaties to which the Republic of Moldova is a party.

At regional level, Regional Development Agencies (RDAs) have powers and competences to attract external funds for the socio-economic development of the regions. In this respect, according to Law no. 438/2006 on regional development in the Republic of Moldova "*RDA attracts non-budgetary means for the implementation of regional operational programs, regional development programs and projects*". At the same time, GD no. 127/2008 on the measures for implementation of the Law no. 438/2006 on regional development in the Republic of Moldova provides RDAs with responsibilities directly related to the absorption of external assistance. The Agency "*attracts non-budgetary means for the implementation of the Regional Development Strategy, programs and related projects*", "*cooperates with the donor community active in the respective development region*" and "*attracts local and foreign investors*"[256]. An important task of the RDAs is to strengthen the "*capacities of regional development actors in fundraising*", respectively the RDAs organize annual sessions for the LPAs to strengthen the external assistance attraction abilities.

At local level, local public administration authorities have autonomy, guaranteed by the Constitution of the Republic of Moldova, the European Charter of Local Self-Government and other treaties to which the Republic of Moldova is a party. According to the Law no. 436/2006 on local public administration, local authorities are empowered to "*establish links of collaboration, cooperation, including cross-border, and twinning with localities abroad*", the mayor having the attributions to support initiatives of "collaboration with localities from other countries and contribute to the expansion of cooperation and direct links with them".

Challenges and limitations

According to the study by Prisacari M. (2023)[257], although a considerable effort has been made to improve the external assistance coordination mechanism, it reveals shortcomings related in particular to aspects of excessive centralization of the Official Development Assistance (ODA) management system, inconsistency of donor efforts, poor coordination of donor interventions, conditioning of assistance by purchase of donor services and products, inefficient monitoring and evaluation system, reduced responsibility and low predictability of external assistance flows.

Another constraint of the ODA coordination mechanism manifests itself at the external assistance planning stage, which is also centralized. Considering the fact that part of the ODA is not reflected in the national public budget, it makes it difficult to monitor public policies in accordance with the priorities of NDS, NRDS and other sectoral strategies/national objectives. National authorities cannot effectively monitor the technical assistance provided through a large number of projects in order to ensure a consolidated approach to this type of assistance. Assistance remains highly dispersed, which complicates its actual impact assessment and undermines, to some extent, efforts to strengthen national capacities. A significant gap is the fact that public administration institutions involved in external assistance projects and programs management fail to accurately estimate the extent to which the projects and programs implemented have achieved the objectives set in national public policies. Although the Managing Authority prepares annual reports on external assistance, they do not include all types of assistance provided to the Republic of Moldova (for example, a number of EU Community Programs – Horizon 2020, Creative Europe, etc., which are not administered by the State Chancellery, but by the relevant ministries).

Those assessments relate in particular to the impact of external assistance provided to the Government and CPAs, and less to LPAs. Irregularities are also attested at the level of the ministries involved in the implementation of externally financed projects. The prepared monitoring reports are often deficient, being simple progress reports, in which some achievements in project implementation are summarized. In this regard, the extent to which projects produce the expected results or how they have achieved their objectives to priorities set in

[256] Decision of the Government of the Republic of Moldova on the measures for the implementation of Law no. 438-XVI of December 28, 2006 on regional development in the Republic of Moldova no. 127 of 08.02.2008.
[257] Prisacari Maria. The impact of external assistance on public policies on regional development in the Republic of Moldova. Doctoral thesis in administrative sciences. 166 pages, 2023.

public development policies, is not assessed. Efforts to coordinate and monitor the implementation of these projects impose transactional costs for donors and greater pressures on government capacities than in the case of financial assistance. In this respect, the external aid coordination system requires a more sophisticated assistance management system.

Other impediments that make the absorption of external assistance difficult are the failure to meet the disbursement conditions set out in the loan/grant agreements, the unjustified extension over time of the infrastructure projects implementation process, projects/programs restructuring, the delay and duplication of public procurement procedures, the postponement of adoption of appropriate legislative acts, as well as the activities implementation processes caused by COVID-19[258].

Referring to the shortcomings that the sectoral coordinators found in implementation of external development assistance projects, the Ministry of Finance highlighted difficulties in correlating activities with the objectives and expected results; in erroneous assessment of needs at the project/program development stage; insufficient focus of project activities on beneficiaries' requirements, etc.[259]

Significant challenges regarding the absorption of ODA were caused by the precarious policy dialogue and poor coordination at sectoral councils' level; by the inconsistency between own programming cycles in the national calendar of the Republic of Moldova and those of the external development partners, as well as by the limited update on the information related to the external assistance projects on the AMP by the beneficiaries.

Even if the barriers to the external assistance efficiency have been revealed, there are no significant advances in overcoming them. An essential factor for streamlining external development assistance is implementation of administrative-territorial reform, a reform that continues to be postponed for non-economic and political reasons.

Better transparency of the process of allocating and using the official external resources is another critical condition. In order to increase the transparency of how the funds provided by international bodies and donor countries are used, the national external assistance management authority has adopted a series of actions such as information sessions for beneficiary public authorities staff, dissemination of information materials on the ODA coordination and management process to all stakeholders, presentation of the key donors for the Republic of Moldova, relevant tools and programs, as well as creation of a centralized database on external assistance. Notwithstanding the undertaken actions, LPAs and other beneficiary institutions are not aware of all available funding opportunities, and their capacity to absorb funds remains low. Capacities issues and needs of local authorities are an important issue, as most donors are currently trying to find a fair balance in their development interventions at local and central government level.

The lack of a systematic and robust autonomous management of local finances inevitably reduces the ability of local and regional authorities to take full responsibility for the management of European funds, which require adequate administrative and planning capacities and sufficient funds to cover the local financial contribution.

At national level, the Government must provide better coordination of external assistance, strengthen filing and planning systems, drive forward the harmonization agenda. Although the institutional framework on donor assistance coordination is being strengthened, the Government of the Republic of Moldova still needs to make considerable efforts towards European integration. However, the coordination of external assistance cannot be carried out without a correct development of public policies and a well-thought-out strategic development planning of the country. Drafting of regional development public policies is critical for maintaining the country's socio-economic development sustainability. In order to achieve tangible indicators in implementation of sectoral reforms, which would lead to a harmonious development of the Republic of Moldova, it is imperative that the disbursed financial means, otherwise insufficient, are targeted to the priority areas.

Donors, despite positive intentions, fail to ensure sufficient coordination of support at their level alone. Many of the donors "intervene in similar areas and there is no effective coordination between the intervention areas and

[258]External Assistance Report for the Republic of Moldova in 2019/2020. Ministry of Finance Chisinau municipality: 2021, 34 pp.
[259] Idem

some areas such as technical assistance for central government tend to be crowded"[260]. This shows the desire of all donors to intervene at the highest level of decision and to increase the visibility of results produced by the allocated funds. At the same time, the tendency for excessive centralization of external assistance coordination functions is emerging increasingly. However, increasing the role and capacities of ministries is indispensable to make the system work. Better coordination with sectoral policies must be ensured at ministerial level and, most importantly, project implementation monitoring and impact assessment must be ensured as well. LPAs and non-governmental organizations must be fully involved in estimating the external assistance impact both in case of projects implemented from external sources and those financed from the budget. Development partners must also publicly disclose the assessments they produce for internal use. All these significant requirements of the external assistance implementation process need to be handled in close coordination between the donors and the final beneficiaries.

Within 21 calendar days of the launch of the new external assistance financing line, the State Chancellery, as the National Coordinating Authority of the Module "*Data on financial assistance available for business start-up and development*", ensures registration of projects/programs on the External Assistance Management Platform (AMP)[261].

4.2. Information on country-driven strategies and on the aspects of the updated NDC that require financial support

The strategies and priorities of the Republic of Moldova with emphasis on overcoming the phenomenon of climate change are as follows:

1. *National Development Strategy "European Moldova 2030"*[262]

In line with the sustainable development commitments, the following strategic objectives are to be implemented by 2030:

1) ensuring resilience to climate change by reducing climate change related risks (SDG 13.1);
2) reducing water pollution, including through land-based activities (SDG 14.1);
3) combating soil degradation (SDG 15.3);
4) integrating biodiversity values into policies (SDG 15.9);
5) implementing sustainable forest management and increasing afforestation and reforestation (SDG 15.2).

The objective of concretely improving the quality of environmental components will be achieved by actively promoting the "polluter pays" principle and by imposing the internationalization of the negative effects of economic activities, including taxation and fair taxation, but also by subsidizing environmentally friendly practices.

2. *The updated Nationally Determined Contribution (NDC 2.0, 2020)*[263]

In NDC 2.0 the Republic of Moldova undertook to achieve, by 2030, the unconditional economy-wide reduction target of 70% compared to 1990-year level. The emission reduction commitment could increase conditionally up to 88%, with the respective support of international donors.

3. *The Low Emission Development Programme to 2030 (LEDP 2030)*[264]

The LEDP 2030 is the legal instrument set up at the national level to achieve the updated NDC's reduction targets. Another LEDP objective is to implement the green economy principles efficiently using resources and energy, applying high performance environmental technologies. The program contains an Action Plan for the years 2024-2026, with mitigation targets in 7 sectors: Energy, Buildings, Transport, Industry, Agriculture, LULUCF and Waste.

4. *Integrated National Energy and Climate Plan 2030 (INECP 2030)*

[260] Progress report on implementation of the National Regional Development Strategy. MARDE Chisinau municipality: December 2020, 44 p.
[261] <http://amp.gov.md/portal/activities?search=&da=&ba=&psec=&loc=>.
[262] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[263] <https://unfccc.int/NDCREG?gclid=CjwKCAiAmsurBhBvEiwA6e-WPChy1Yfh3Okv3WsK0edZGnzuV2p8hkUICwoL4s386hK0km68b_Mf3xoC4NEQAvD_BwE>.
[264] <https://renergy.md/programul-de-dezvoltare-cu-emisii-reduse-al-republicii-moldova-pana-in-anul-2030-intra-in-vigoare-la-1-ianuarie-2024/>.

Within the Ministerial Council of the Energy Community (EnC) of December 15, 2022, the INECP 2030 objectives of the EnC Contracting Parties were approved by Decision no. 2022/02/MC-EnC (for the Republic of Moldova, the INECP targets have been agreed only for the territory on the right bank of the Dniester River):

- Ensuring primary energy consumption at the level of 3,000 kilotons of oil equivalent;
- Ensuring a share of at least 27% of renewable energy in the energy balance;
  - 935 MW RES by 2030 and 3765 MW by 2050;
  - decreasing dependence on electricity imports from 83% in 2016 to 3% in 2050;
- Reduction of GHG emissions by 68.6% by 2030 compared to baseline year level (1990).

The INECP 2030 of the Republic of Moldova is pending approval, it is anticipated that it will be approved by the Government by the end of 2024 or earlier in 2025.

5. *Energy Strategy of the Republic of Moldova 2050 (ESM 2050), concept.*

The current Energy Strategy of the Republic of Moldova until 2030 (ESM 2030) approved in 2013 no longer meets the new up-to-date requirements.

The new Energy Strategy (ESM 2050), pending approval, is focused on five strategic objectives:

a) increasing energy security,
b) development of competitive energy markets and regional integration;
c) promoting energy efficiency;
d) development of sustainable renewable energy
e) consumer protection;

The main international agreements on combating climate change are the following:

1. *Paris Agreement*[265]

Following the approval of the Law on ratification of the Paris Agreement no. 78/2017[266], several normative acts of commitments to reduce greenhouse gas emissions were adopted. These include:

1.1. Intended Nationally Determined Contribution (NDC 1.0, 2015), submitted to the UNFCCC on 25 September 2015[267];
1.2. The Low Emission Development Strategy of the Republic of Moldova until 2030 (LEDS 2030) and the Action Plan for its implementation, approved by GD no. 1470/2016. The LEDS 2030 was the legal instrument set up at the national level to achieve the reduction commitments set out in NDC 1.0 (2015);
1.3. The Low Emission Development Programme 2030 (LEDP 2030)[268] and the Action Plan for its implementation, approved by GD no. 659/2023. The Program is the legal instrument set up to achieve the mitigation targets set out in NDC 2.0, 2020.

The progress made by the Republic of Moldova in achieving the objectives of the Paris Agreement can be identified from the National Inventory Report:1990-2022. Based on the report, the total net GHG emissions in 2000 were about 9.06 Mt CO_2 equivalent, and in 2022 – 13.37 Mt CO_2 equivalent, an increase of almost 47.5%. At the same time, the reduction of GHG emissions in 2022 compared to 1990 was 69.5%, the 2030 reduction target being 70%. Accordingly, given the continuous upward trend in GHG emissions over the period 2000-2022, the country is expected to make significant efforts to meet its reduction commitments under the NDC 2.0 (2020).

1. *Accession of the Republic of Moldova to the Energy Community Treaty*[269].

By signing the Energy Community Treaty (EnCT), Moldova committed to aligning and implementing key EU energy legislation, developing an appropriate regulatory framework and liberalizing its energy markets in line with the Energy Community (EnC) acquis within a determined timeframe. The EnC acquis comprises legal acts in the following areas: electricity, gas, renewable energy, energy efficiency, climate, environment, competition, statistics, infrastructure and oil. Since joining the EnC, Moldova has worked to align its laws with the EU energy acquis, in line with the EnCT.

[265] Law nr.78/2017. <https://www.legis.md/cautare/getResults?doc_id=99251&lang=ro>.
[266] <https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro>.
[267] <https://www.ecolex.org/fr/details/legislation/republic-of-moldovas-intended-national-determined-contribution-lex-faoc190358/>.
[268] <https://renergy.md/programul-de-dezvoltare-cu-emisii-reduse-al-republicii-moldova-pana-in-anul-2030-intra-in-vigoare-la-1-ianuarie-2024/>.
[269] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro

According to the Annex to the Treaty, the Republic of Moldova should transpose 13 EU normative acts (acquis) into national law[270].

The latest accessible report of the EC on the implementation of the acquis by Moldova (November 1, 2023)[271] reveals the next stage of the acquis transposition: integration of energy markets – 59% (electricity – 57%, gas – 60%), decarbonization of the energy sector – 37% (implementation of renewable energy sources – 17%, implementation of energy efficiency – 78%), ensuring energy security – 54%, environmental protection – 49%, performance of national authorities – 82%.

2. *Association Agreement between the Republic of Moldova, on the one part, and the European Union and the European Atomic Energy Community and their Member States, on the other part (EU-RoM AA)*[272]

Within the EU-RoM AA, climate action is subject to Chapter 17 and Annex XII of Title IV. Chapter 17 sets out general actions that should be undertaken by Moldova, while Annex XII of Title IV sets out the EU acquis to be implemented:

- Directive no.2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community;
- Commission Regulation (EC) no. 842/2006 on certain fluorinated greenhouse gases;
- Commission Regulation (EC) no. 1005/2009 on substances that destroy the ozone layer;
- Directive no. 98/70/EC relating to the quality of petrol and diesel fuels.

Since the entry into force of the EU-RoM AA (2016), the Republic of Moldova has managed to approve, on March 3, 2023, the Law no. 43/2023 on fluorinated greenhouse gases[273], the Law no. 178/2023 on the accession of the Republic of Moldova to the Amendment to the Montreal Protocol on Ozone Layer Depleting Substances, adopted in Kigali on October 15, 2016[274]. Regarding fuel quality, Moldova has adopted several EU standards and aligned some components of the relevant Directive. The design of an ETS within the Energy Community is not yet agreed.

4.3. Underlying assumptions, definitions and methodologies

When reporting information on required and received support, the Republic of Moldova will use the following underlying assumptions, definitions and methodologies:

a) The exchange rate MDL/$US shall correspond to the average value established by the National Bank of Moldova (NBM) on 25.02.2024;
b) The value of the necessary support shall be estimated in accordance with GD no. 377/2018 on regulation of the institutional framework and external assistance management coordination mechanism;
c) The reporting year or the time interval shall correspond to the reporting deadlines established by the UNFCCC, as well as to those established by the official documents of the country;
d) the support obtained is identified by specific sources;
e) the support is formulated in two dimensions: committed and disbursed;
f) the status of the supported activity is identified in one of three dimensions: planned, ongoing or completed;
g) the support channel shall be described by one of the following specifications: bilateral, regional or multilateral;
h) the support shall be identified and reported as one of the following types: mitigation, adaptation or cross-cutting;
i) the financial instrument shall be identified and reported in the following qualification: grant and loan;
j) the support shall be divided into sectors and subsectors;
k) the authorities' reports on the use, impact and estimated results of the received support shall be taken into account;
l) the support shall also be identified and reported as a contribution to technology development and transfer, capacity building and cross-cutting;

[270] Ibid
[271] <https://www.energy-community.org/implementation/report/Moldova.html>.
[272] Law nr.112/2014.
[273] <https://lege.md/act/privind_gazele_fluourate_cu_efect_de_sera>.
[274] <https://www.parlament.md/ProcesulLegislativ/Proiecteactelegislative/tabid/61/LegislativId/6493/language/ro-RO/Default.aspx>.

m) double counting shall be avoided in reporting the information on the support required and received for the implementation of Article 13 of the Paris Agreement and transparency-related activities, including for capacity building related to transparency, when reporting such information separately from other information on the support required and received.

4.4. Information on financial support needed by the Republic of Moldova under Article 9 of the Paris Agreement

In order to attract international funding, the Support Platform for the Republic of Moldova (Moldova Support Platform)[275] was recently created as Romania's, Germany's and France's initiative, which aims to generate immediate political, financial and material assistance, as well as in-depth expertise for the democratic reform process, from the institutions and Member States of the European Union, G7 countries, international financial institutions and international organizations, as well as other development partners. The attraction of international funding is carried out through Conferences, the purpose of which is to mobilize, focus and coordinate the political, technical and financial support of the developed countries for the Republic of Moldova[276].

The first edition of the Ministerial Conference of the Support Platform for the Republic of Moldova took place in Berlin, Germany, on April 5, 2022. The second edition took place in Bucharest, Romania, on July 15, 2022. The third edition of the Conference took place in Paris, France on November 21, 2022, and the fourth edition of the Conference was hosted in Chisinau on October 17, 2023.

During the preparation of Ministerial Conferences, the meetings of the thematic working groups based on 6 pillars are convened, as follows:

- humanitarian effort – managing the flow of refugees and relocating them to European states;
- energy – supporting the energy security of Moldova, promoting EE and RES;
- the fight against corruption – supporting the government in implementing the ambitious reform agenda, including in the areas of justice, combating corruption and promoting economic development;
- border management – internal affairs and efficient border management;
- financial assistance – increasing socio-economic resilience;
- administration reform and public finance management.

The analysis of the pillars shows that currently they can be considered to reflect the key areas for attracting international funding for Moldova, among which the energy sector standing out, with a share of over 69% GHG emissions per country in 2022. External assistance for this sector will be targeted towards promoting EE, RES and energy security.

In addition to attracting external assistance through the Moldova Support Platform, external financing is also provided through the mechanism, established by the Regulation on the institutional framework and external assistance management coordination mechanism, approved by GD no. 377/2018, the mechanism already described above.

The priority objectives in attracting external assistance cannot be other than those set out in legal acts approved by the Parliament and the Government. Thus, for the Ministry of Environment, the priorities are set out in the Environmental Strategy for the years 2024 – 2030[277], in the Law no. 74/2024 on Climate Actions, the Low Emission Development Program until 2030[278], the National Climate Change Adaptation Program until 2030 and other, and for the Ministry of Energy – in the Energy Strategy until 2050 (concept)[279], in the Integrated National Energy and Climate Plan 2030 (draft), and other.

[275] <https://gov.md/ro/platforma-de-sprijin-pentru-republica-moldova>.
[276] <https://gov.md/ro/content/sase-acorduri-de-finantare-semnate-cadrul-platformei-de-sprijin-pentru-republica-moldova>.
[277] <https://www.mediu.gov.md/ro/content/4548>.
[278] <https://www.undp.org/ro/moldova/press-releases/programul-de-dezvoltare-cu-emisii-reduse-fost-aprobat-moldova-fiind-cu-un-pas-mai-aproape-de-o-economie-fara-carbon>.
[279] <https://midr.gov.md/files/shares/Concept_Strategia_Enenergetica__act__.pdf>.

Guided by these strategies' objectives, the Inter-Ministerial Committee for Strategic Planning examines the funding proposals coming from the respective Ministries. With reference to climate change, lastly (2022-2024) decisions[280] have been made with a view to receive external funding for:

- implementation of the NCCAP 2030 and LEDP 2030 through the consolidation and modernization of the forestry sector of Moldova, by contracting financial assistance in the form of loans, respectively by attracting financial resources in the form of grants;
- expansion of irrigated areas;
- raising the energy efficiency of the centralized heat supply system in Chisinau municipality;
- security of natural gas supply;
- supporting the project proposal of the Ministry of Energy "Sustainable Transition to Energy Efficiency in Moldova", in accordance with Priority 2 of the National Plan "Building European Moldova" – 20 Government actions: energy efficiency of buildings, to be financed with the support of the EBRD;
- redirection of 40 million Euro towards the renovation of the power stations of the SE "Moldelectrica";
- funding of the following priorities:
  - peaceful and inclusive society;
  - sustainable economic development;
  - training and employment of labor force
  - climate, energy and equitable transition.
- Increase of the EIB loan by 28 million Euro for the implementation of the project "Energy Efficiency in the Republic of Moldova";
- Accessing the 100 mil. EUR grant through the EBRD and contracting of the additional loan of 100 million Euro for the project "Security of natural gas supply";
- Initiating negotiations with the EIB for the implementation of the National Forest Extension and Rehabilitation Program for the years 2023-2032;
- Railway reconstruction;
- Road's rehabilitation, etc.

With reference to the above, Table 4-1 presents the main sectors of the development partners intervention in the Republic of Moldova identified in the Joint European Development and Cooperation Strategy (Joint Programming Document)[281].

It should be noted that the External Assistance Coordination and Management Mechanism is a complex cycle that includes several stages: programming, implementation, monitoring, reporting and evaluation. Although the process of coordinating external assistance at national level has made significant progress, it continues to be deficient in aspects related to the excessive centralization of ODA management, fragmentation of donor work, missions and uncoordinated work of donors, linking assistance to donor services or products, poor monitoring and evaluation systems, mutual accountability and predictability of assistance flows.

The issues of local authorities' capacities and needs are a separate and important topic, as most donors are currently trying to find a fair balance in their development interventions at local and central government level.

In this context, it is imperative to increase national capacities to negotiate and develop partnerships with both international and national actors to attract funds targeted towards sustainable development and the achievement of the 2030 Agenda. At the same time, actions are needed to increase the capacity to absorb and efficiently capitalize on the assistance provided by development partners in relation to the public development policies developed[282].

[280] <https://cancelaria.gov.md/ro/apc/comitetul-interministerial-pentru-planificare-strategica>.
[281] <https://www.eeas.europa.eu/node/40534_en>.
[282] <http://www.cnaa.md/files/theses/2023/59052/maria_prisacari_thesis.pdf>.

Pursuant to Article 9 of the Paris Agreement (PA), developed countries, parties to the PA, will provide financial resources to assist developing countries, parties to the PA, in both mitigation and adaptation actions to climate change, in furtherance of their obligations under the Convention.

In the Republic of Moldova, two documents, effectively strategic, related to combating climate change were approved in 2023:

1. The Low-Emission Development Program of the Republic of Moldova until 2030 (LEDP 2030) (GD no. 659/2023)[283];
2. The National Climate Change Adaptation Programme until 2030 (NCCAP 2030) (GD no. 624/2023)[284].

Both documents contain concrete actions to achieve the objectives of GHG emissions reduction and climate change adaptation programs, for which support, including financial support, from developed countries is identified. Thus, according to the LEDP 2030, achieving the Program's objectives require financial means in amounts and deadlines as set out in Table 4-2.

The financial means necessary to achieve the conditional objective of the Program are directly related to implementation of its unconditional scenario and support from donors and international financial bodies. Thus, in order to achieve the general objective of the Program for the years 2024-2026, the amount of financial means required to achieve the unconditional objective is about MDL 23,956.95 million, and to achieve the conditional objective – additionally MDL 9,550.0 million.

Regarding the NCCAP 2030, MDL 1,836.0 million are needed for the period 2023-2027, of which MDL 275.0 million (15%) from the state budget and MDL 1,561.0 million (85%) from development partners sources, identified at the time of Program development (external sources – UNDP, WB, FAO, GIZ, EIB, EBRD, NAP-2, NAP-3, NDA, FPI, LIFE Program, Embassy of Sweden, EU4Environment – Water & Data, etc.).

Table 4-1: Main sectors of intervention of development partners in the Republic of Moldova

Economic development and market opportunities, including sustainable and inclusive economic growth, social protection and health		**Strengthening institutions and good governance, including rule of law and security**		**Connectivity, energy efficiency, environment and climate change**		**Mobility, support for visa liberalisation benchmarks and support for education, training and research**		**Cross-cutting issues, including strengthening civil society, promoting human rights and gender equality, and improving strategic communication, including with citizens**	
Economic development	EBRD EU, Germany, Sweden, USAID	***Justice and Home Affairs***	USAID, USA, Estonia, EU, France, Hungary, Latvia, Netherlands, Romania, Sweden, UK	***Transport***	EIB, EBRD, EU, Bank World, Romania	***Visa liberalisation***	Estonia, EU, France, Hungary, Latvia, Netherlands, Sweden, Romania, UK	***Civil Society***	Austria, Czech Republic, EU, Finland, Germany, Slovakia, Switzerland, Romania Poland, Sweden, UK, USA
Agriculture and rural development	Austria, Czech Republic, EU Latvia, Lithuania, Poland, Romania, USA, Japan, JIKA, EBRD, IFAD, FAO	***Democratic governance and public administration***	Austria, Czech Republic, Estonia, EU, Germany, Latvia, Lithuania, Netherlands, Poland, Romania, Switzerland	***Energy***	World Bank, EIB, EU, EBRD, GB United Kingdom GR Greece	***Migration (border management)***	IOM, Austria, Czech Republic, EU, Italy, Romania	***Gender equality***	UN Women, UNDP, Austria, EU, Lithuania, Sweden, Czech Republic
						Mobility	France, EU, Romania		
Social protection and health	WHO, World Bank, Japan, JIKA, TIKA, Switzerland, CEB, Austria, Czech Republic, EIB, EU, Germany, Sweden	***Economic governance.***	World Bank, Austria, EU, Netherlands, Slovakia, UK	***Environment protection and Climate Change***	GEF, Austria, Czech Republic, EIB, EU Germany, Slovakia, Switzerland, Sweden, Romania	***Youth***	EU, UNFPA, UNICEF, USA	***Communication***	EU *Most active states:* UK, Sweden, Germany, USA
						Employment and productivity	World Bank, Austria, EU, Germany, Liechtenstein, Romania, Switzerland		
						Culture & Media	Czech Republic, France, EU Romania, Switzerland, UK		
						Research & innovation	EU		

Source: Joint European Development Cooperation Strategy for the Republic of Moldova, 2018

[283] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[284] <https://www.legis.md/UserFiles/Image/RO/2023/mo448-451md/Program_624_md.docx>.

Table 4-2: Financial means (MDL million) required to achieve sectoral GHG emission reduction targets

Sectors	Total, for the period 2024-2026 (million lei)	
	unconditional objective	conditional objective (additionally)
Energy	14,138.0	8,056.8
Transport	5,511.35	0
Buildings	2,296.1	739.3
Industry	72.9	19.2
Agriculture	191.5	66.4
LULUCF	280.0	224.5
Waste	1,467.1	443.8
TOTAL	**23,956.95**	**9,550.0**

Tab. 4-3 contains the estimated amounts and the sources for achieving NCCAP 2030 over the period 2023-2027.

Table 4-3: Estimation of sources for achieving NCCAP by 2030, MDL million

Yearly Funding	2023	2024	2025	2026	2027	Total
State budget	14	58	76	68	60	275
External sources (donors)	78	326	430	384	342	1,561
Total	**92**	**384**	**506**	**452**	**403**	**1,836**

The total cost of implementing the NCCAP 2030 is estimated at about MDL 3 billion, most of the funds will be invested in sectoral measures (specific objective 5). Among sectors, the largest allocation of costs is for the forestry sector (MDL 670 million), and the smallest – for the transport sector (MDL 4.5 million).

One of the shortcomings of the National Climate Change Adaptation Strategy until 2020 (2014) refers to the inconsistency of initial cost estimates for climate change adaptation (CCA) measures planned in its related Action Plan, with the subsequent spending in two of the priority sectors (agriculture and water resources management).

A number of gaps were also identified in planning and reporting based on the financing indicators of CCA actions. These are gaps that the new NCCAP 2030 aims to overcome by synergistically applying the methodology for earmarking the budget for CCA actions and the tools for CCA streamlining.

The breakdown of costs by objectives and actions is presented in Table 4-4, and Table 4-5 illustrates the breakdown of NCCAP 2030 costs by years.

Table 4-4: Breakdown of NCCAP 2030 costs by specific objectives and actions, MDL million

Specific objectives (SO)	Implementation costs
SO 1. Developing CCA capacities and cross-sectoral cooperation	**11.5**
Priority Action 1.1. Operationalization of the CCA coordination mechanism	1.8
Priority Action 1.2. Institutional capacity building for effective implementation of CCA measures	2.5
Priority Action 1.3. Ensuring continuous trainings aimed at capacity development for the CCA policy implementation	6.6
SO 2. Raising awareness on climate change adaptation and disaster risk reduction by means of reliable and accessible information	**15.4**
Priority Action 2.1. Ensuring availability and use of climate data and information in priority sectors	1.9
Priority Action 2.2. Targeted capacity building on climate change information collection, management, use and sharing	6.7
Priority Action 2.3. Creating a coordinated system for collection and management of disaster risk reduction and CCA data	2.2
Priority Action 2.4. Raising awareness and preparedness of policy makers and general public on climate risks and adaptation possibilities	4.6
SO 3. Expanding CCA budgeting and increasing resilience	**1.9**
Priority Action 3.1. Integrating CCA aspects into sectoral budgets and ensuring cross-sectoral financial and operational synergies	0.3
Priority Action 3.2. Capacity building for CCA integration in budget planning and funding at national and local level	1.6
SO 4. Integration of CCA and RRD into sectoral strategic planning and investment planning at national and local level	**21.4.**
Priority Action 4.1. Integrating climate change adaptation aspects into sectoral management practices	1.6
Priority Action 4.2. Integrating climate RRD into development planning and enhancing preparedness for disaster risk management	16.8
Priority Action 4.3. Gender mainstreaming in CCA and MRD planning, and promotion of adaptation actions at Community level	2.9
SO 5. Increasing the resilience of priority sectors through climate investment and reducing the risks and negative impacts of climate hazards	**1,786.3**
Priority Action 5.1. Adaptation of the agricultural sector to climate change by implementing complex agricultural practices, modern adaptation technologies and soil conservation	364
Priority Action 5.2. Increasing energy efficiency and resilience of the energy sector infrastructure by adjusting to the forecasted hydrometeorological parameters	58.3
Priority Action 5.3. Adaptation of the forestry sector to climate change by implementing complex biodiversity conservation practices and ecosystem approach	670
Priority Action 5.4. Reducing the impact of climate change on public health and health services	38.2

Specific objectives (SO)	Implementation costs
Priority Action 5.5. Increasing the resilience of the transport sector infrastructure by implementing technologies adjusted to the forecasted hydrometeorological parameters	4.5
Priority Action 5.6. Adapting the water resources sector to climate change through efficient use of resources, ensuring their quality and quantity and reducing the risk of flooding	308
Total	**1,836.4**

Detailed information in the format prescribed by p. 133 of the MPG on external assistance necessary to achieve the objectives of the NDC 2.0 (2020) is also presented in the common tabular reporting format, separately for climate change mitigation and adaptation.

Table 4-5: Breakdown of NCCAP 2030 costs by years, MDL

Years	2023	2024	2025	2026	2027
SO1	2,208,000	7,297,850	1,948,800	-	-
SO2	177,165	4,374,100	5,851,800	3,460,800	1,485,800
SO3	29,600	1,585,000	270,000	-	-
SO4	1,140,000	6,281,000	7,664,700	5,958,300	340,000
SO5	88,173,972	364,577,561	489,777,668	442,764,269	400,987,887
Total	**91,728,737**	**384,115,511**	**505,512,968**	**452,183,369**	**402,813,687**

4.5. Description of how the support to be received will contribute to achieving the targets of the updated NDC and to the long-term goals of the Paris Agreement

The LEDP 2030 was approved with the aim of detailing the actions to be undertaken to achieve the NDC 2.0 (2020) targets. As known, the NDC 2.0 has two GHG mitigation objectives: unconditional and conditional. The unconditional objective will be achieved with its own forces and financial means, and the conditional one – with the support of donors. At the same time, both the unconditional and the conditional objective cannot be achieved without overcoming the barriers in the process of implementing LEDP 2030. In this regard, external assistance is much needed and welcomed. Support from donors to create the framework within which NDC 2.0 objectives can be achieved will be oriented towards overcoming the following barriers:

- The need to develop data collection, reporting, monitoring capacities and the availability of evaluation and/or verification mechanisms both at national and subnational level;
- Developing and strengthening the Monitoring, Reporting and Verification (MRV) system in the context of NDCs, strengthening monitoring capacities and performing data availability and data sharing gap analysis;
- Strengthen the capacity of leading institutions to develop and implement NDC-related policies and programs, coordinate with relevant sectoral ministries, and involve stakeholders in the NDC implementation process;[285]
- Create strong institutional structures to manage the NDC implementation process. As the country is in the process of implementing NDC, institutional arrangements become critical. Currently, the country can rely on institutional arrangements that are already in place for climate action, but these are not enough. This may include strengthening the capacity of leading institutions to develop and implement NDC-related policies and programs, coordinate with sector-specific line ministries, and involve stakeholders in the NDC implementation process. Support is required for intergovernmental coordination and development of institutional structures for the coordination of NDC implementation, as well as support from bilateral or international cooperation;
- Support is required for sector-specific training on mitigation and adaptation actions, especially in the transport, agriculture and waste sector, especially during the implementation of those actions;
- Develop sector-specific standards or guidelines for NDC implementation. Support for development of clear roadmaps with timeframes for predetermined actions;

[285] <https://www.undp.org/sites/g/files/zskgke326/files/publications/Developing%20Country%20Support%20Needs%20for%20NDCs_Survey%20Analysis.pdf>.

- Most mitigation actions involve new technologies, and the challenge arises in terms of how best to access them. Increased capabilities to select and approve new clean technologies, including technology development or transfer;
- Support is also required to identify opportunities for the transfer or purchase of clean products, technologies, as well as to mobilize funding for those interventions. Also, capacities development for the design and management of projects involving the implementation of new technologies, identification of knowledge exchange opportunities for a better result and the selection of efficient and low-priced technologies;
- After assessing the implementation costs, the transformation of NDC implementation plans into investment-ready projects is one of the main concerns. At this stage, the need to review financial requirements, identify national public resources (especially for the unconditional target) and attract international financial support is anticipated. This will involve analysis of gaps in the institutional financial framework and recommendations on effective institutional mechanisms, including new market mechanisms to access international climate finance. In this regard, it is required to increase the capacities to develop proposals for adequate funding or to formulate requests for funding assistance from different sources, for the specific sectors identified in the NDC. Creating pilot projects demonstrating the new funding schemes would help accelerate mitigation actions;
- It is worth mentioning that awareness of the Paris Agreement, climate change and NDC remains insufficient in private sector entities, which is a significant barrier to progress with concrete actions. In this regard, dialogue with private sector companies is required to share experiences and lessons learned from private sector involvement. Tools and approaches related to the involvement of private sector actors in the NDA implementation phase will need to be identified, with the opportunity to build on experiences from the public-private sector partnerships and other relevant initiatives.

4.6. Information on financial support received under Article 9 of the Paris Agreement

4.6.1. Analysis of the information availability

In accordance with Article 9 of the Paris Agreement, developed country Parties shall provide financial resources to support developing country Parties in both climate change mitigation and adaptation. In other words, the information on financial support received by the Republic of Moldova, part of the Convention, should reflect external assistance only for climate change mitigation and adaptation positions, not in full for all activities of the country.

The most accessible source of detailed data on external assistance is the External Assistance Management Platform[286]. At the same time, not all the information required in paragraph 134 of the MPG is available, also not all the information is presented on the aforementioned Platform. Thus, a large part of EU-funded projects are missing on this site, such as EU4Climate[287], and for EU4Environment and EU4Energy the information is partial.

Table 4-6 shows the structure of the available information on the respective Platform indicating the actions needed to retrieve it, but not before selecting the projects out of a total of about 900 as of January 19, 2024, that could be attributed to mitigation, adaptation or combined to climate change, the actions attributed by the team of experts responsible for compiling this chapter, was carried out within the limits of their competences.

Table 4-6: Analysis of information availability on the AMP platform

Information in paragraph 134 MPG	Availability in AMP table	Availability of data in the Note attached to projects	Comments
(a) Title (of activity, programme or project);	Yes		
(b) Description of the programme/project;	No	Yes	
(c) Financing channel: unilateral, bilateral, multilateral;	Yes, but the determination must be done by the expert based on the analysis	Yes, but the determination must be done by the expert based on the analysis	

[286] <https://amp.gov.md/portal/activities>.
[287] <https://eu4climate.eu/moldova/>.

Information in paragraph 134 MPG	Availability in AMP table	Availability of data in the Note attached to projects	Comments
(d) Beneficiary entity;	Yes	Yes	
(e) Implementing entity	No	Yes	
(f) Amount received (in national currency and US dollars);	Yes, but it corresponds to the amount disbursed	Yes	Information is in Euros
(f) Timeframe	No	Yes	It is only the actual end date of the project
(h) Financial instrument (grant, concessional loan, non-concessional loan, equity, security or other);	No	Yes, but not in all Project Notes, and the instruments are of 2 categories: grant and loan	Only grant and loan will be applied in the paper, and exceptions to the instrument will be indicated in Notes
(i) Status (committed or disbursed);	Yes, but the conclusion is drawn based on the analysis of the disbursement status	Yes, but the secure information is only for the "committed" status	
(j) Sector and sub-sector;	Yes, but the sectors only correspond to the primary ones	Yes, but the sectors only correspond to the primary ones	Further analysis will need to identify the sectors in line with the UNFCCC structure
(k) Type of support (mitigation, adaptation or cross-cutting);	No	Can be evaluated following the analysis	The analyzer is required to have competence to determine the type of support
(l) Whether the activity has contributed to the development and transfer of technology and/or capacity building	No	Can be evaluated following the analysis	The analyzer is required to have competence to determine this particularity
(m) Activity status (planned, ongoing or completed);	No	Yes	
(n) Usage, impact and expected results.	No	Yes, but not in all Project Notes	
Total cost of assistance/ project	No	Yes	This particularity is missing in the list of paragraph 134 of the MPG

Following the analysis made in Tab. 4-1, the amount of information available on External Assistance Management Platform was extended with data available in the Notes attached to the projects, and the results were presented in a separate Excel file reflecting the following information for each external assistance project:

Source	Title/ (programme / project description - see note)	Beneficiary / implementing entity	Donor entity	Loans		Grants	
Detail note		Beneficiary Agencies	Donor Agencies	Commitments (million EUR)	Actual disbursements (million EUR)	Commitments (million EUR)	Actual disbursements (million EUR)

Continue

Commitments, total		Disbursements, total		Funding channel	Mitigation (At) / Adaptation (Ad) / Cross-cutting (M)	Technology transfer (T) / Capacity building (C) / Cross-cutting (M)	Transparency (reports to UNFCCC), R / Transparency (domain improvement), D
ROL million -	Million US $	ROL million -	Million US $	Unilateral (U) / Multilateral (M) / Bilateral (B)			

Continue

Primary Sectors	Location	Time frame		Status: planned (P), in progress (C) or completed (F)	Usage, impact and expected results (see note)	Type of technology: RES; EE - energy efficiency; AC- water, sanitation; CET- district heating power plant; DC-capacity development; L-Laboratory; E-education; D-Waste; A-other;
		Date when Signed	Actual Closure Date			

Each of the projects was considered separately, and only those related to climate change, in particular mitigation, adaptation and mixed/cross-cutting projects were identified. Out of the total of about 900 projects, only about 25% were chosen in the "climate change" category. The period covered: 2011-2027

4.6.2. Information on financial support received by the Republic of Moldova in climate change area

The financial support received by the Republic of Moldova in the field of climate change by categories of projects is presented in the common reporting format tables. The summary of this support shows the following.

According to Table 4-7, during the years 2011-2027 the total amount of financing commitments by development partners (DP) on climate change amounted to US$ 1,669.17 million, of which – US$ 994.16 million as loans, and US$ 675.01 million as grants. Respectively, between 2011 and 2023, US$ 951.56 million were disbursed, of which US$ 593.90 million as loans and US$ 357.66 million as grants. That is, out of the total amount of disbursements, about 62% are loans and 38% are grants.

Table 4-7: DP financing commitments and disbursements made by the Republic of Moldova to combat climate change, total in the period 2011-2023

	US$ Million			% of total		
	Loans	Grants	Total	Loans	Grants	Total
Commitments	994.16	675.01	1669.17	60	40	100
Disbursements	593.90	357.66	951.56	62	38	100

In graphic form, the respective support is shown in Fig. 4.2.

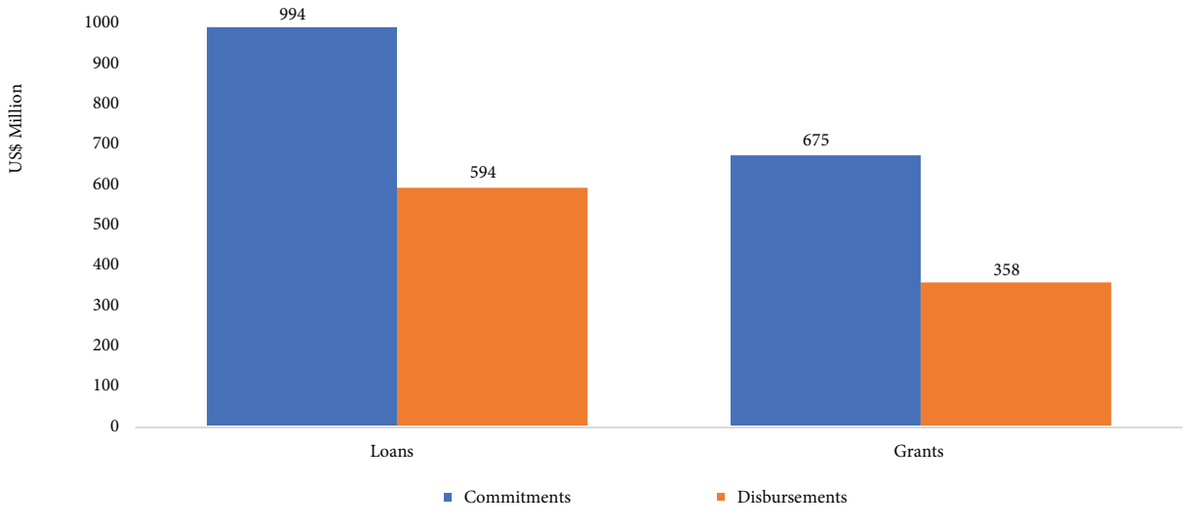


Figure 4-2: Financial support to the Republic of Moldova to combat climate change during 2011-2023.

The evolution of financial support during 2011-2023 is shown in Figure 4-3 – for each year, and in Figure 4-4 – cumulatively.

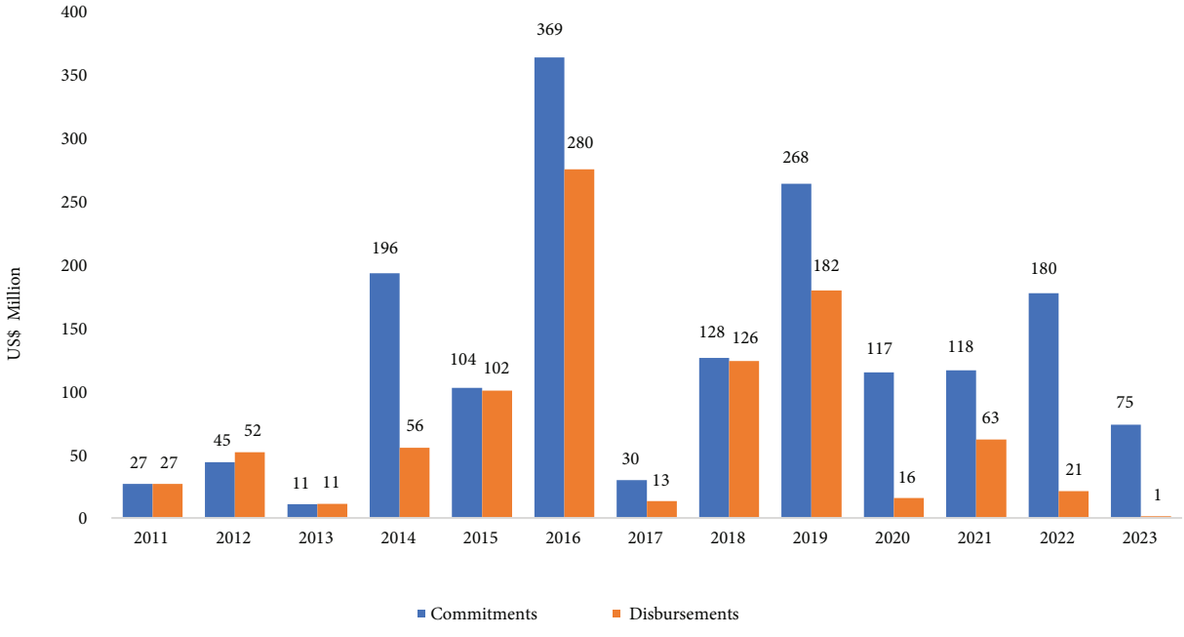


Figure 4-3: Evolution of climate change support provided to the country by development partners during 2011-2023.

Fig. 4-3 highlights financial commitments for 2016 – US$ 369 million. Support provided by the European Investment Bank - US$ 130 million for the "Fruit Garden of Moldova" project, World Bank Group - US$ 81 mil. for the "Improving local roads" project, International Development Agency - US$ 81 million for the "Rehabilitation of local roads" project, United States Agency for International Development - US$ 17 million for

the "A more efficient and responsible democratic governance" project, US$ 28 million for "High performance agriculture in Moldova (APM)" and other.

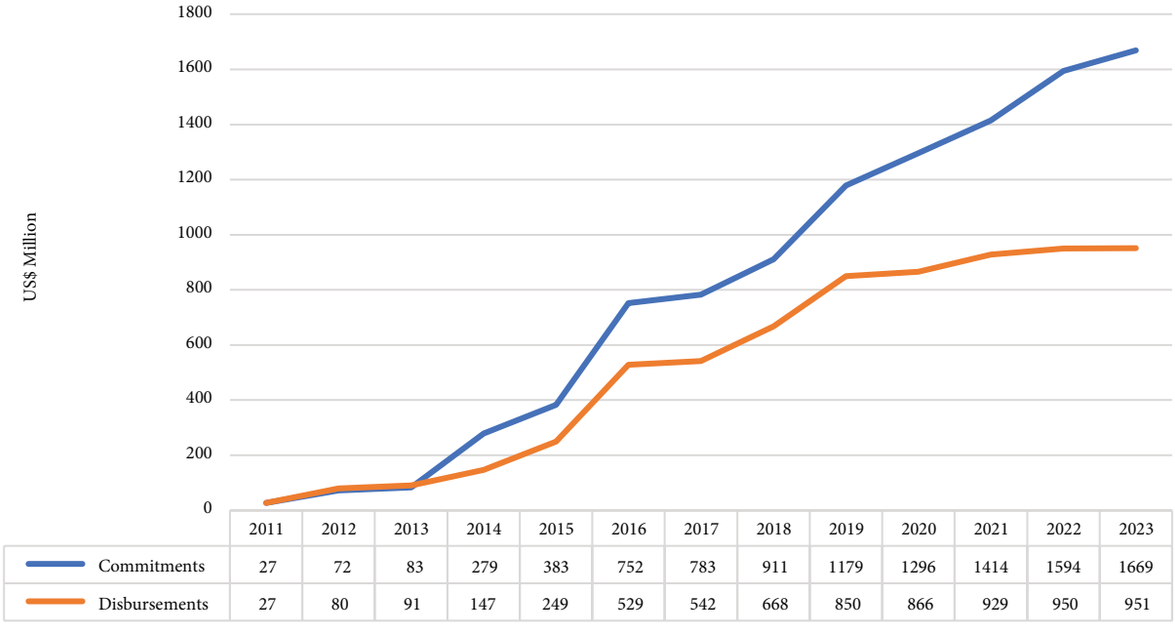


Figure 4-4: Evolution of the cumulated financial support received by the Republic of Moldova during 2011-2023 to combat climate change.

The contribution of each development partner to the support provided to the Republic of Moldova during the years 2011-2023 is presented in Table 4-8, and its graphical presentation is set out in Figure 4-5.

Table 4-8: Development partners' contribution to the financial support provided to the Republic of Moldova for climate change during 2011-2023

No.	Donors	Loans		Grants		Total	
		Commitments	Disbur-sements	Commitments	Disbur-sements	Commitments	Disbur-sements
1	European Investment Bank (EIB)	309.40	268.52	42.34	0.00	351.73	268.52
2	International Development Association (IDA)	161.82	132.28	0.00	0.00	161.82	132.28
3	United States Agency for International Development (USAID)	0.00	0.00	185.75	102.29	185.75	102.29
4	European Commission (EC)	0.00	0.00	149.23	101.65	149.23	101.65
5	EBRD	289.31	69.33	44.96	10.20	334.27	79.54
6	World Bank Group	121.49	64.24	0.45	0.45	121.93	64.69
7	Delegation of the European Union in Moldova	0.00	0.00	43.36	43.36	43.36	43.36
8	International Bank for Reconstruction and Development (IBRD)	38.79	38.69	0.36	0.36	39.15	39.04
9	Czech Development Agency, Czech Republic	0.00	0.00	17.64	17.64	17.64	17.64
10	Global Environment Facility (GEF)	0.00	0.00	15.92	14.63	15.92	14.63
11	International Fund for Agricultural Development (IFAD)	15.95	13.08	0.49	0.25	16.45	13.33
12	Swedish International Development Agency (SIDA)	0.00	0.00	17.77	10.67	17.77	10.67
13	Neighborhood Investment Facility (NIF)	0.00	0.00	8.68	8.68	8.68	8.68
14	International Fund for Agricultural Development	38.36	5.58	6.05	2.45	44.42	8.03
15	Swiss Agency for Development and Cooperation	0.00	0.00	6.41	5.40	6.41	5.40
16	Kingdom of Denmark	0.00	0.00	5.17	4.55	5.17	4.55
17	Federal Ministry for Economic Cooperation and Development (BMZ), Federal Republic of Germany	0.00	0.00	21.77	3.86	21.77	3.86
18	Government of the People Republic of China	0.00	0.00	3.61	3.61	3.61	3.61
19	United States Department of Defense	0.00	0.00	3.18	2.74	3.18	2.74
20	Ministry of Regional Development and Public Administration Romania	0.00	0.00	2.27	2.61	2.27	2.61
21	Austrian Development Agency (ADA)	0.00	0.00	55.78	2.42	55.78	2.42
22	Kingdom of Sweden	0.00	0.00	2.34	2.25	2.34	2.25

No.	Donors	Loans		Grants		Total	
		Commitments	Disbur-sements	Commitments	Disbur-sements	Commitments	Disbur-sements
23	Eastern Europe Energy Efficiency and Environment Partnership (EBRD) Fund	2.17	2.17	6.10	0.00	8.27	2.17
24	Food and Agriculture Organization (FAO)	0.00	0.00	2.06	2.14	2.06	2.14
25	The United Nations Children's Fund	0.00	0.00	3.59	1.94	3.59	1.94
26	"European Business Association" NGO	0.00	0.00	0.02	1.64	0.02	1.64
27	European Research Executive Agency (REA)	0.00	0.00	1.35	1.20	1.35	1.20
28	Slovak Agency for International Development Cooperation (SlovakAid), Slovak Republic	0.00	0.00	1.31	0.80	1.31	0.80
29	Green Climate Fund (GCF)	0.00	0.00	2.19	0.74	2.19	0.74
30	Liechtenstein Development Service (LED)	0.00	0.00	1.03	0.64	1.03	0.64
31	European Education, Audiovisual and Culture Executive Agency (EACEA)	0.00	0.00	1.50	0.60	1.50	0.60
32	Romania	0.00	0.00	0.60	0.60	0.60	0.60
33	Environmental Project Management Agency subordinated to the Ministry of Environment of the Republic of Lithuania (EPMA)	0.00	0.00	0.55	0.55	0.55	0.55
34	Republic of Poland	0.00	0.00	0.53	0.53	0.53	0.53
35	Italian Republic	0.00	0.00	11.12	0.52	11.12	0.52
36	United Nations (UN) Organization	0.00	0.00	0.47	0.47	0.47	0.47
37	Slovak Republic	0.00	0.00	0.43	0.43	0.43	0.43
38	EBRD Early Transition Fund	0.00	0.00	0.04	0.40	0.04	0.40
39	Council of Europe (CoE)	0.00	0.00	0.34	0.34	0.34	0.34
40	International Atomic Energy Agency (IAEA)	0.00	0.00	3.58	0.33	3.58	0.33
41	International Organization for Migration (IOM)	0.00	0.00	0.31	0.31	0.31	0.31
42	United Nations Environment Programme (UNEP)	0.00	0.00	0.56	0.31	0.56	0.31
43	Minister for Foreign Affairs of the Czech Republic	0.00	0.00	0.27	0.27	0.27	0.27
44	Embassy of Japan in Moldova	0.00	0.00	0.36	0.26	0.36	0.26
45	Republic of Lithuania	0.00	0.00	0.25	0.25	0.25	0.25
46	United Nations Development Programme (UNDP)	0.00	0.00	0.16	0.16	0.16	0.16
47	Black Sea Basin Joint Operational Programme	0.01	0.00	0.15	0.15	0.16	0.15
48	Turkish International Development Cooperation Agency (TIKA)	0.00	0.00	0.10	0.10	0.10	0.10
49	Japanese Agency for International Cooperation (JICA)	0.00	0.00	0.09	0.09	0.09	0.09
50	Multilateral Fund for the Implementation of the Montreal Protocol	0.00	0.00	0.07	0.08	0.07	0.08
51	Council of Europe Development Bank (CEB)	0.00	0.00	0.05	0.05	0.05	0.05
52	The Government of Japan	0.00	0.00	0.04	0.04	0.04	0.04
53	United Nations Industrial Development Organization (UNIDO)	0.00	0.00	0.98	0.04	0.98	0.04
54	Energy Community (EnC)	0.00	0.00	0.03	0.03	0.03	0.03
55	Embassy of the Czech Republic in the Republic of Moldova	0.00	0.00	0.03	0.02	0.03	0.02
56	Swiss Confederation	0.00	0.00	0.01	0.01	0.01	0.01
57	Agency for Cross-border Cooperation and European Integration (ACTIE)	0.00	0.00	0.01	0.01	0.01	0.01
58	United Nations Development Programme (UNDP)	0.00	0.00	0.05	0.01	0.05	0.01
59	Agency for Restructuring and Modernization of Agriculture (ADMA)	14.66	0.00	0.00	0.00	14.66	0.00
60	"International Association of Eco-TIRAS River Keepers" NGO	0.00	0.00	0.01	0.00	0.01	0.00
61	AO "Automobile Club of Moldova"	0.00	0.00	0.01	0.00	0.01	0.00
62	"Independent Analytical Center Expert-Group" NGO	0.00	0.00	0.04	0.00	0.04	0.00
63	"National Center for Assistance and Information of Non-Governmental Organizations in Moldova CONTACT" NGO	0.00	0.00	0.04	0.00	0.04	0.00
64	International Labor Organization (ILO)	0.00	0.00	0.43	0.00	0.43	0.00
65	United States of America (USA)	2.18	0.00	0.00	0.00	2.18	0.00
66	Others			0.59	1.53		
	TOTAL	**994.15**	**593.89**	**675.01**	**357.67**	**1669.16**	**951.56**

As seen from Table 4-8 and Figure 4-5, the largest disbursements for the implementation of climate change projects during 2011-2023 were made by the European Investment Bank – US$ 268.5 million, International Development Association – US$ 132.3 million, United States Agency for International Development – US$ 102.3 million, European Commission – US$ 101.7 million, EBRD – US$ 79.5 million, World Bank Group – US$ 64.7 million, etc.

It is worth mentioning that the financial contribution for GHG emissions mitigation and, separately, for adaptation to climate change were different over the time period considered. Thus, according to Figure 4-6, 59% of the commitments have been made for GHG emissions mitigation, 19% for climate change adaptation, and 22% - for cross-cutting projects. Respectively, in the disbursements part 62% - climate change mitigation, 10% - climate change adaptation, and 28% - cross-cutting financing.

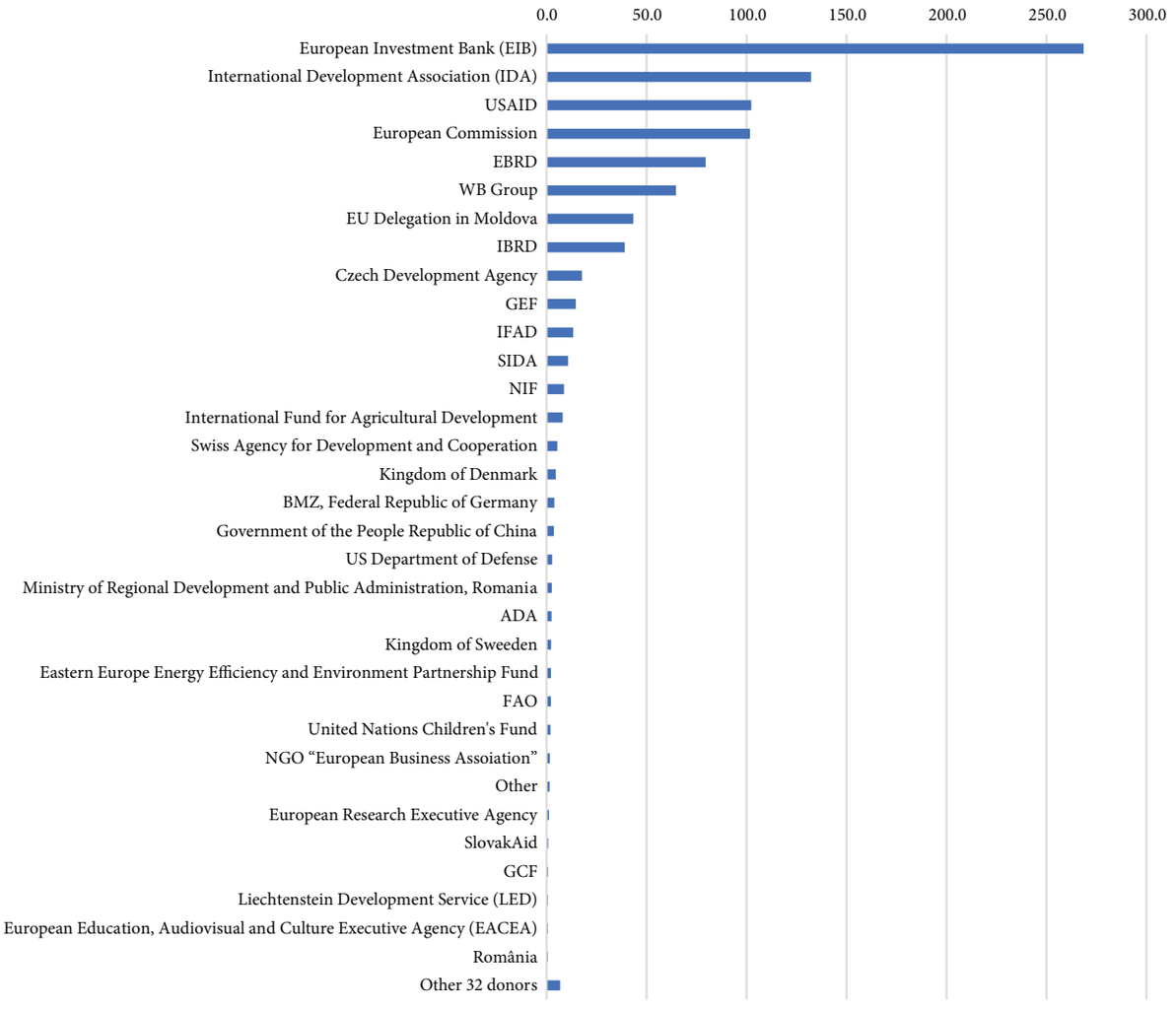


Figure 4-5: Development partners' disbursements to the Republic of Moldova for climate change during 2011-2023, US$ Million.

Figure 4-6: Financial commitments and disbursements of development partners (DP) for climate change.

The external financial assistance by sectors is reflected in Table 4-9 and Fig. 4-7.

Table 4-9: Cumulative external financial assistance granted during 2011-2023 for sectoral projects on climate change

Sectors	The support, million Euro		Support, % of total	
	Commitments	Disbursements	Commitments	Disbursements
Transport	415.3	255.4	24.9	26.8
Agriculture	319.1	234.6	19.1	24.7
Energy	321.1	233.6	19.2	24.5
Multisectoral	108.3	53.2	6.5	5.6
Water, sanitation and wastewater treatment and discharge	115.1	29.6	6.9	3.1
Health	82.3	3.3	4.9	0.3
Education	55.5	8.9	3.3	0.9
Governance and civil society	47.9	3.3	2.9	0.3
Disaster prevention	1.4	1.3	0.1	0.1
Communication	1.0	0.0	0.1	0.0
Banks & Financial Services	0.4	0.4	0.0	0.0
Industry	0.4	0.4	0.0	0.0
Other	201.4	127.6	12.1	13.4
TOTAL	**1,669.2**	**951.6**	**100.0**	**100.0**

As seen from Table 4-9 and Figure 4-7, the transport, agriculture and energy sectors enjoyed the largest financial contribution from development partners, with the share of total contribution respectively 26.84%, 24.65% and 24.55%.

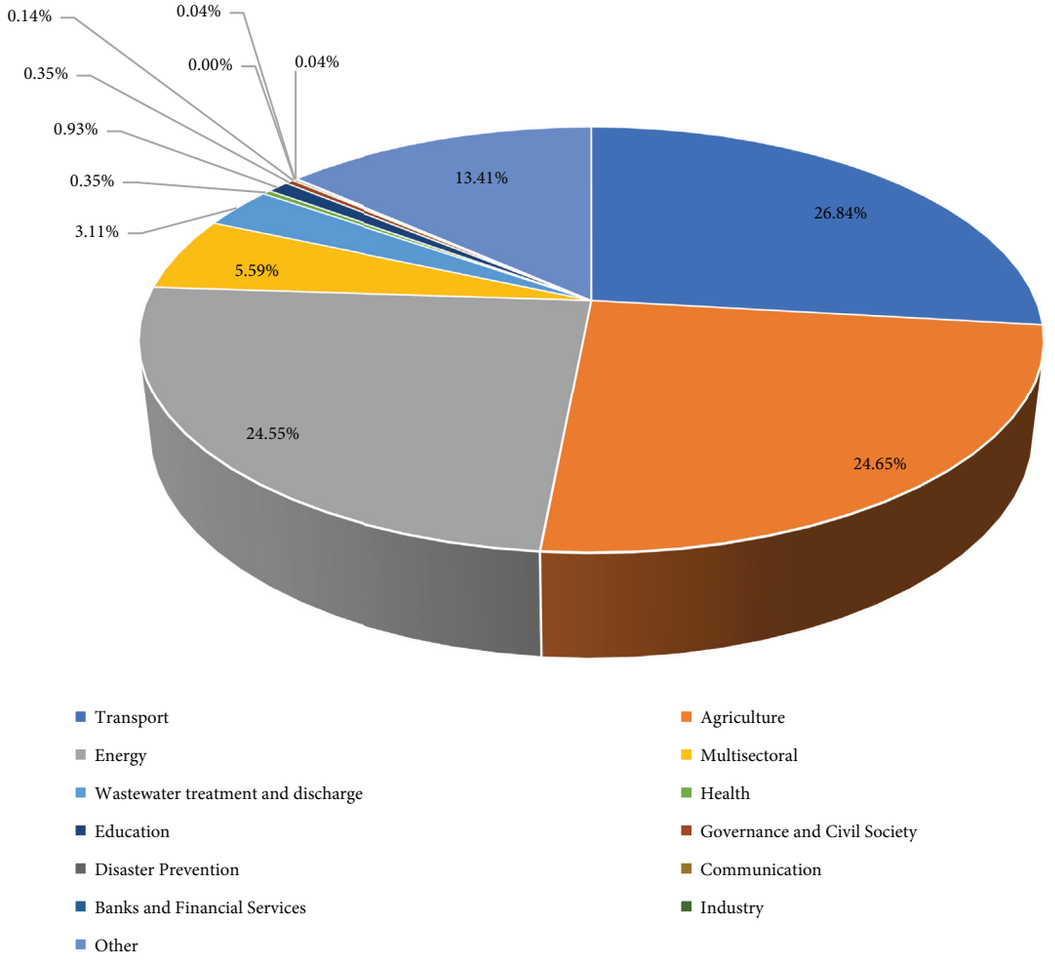


Figure 4-7: External assistance disbursed to the Republic of Moldova during 2011-2023 for the implementation of climate change projects.

4.7. Information on technology development and transfer support needed under Article 10 of the Paris Agreement

4.7.1. Technology transfer for climate change mitigation and adaptation

There are a multitude of definitions of the notion of technology transfer. The one proposed by the Global Environment Facility (GEF) mentions, that technology transfer represents:

"a broad set of processes encompassing the flows of know-how, experience and equipment for climate change mitigation and adaptation between different stakeholders, such as governments, private sector entities, financial institutions, non-governmental organizations and institutions in the research / education sector".

The term "transfer" includes the diffusion of technologies and technological cooperation between and within countries. It covers technology transfer processes between developed countries, between developing countries and countries with economies in transition. This encompasses the process of studying to understand, use and reproduce technology, including the ability to choose and adapt them to local conditions and integrate them with domestic technologies"[288].

The Intergovernmental Panel on Climate Change (IPCC) identifies three major dimensions necessary to ensure the technology transfer efficiency: (i) capacity building; (ii) enabling business environment; (iii) technology transfer mechanisms[289].

4.7.1.1. Capacity building

In accordance with the provisions of Law no. 182/2010, updated in 2023, 10 Industrial Parks (IP) have been established in the Republic of Moldova, including:

- two on the basis of joint-stock companies where the state is a majority stakeholder (IP "TRACOM", Chisinau municipality and IP "Raut", Balti municipality;
- four based on public property (IP "Cimislia", Cimislia; IP "Edinet", Edinet; IP "Comrat", Comrat, IP "Cahul", Cahul;
- two based on public – private property (IP "Triveneta Cavi Divelopment" and IP "CAAN" from Straseni);
- two based on private property (IP "Bioenergagro", Drochia and IP "FAIP", Durleşti)[290].

Industrial parks have technical and production infrastructure within which economic activities are carried out, mainly industrial production, service provision, capitalization of scientific research and/ or technological development in a regime of specific facilities to capitalize on the human and material potential of the regions. These entities comprise more than 105 companies that have businesses that have created 4,202 jobs, and the turnover of the IP residents has increased steadily since 2010, respectively in 2022 the residents' turnover was about MDL 6.9 billion[291]. Industrial platforms that offer attractive conditions for investors, such as Industrial Parks or Free Economic Zones, have ensured in recent years the industrial development of the regions in which they are located. At the same time, it has been found that the uneven diversification of these industrial platforms contributes to deepening of inequalities in relation to the territorial-administrative units where such entities are missing. In this context, in order to increase the competitiveness, productivity and employment of the industrial sector, in 2020 the Government decided to create Multipurpose Industrial Platforms (MIPs) in regions that do not have IP or Free Economic Zone (FEZ) platforms. The pilot program for establishing Multifunctional Industrial Platforms was approved by Government Decision no. 748/2020, updated in 2022. It provides for the creation of at least 5 MIPs in different regions of the country. Fully equipped in terms of access to utilities, the designated locations for the establishment of the MIP will become true centers of excellence for industrial development at local level. Unlike IP or FEZ, the operating model of the Multipurpose Industrial Platforms is based on guaranteeing easy access for investors, rather than providing tax incentives, which would boost the efficiency of industrial projects implementation in a short period of time.

[288] O. Davidson, B. Metz et al, "Methodological and Technological Aspects in Technology Transfer" – Summary for Policy Makers of the IPCC Working Group III Special Report (2000), p. 3. <https://www.ipcc.ch/site/assets/uploads/2018/03/srtt-en-1.pdf>
[289] Idem.
[290] <https://cancelaria.gov.md/sites/default/files/document/attachments/nu-1058-mded-2023.pdf>.
[291] Idem

4.7.1.2. Enabling business environment

Paragraph 10 "Ensuring the fundamental right to a healthy and safe environment" of Chapter 4 "Development Goals 2030" included in the National Development Strategy "European Moldova 2030" details the strategic vision for reducing GHG emissions and implementing climate change adaptation measures."

According to the sustainable development commitments, the following strategic targets are to be met by 2030:

1) ensuring resilience to climate change by reducing climate-related risks (SDG 13.1);
2) reducing water pollution, including through land-based activities (SDG 14.1);
3) combating soil degradation (SDG 15.3);
4) integrating biodiversity values into policies (SDG 15.9);
5) implementing sustainable forest management and increasing afforestation and reforestation (SDG 15.2).

The objective of tangibly improving the quality of environmental components will be achieved by actively promoting the "polluter pays" principle and by imposing the internalization of the negative effects of economic activities, including through taxation and fair taxation, but also by subsidizing environmentally friendly practices. Integrating the measures and principles of the circular economy into the production processes in the national economy branches will contribute to improving the quality of the environment and, respectively, the standard of living of the population of the Republic of Moldova. Innovative ideas, solutions and projects for integrated waste management will be supported. This will allow a real decoupling of economic growth from environmental degradation. At the same time, encouragement and active involvement in collaborative efforts between the Government and employers' and employees' organizations, with the support of international organizations, will be promoted to effectively incorporate policies that allow a transition to a sustainable environment.

Regarding the business environment of the Republic of Moldova, it can be assessed by consulting the World Bank's Doing Business study. According to the study, the Republic of Moldova ranks 48th out of 190 evaluated countries, with a score of 74.4 points, the maximum being 86.8 awarded to New Zealand[292]. Following the Republic of Moldova are such countries as Hungary (ranks 52nd), Romania (ranks 55th), Italy (ranks 58th), Bulgaria (ranks 61st).

Development of small and medium-sized enterprises in the medium and long term is supported by a favorable legal framework created in Moldova. In this context, the following were approved:

- Strategy for small and medium-sized enterprises sector development for the years 2012-2020[293];
- Strategy for the entrepreneurial activity regulatory framework reform for the years 2013-2020 as of 2013 and the Action Plan for its implementation for 2018-2020[294];
- Law on small and medium-sized enterprises approved in 2016 and updated in 2024[295];
- Law on peasant farms (small farmers) approved in 2000 and updated in 2023[296];
- Law on Investments in Entrepreneurial Activity approved in 2004 and updated in 2023[297];
- Law on Entrepreneurship and Enterprises approved in 1992 and updated in 2024.

Despite the undertaken steps, the business environment continues to have shortcomings. Thus, according to the European Commission Report of 11 November 2023[298], Moldova is in the early stages of preparing for free movement of workers, where it has made limited progress. For Companies Law, Moldova is between the incipient phase and some level of preparedness, with limited progress. For the free movement of capital, Moldova is between some and moderate level of preparedness, with some progress made.

[292] <https://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf>.
[293] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[294] <https://www.legis.md/cautare/downloadpdf/49476>.
[295] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[296] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[297] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[298] Republic of Moldova. Report Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. 2023 Communication on EU Enlargement. Brussels, 8.11.2023. SWD (2023) 698 final.

All remaining areas within this cluster, namely the free movement of goods, the right of establishment and the freedom to provide services, the free movement of capital, intellectual property, competition policy and consumer and health protection, have a certain level of preparedness. During the reporting period progress achieved has been limited in some of these areas, apart from financial services where good progress has been made.

With regard to the Green Agenda and sustainable connectivity, Moldova is at an early stage of environmental and climate change preparedness and has made some progress in the reporting period by adopting cross-cutting environmental legislation and implementing regulations on nature protection and industrial emissions. A certain level of preparedness has been achieved with limited progress in transport policy and some progress in trans-European networks, while the country is at between some and moderate level of preparedness in the energy department. In the field of energy, Moldova has made good progress, with the highest performance rate of progress among the Contracting Parties in the Energy Community, as reflected in the Annual Implementation Report for 2022[299].

The main obstacles and challenges to implementing climate change measures include limited administrative capacity, fragmented sectoral policies, and lack of government oversight over the climate policies and commitments implementation, as well as insufficient monitoring and verification of greenhouse gas emissions, including the reliability of data across the country.

4.7.1.3. Mechanisms for technology transfer

As known[300], the mechanisms for technology transfer comprise a number of components, including the national research and innovation system.

In the Republic of Moldova, it is regulated by several normative acts:

- The Code on Science and Innovation, approved in 2004 and updated in 2023[301];
- Education Code, approved in 2014, updated in 2020[302];
- The National Research and Innovation Programme for the years 2020-2023 and Methodology for financing research and innovation projects[303].
- National Research and Innovation Programme for the years 2024-2027[304]

An extensive reform of the national innovation system began in 2017, when, along the restructuring of all ministries within the Government and the reallocation of financial resources, the entire architecture of the research, development and innovation was changed. Thus, on February 20, 2018, a series of amendments to the Code on Science and Innovation entered into force. According to the new version of the Code, all scientific research institutes within the Academy of Sciences of Moldova (ASM) became subordinated to the Ministry of Education and Research (MoER). The ASM was deprived of the right to be a founder of these institutes: starting with 2018, the role of the ASM has become rather symbolic, its responsibility being reduced to drafting an annual report on the state of research-development and innovation in Moldova and on symbolic or consultative attributions in projects evaluation or in formulation of management proposals. The Supreme Council for Science and Technological Development was dissolved, and the responsibility for the development of state policy in the field of research and development – including the formulation of priority research and development topics or state programs management was assigned to the former Ministry of Economy (reorganized into the Ministry of Economic Development and Digitization). At the same time, the development of state policies in the field of innovation and technology transfer was assigned to the former Ministry of Economy.

At theoretical level, the purpose of this institutional transfer was to ensure more efficient ways of managing and financing research and innovation, activities that are under the responsibility of the MoER. Consequently, at the time of the reform implementation (2017) a substantial increase in the financing allocations for research projects was foreseen. This actually didn't happen. Currently, the level of public research funding in Moldova is ten times lower than the EU average and twice as low as in the country with the lowest level of research-innovation (R&I)

[299] <https://www.energy-community.org/news/Energy-Community-News/2022/12/07.html>.
[300] O. Davidson, B. Metz et al, "Methodological and Technological Aspects in Technology Transfer" – Summary for Policy Makers of the IPCC Working Group III Special Report (2000), p. 7. <https://www.ipcc.ch/site/assets/uploads/2018/03/srtt-en-1.pdf>.
[301] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[302] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[303] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro
[304] https://www.legis.md/cautare/getResults?doc_id=110607&lang=ro

funding (Romania). Under these circumstances, at the request of the Government, the EU conducted a study to identify ways of transforming R&I towards an organization and funding that would correspond to best practices in the field. According to the study[305], the following challenges were identified:

1. General systemic challenges of R&I in the Republic of Moldova
   1.1. *The Moldovan science system is highly fragmented:* It particularly affects research organizations, separates fundamental from applied and development research, separates research from education, disperses research equipment, and affects the links between public research and business. Moreover, Moldova has a relatively large number of subcritical research organizations, influencing infrastructure fragmentation and overall research capacity. Relationships between research institutes and universities are also problematic, especially because of different rules for researchers. It also affects doctoral education and science education.

   1.2. There are a number of issues associated with the governance of science:
   - *Unclear authority:* On the one hand, the boundaries between decision-making and executive authorities seem to be blurred, and all decisions seem to be made by executive political apparatuses (ministries). On the other hand, elected politicians seem to be hesitant in accepting this authority or are in difficulty accepting it due to the accelerated pace of political change in the country.
   - *Universal application of rules established by law:* Partially and due to unclear authority issues, the R&I system in Moldova is hampered by layers of rules, regulations and laws. While some of the laws may be appropriate, they can stifle the system when applied at lower decision levels on research funding.
   - *Lack of systemic research priorities:* Although research priorities are set, they are so generic that they have little utility in decision-making, funding and research.
   - *Lack of alignment of research, innovation and economic priorities:* Even where priorities can be identified, there are no indications of their alignment.

   1.3. *Structural, legal and institutional instability:* Considering that functioning of the system depends mainly on rules and regulations, the high frequency with which the rules change induces a wide range of problems, even to the point where action becomes impossible due to the fact that the subsequent change could invalidate it and therefore the priority becomes the next round of changes rather than the actual research activity. This instability also increases uncertainty at different levels of the research system. For example, uncertainty of funding affects procurement rules - collaboration agreements, evaluation rules, different types of criteria, etc. Moreover, this uncertainty invariably hinders research collaborations, especially with industry and research teams outside the country.

2. Specific challenges associated with the development and operation of public research and innovation infrastructure
   2.1. *Lack of a clearly articulated strategic vision on research infrastructures and their alignment with the country's research and economic priorities:* While there is ambition to link some of the research infrastructures to international infrastructures, this will be difficult to achieve without a strategy for research infrastructures and facilities that is aligned with national priorities and takes into account resource constraints. However, the definition of what constitutes a research infrastructure in Moldova is unclear and is not, as such, in line with the internationally accepted definition. A mapping of the research infrastructures was carried out in 2021, but apart from documenting what is available in the country, other objectives underlying this mapping are unclear.

   2.2. Funding for the research infrastructure development and maintenance is suboptimal and current levels of investment are well below the required level.

   2.3. *Research infrastructures are dispersed between institutions, which prevents the necessary critical mass from being reached.* This runs counter to the ambition of internationalization, to make Moldovan research more visible; it also creates obstacles to the efficient exploitation and the introduction and integration

[305] <https://op.europa.eu/ro/publication-detail/-/publication/ff106746-922a-11ed-b508-01aa75ed71a1>.

of at least some of the Moldovan research infrastructures into the European research infrastructures as a whole.

2.4. *Lack of openness culture towards sharing of equipment and facilities*. There are no legal constraints in terms of opening facilities and equipment to researchers from different institutions, but there is also no culture of openness.

3. Specific challenges associated with science-business cooperation

3.1. *Lack of a common understanding of the value that cooperation between science and business brings to participants, the rest of society and the economy.* There is also lack of role models or 'champions' of collaboration. Poor understanding and lack of common language lead to confusion and lack of transparency, interest and prioritization of this topic.

3.2. *Lack of strategic (political) commitment to science-business cooperation:* At present this is not an articulate priority on the agenda of government, universities, research institutes, or businesses. A single government program directly supports cooperation between science and business, and the way it is designed is problematic. Although promising, the Smart Specialization process currently undertaken by Moldova does not have an associated budget for the implementation phase. Finally, the financial resources allocated to the relations between science and business (by all actors) are limited, as well as the time and efforts invested in promoting connections.

3.3. *Insufficient critical mass in research and low absorption capacity among enterprises:* on the one hand, the research activity and the results of universities and research institutes are systemically inconsistent, the marketing capacity is weak and there is a lack of alignment between the R&I, Smart Specialization and economic priorities of the Republic of Moldova. Consequently, very little research is currently aligned to market needs and therefore has an *a priori* limited commercial potential. On the other hand, most of the business environment in Moldova consists of SMEs in traditional sectors, with little interest in scientific cooperation and minimal capacity to absorb research results, that is, the ability to identify, assimilate, transform and use external knowledge, research and practices.

3.4. *Lack of awareness and relationships between research and business actors and insufficient support mechanisms.* Most universities, research institutes, businesses and government agencies are unaware of the other actors in the ecosystem, what they offer and how they can contact and collaborate. Only some have cooperation experience; and there are very few places/ opportunities where researchers and business people can meet and network. Most businesses do not see universities and research institutes as potential collaboration partners. Therefore, this lack of awareness and networking keeps trust in the ecosystem low.

Given the mentioned barriers, a great part of related recommendations developed by the European Commission have been reflected in the legal framework of the Republic of Moldova. The Code on Science and Innovation (Law no. 259/2004, updated in 2023) was amended and the National Program for Research and Innovation for the years 2024-2027 (GD no. 1049/2023) was approved.

At present in Moldova there are 50 research organizations subordinated to the following ministries: Ministry of Education, Culture and Research (32 institutions), former Ministry of Health, Labor and Social Protection (9 institutions), Ministry of Agriculture and Food Industry and Ministry of Environment (8 institutions) and State Chancellery of the Government of the Republic of Moldova (1 institution)[306]

Law no. 226/2018 regulates the establishment and operation of science and technology parks and innovation incubators. These two types of entities are part of the research, development and innovation infrastructure of the Republic of Moldova, and the aforementioned law brought their functioning in line with the complex reform of the sector, implemented since 2017.

The architecture of the innovation system of the Republic of Moldova also includes the State Agency on Intellectual Property (AGEPI) and the Organization for Entrepreneurship Development (ODA), created on July 22, 2023 and replacing the previous Organization for Small and Medium-sized Enterprises Development

[306] <https://ancd.gov.md/ro/content/organiza%C8%9Bii-de-research>.

(ODIMM). In addition, the new Entrepreneurship and Economic Growth Fund (FACEM), also managed by ODA, was launched to provide long-term loans in the currency of the Republic of Moldova to SMEs in priority sectors such as energy efficiency[307].

4.7.2. Information on the technology development and transfer support needed

Support for the necessary technology development and transfer for the Republic of Moldova was identified from two official documents of the country: the Low Emission Development Program until 2030 (GD no. 659/2023) and the National Climate Change Adaptation Program until 2030 (GD no. 624/2023).

The respective actions ranked according to the parameters set out in par. 136 of the MPG are presented in the common reporting tabular format. The data in it have been systematized as shown in Table 4-10 and Tab. 4-11, and in Fig. 4-8 and 4-9 results are presented in graphical form.

Table 4-10: Financial support needed for technology transfer to mitigate GHG emissions and adapt to climate change in the period up to 2027

Sector	GRANT	LOAN	TOTAL
ENERGY			
Mitigation	295.6	443.4	739
Adaptation	20.44	30.66	51.1
Subtotal	**316.04**	**474.06**	**790.1**
BUILDINGS			
Mitigation	36.9	4.1	41
Adaptation	13.293	1.477	14.77
Subtotal	**50.193**	**5.577**	**55.77**
INDUSTRY			
Mitigation	0.2	0.9	1.1
Adaptation	0.0	0.0	0.0
Subtotal	**0.2**	**0.9**	**1.1**
AGRICULTURE			
Mitigation	3.2	0.8	4.0
Adaptation	18.7	4.7	23.4
Subtotal	**21.9**	**5.5**	**27.4**
LULUCF			
Mitigation	11.3	1.3	12.5
Adaptation	63.2	7.0	70.3
Subtotal	74.5	8.3	82.8
WASTE			
Mitigation	19.84	4.96	24.8
Adaptation	0	0	0
Subtotal	**19.84**	**4.96**	**24.8**
Mitigation	367.0	455.4	822.4
Adaptation	115.7	43.8	159.6
TOTAL	**482.7**	**499.2**	**981.9**

Table 4-11: Aggregate support for technology transfer for climate change mitigation and adaptation in the period up to 2027

Sectors	Grant, US$ Million	Loan, US$ Million	TOTAL	
			US$, Million	%
Agriculture	22	5	27	3
Buildings	50	6	56	6
Waste	20	5	25	3
Energy industries	316	474	790	80
Industry	0	1	1	0
LULUCF	74	8	83	8
TOTAL	**483**	**499**	**982**	**100**

[307] <https://neighbourhood-enlargement.ec.europa.eu/document/download/d8ef3ca9-2191-46e7-b9b8-946363f6db91_en?filename=SWD_2023_698%20Moldova%20report.pdf>.

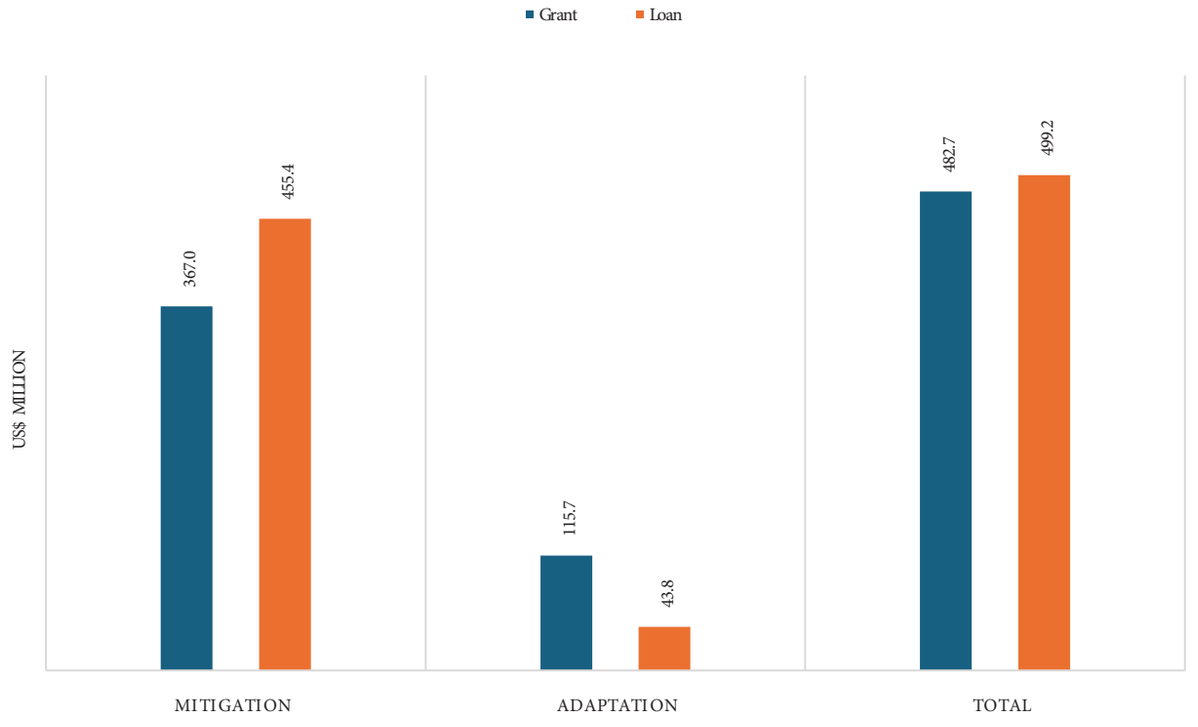


Figure 4-8: Financial support required for technology transfer to mitigate GHG emissions and adapt to climate change in the period up to 2027.

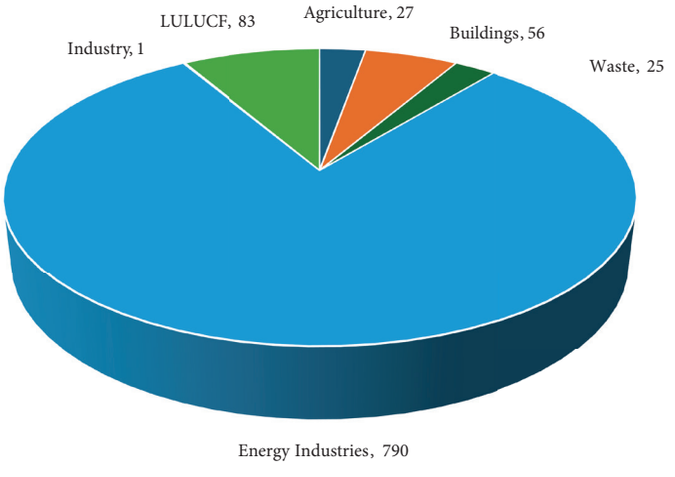


Figure 4-9: Financial support required for technology transfer to mitigate GHG emissions and adapt to climate change by sectors in the period up to 2027, US$ Million.

As seen from the information presented, the total amount of funding needed for technology transfer to climate change mitigation and adaptation by 2027 is estimated at US$ 982 million, and the largest support in this regard is expected in the Energy Industries, about US$ 790 million, representing 80% of the necessary financial support, including US$ 316 million as a grant. The second sector by the amount of support required for technology transfer is the LULUCF sector – US$ 83 million, respectively – 8% of the total support required. At the same time, in order to mitigate GHG emissions, the required funding amounts to US$ 822.4 million (US$ 367 million - grant, US$ 455.4 million – loan) – for the technology transfer to mitigate GHG emissions and US$ 155.5 million (US$ 115.7 million - grant, US$ 43.8 million – loan) for climate change adaptation, respectively.

4.7.3. Case studies on technology transfer, including success and failure cases

As mentioned above, very few national research and innovations are currently aligned with the needs of the market in the country and therefore *a priori* have a limited commercial potential. On the other hand, most of the business environment in Moldova consists of SMEs from traditional sectors, with little interest in scientific

cooperation and minimal capacity to absorb research results, that is, the ability to identify, assimilate, transform and use external knowledge, research and practices. As a result, technology transfer has so far taken place virtually exclusively through projects funded by development partners.

Thus, the European Bank for Construction and Development launched in 2010 the "Moldova Sustainable Energy Financing Facility" Project (MoSEFF)[308], with a loan of EUR 42 million to the participating financial institutions (PFIs) in Moldova for re-lending to enterprises wishing to invest in EE and RES projects. The project lasted until 2016 and helped save over 323 million kWh of energy and reduce GHG emissions by over 60.7 tons annually.

The loans were granted by 5 partner financial institutions: MICB, MAIB, Mobias Banca, BCR, PCB. Beneficiaries were able to select pre-approved technologies, such as building insulation, boilers, photovoltaic sources, biomass, modern technologies in various production processes, agricultural machinery and machines, biomass and biogas CHPs, etc., which met the high energy efficiency standards of the online technology selector.

The Beneficiaries were provided with free advisory services comprising energy audits, training and marketing support. The consultancy provided support to beneficiaries in selecting the best solutions, as well as during the projects implementation phase.

Advisory services and investment incentives (up to 20% of the investment value) were funded by the EU. Below there are some success stories within this advanced technology transfer project[309].

1. Spandor SRL, based in Chisinau, imports meat and offers cold storage services. The owner has upgraded the refrigerators to reduce expenses by investing in a renewable energy generation system. The company has installed a Photovoltaic Solar Power Plant, with an installed power of 493 kW, which provides 100% of the energy needed for the refrigeration operation. According to estimates, the investment generated about 570 MWh of green electricity per year and contributes to the reduction of greenhouse gas emissions by 748 t CO_2.
2. Spandor SRL has requested a GEFF loan through MAIB to finance the investment worth EUR 360,000. The PV systems were selected from the EBRD's Green Technology Selector, an online database of more than 30,000 high-performance products that contribute to energy savings and other environmental benefits.
3. Skyvolt SRL, established in 2017, has built and operates a 1 MW photovoltaic solar system in Singerei, in the northern region of Moldova. The company was granted the status of eligible producer by the National Agency for Energy Regulation (ANRE) in 2020. According to the National Center for Sustainable Energy (CNED), 61 companies were approved as eligible producers who were granted a fixed tariff for a period of 15 years for feeding electricity into the grid. The investment of EUR 800,000 will allow generation of 1.2 GWh per year of clean electricity that is delivered to the national electricity grid at a flat rate of 1.88 MDL/kWh. The investment also contributes to saving of about 585 t CO_2 annually.
4. Nina Patic II is a small bakery in the city of Orhei, 40 kilometers from the capital of Moldova. Established in 1999, the bakery offers a variety of services besides bread production. The bakery decided to apply for a loan under the EBRD MoSEFF project, "Green Economy Financing Facility" (GEFF)'s predecessor, to install a modern heat distribution system and replace the old electric boiler. The MoSEFF team satisfied the request by carrying out a respective feasibility study. The investment of EUR 8,335 in a new pellet boiler and heat distribution system allowed the bakery to achieve significant energy savings, about 98%. The investment was paid off from energy savings in just one and a half years, turning future cash flows into company revenue for years to come. The introduction of RES has supported other SMEs in the area by developing local supply chains and business environment. Last but not least, the project has led to improved working conditions for people, helping to create a better environment by using a greener fuel. This project demonstrates the best examples of sustainable development of SMEs not only in terms of cost savings, but also production efficiency and work comfort.

[308] <https://ebrdgeff.com/seff_facilities/commercial-moldova/>.
[309] Idem

5. Covoare-Ungheni is the largest carpet manufacturer in Moldova. With a production capacity of five million square meters per year, it supplies its products to Europe and neighboring countries. In order to reduce its energy consumption and production costs, the company decided to invest in upgrading the equipment and turned to MoSEFF for funding. The MoSEFF team supported the company with the analysis of the proposed efficient technologies, potential energy saving areas, their financial-technical parameters and profitability. The project included the replacement of a boiler burner, the rehabilitation of the wastewater treatment unit, the implementation of measures aimed at reducing electricity losses and the installation of power factor correction units. The EUR 212,300 investment allowed Covoare-Ungheni to reduce its energy consumption by 71%, resulting in substantial annual cost savings. This resulted in paying off the investment in a little over two years, turning the future cash flow into the company's revenue for years to come. In addition, the company reduced its CO_2 emissions by 54%, contributing to climate change mitigation.

Also, the recent EBRD loans for the "Modernization of the district heating system in Balti" and the "Energy Efficiency of Buildings in Moldova" projects, as well as the loans provided by the World Bank for the "Development of the Power System and the improvement of the efficiency of the district heating system", are additional examples of modern technologies transfer in the country's economy[310].

More examples of advanced technologies transfer in the Republic of Moldova can be found on the website of the "Green Economy Financing Facility" (GEFF) [311].

In addition to the energy sector, examples of technology transfer can be provided for other sectors as well. Table 4-12 shows only some of the most important technology transfer projects for the agriculture sector. The entire series of such projects implemented during 2011-2023 is presented in the common reporting tabular format. These present the respective projects also for the other sectors financed by the development partners.

Table 4-12: Examples of technology transfer projects in the agriculture sector

Project title	Donor entity	Financial commitment, EUR Million	Period	
Moldova High-Performance Agriculture (APM) Project	USAID	25.9	21.11.2016	20.11.2022
Rural Resilience Project (IFAD VII)	IFAD	22.2.	06.10.2017	30.09.2023
Farmer to Farmer Program in Moldova	USAID	1.2	01.10.2018	30.09.2023
COMPETITIVE AGRICULTURE (+ 2 additional funding + Grant)	IDA, GEF, Kingdom of Sweden	41.2	28.05.2012	30.06.2022

It is worth mentioning that once implemented, the experience gained was widely spread among analog companies in the country, by organizing field visits, workshops, exhibitions, thematic meetings, media, etc., thus motivating enterprises to tailor their activity to the application of advanced technologies existing on the world market.

Not exactly a successful one was the MoREEFF project[312] dedicated to energy efficiency in residential buildings, launched by the EBRD in 2012, with a financing of EUR 35 million. The project consisted of credit lines from local banks for re-lending to individuals, households, groups of residents, housing associations, condominiums and cooperatives, as well as housing management companies and energy service companies (ESCOs) to finance eligible EE residential projects. Due to the lack of ESCO in the country, an adequate level of tenants' organization, as well as their financial capacity to participate with respective contributions in projects, the number of projects completed under MoREEFF was limited.

4.7.4. How support has contributed to the development and transfer of endogenous technology, capabilities and know-how

As a result of the support from the development partners during the period under review (2011-2023), added value was created in the process of strengthening the country's capacities to create its own innovative technologies and promote them on the national market. Thus,

In the energy sector:

Through the Innovative Program "Clean technologies for small and medium-sized enterprises and start-ups", (2022-2024)

[310] Expert-Group, Linking external assistance to the country's strategic development priorities. 2023.
[311] <https://ebrdgeff.com/?country%5B%5D=40&content_type%5B%5D=projects>.
[312] <https://www.ebrd.com/work-with-us/projects/psd/moreeff---moldovan-residential-ee-financing-facility.html>.

- Innovations in clean technologies at an early stage in enterprises have accelerated;
- Moldova's innovation and entrepreneurship ecosystem is strengthened to promote and support clean technology innovations and entrepreneurship.

Under the "Laboratory for Sustainable Energy Storage in Cities and Sector Coupling - CSSC LAB" project, (2020-2022)

- 5 pilot actions to improve energy security and efficiency have been developed and implemented.

The project "Facilitating a fair energy transition in the Republic of Moldova", 2023-2027 is expected to:

- Advance, test and implement innovative technologies at regulatory and technological level (smart meters, Sandbox, etc.).
- Facilitate the adoption of low-carbon technologies and practices in all economic sectors (other than energy), such as transport, buildings, industry, agriculture, LULUCF, waste, etc., to significantly reduce carbon emissions and promote a greener economy.
- Promote and support energy and climate research and innovation, encouraging the advancement of sustainable technologies and practices.
- Promote and facilitate the widespread adoption of green and clean business models by the private sector.
- Raise awareness on the adoption of renewable energy sources and energy efficient practices among households, businesses, institutions and others.
- Improve policy and regulatory frameworks for an inclusive energy transition, in line with Moldova's commitments in the EU accession process, the EnCT and the Paris Agreement.
- Develop and disseminate relevant knowledge products (studies, policy notes, guidelines, etc.) on best practices, guidelines, on the implementation of measures such as financing mechanisms, decentralized energy solutions and grid disconnection options, etc., through the "On Demand Expert Facility".

Under the "Research and promotion of the generation of high-efficiency energy from solar energy by trigeneration for the production of electricity, thermal energy, cold air and the purchase of equipment", 2020-2022:

- The trigeneration system of electricity, hot water and cold air based on solar energy conversion has been developed and put into operation.
- 42 photovoltaic panels were equipped with tubular capillary mats purchased and integrated into the trigeneration system.
- 5 patent applications were filed with AGEPI in Moldova.
- The knowledge and experience gained were presented to students, master students, doctoral students and engineers at 2 roundtables.

Under the "Physical and photoelectrocatalytic properties of the compound (Ag,Cu)2ZnSn(S,Se)4 for ecological and photoelectrocatalytic photovoltaic devices" project, 2017-2023:

- The prototype of a photovoltaic element based on the ACZTSSe layers has been developed. The new knowledge gained will be important for researchers dealing with the development, manufacture and optimization of optoelectronic and photovoltaic devices based on these high perspective materials.

In the industry sector:

Under the "Strengthening local capacities for production of solar collectors in the Republic of Moldova" project, 2016-2018:

- Local production capacity for solar thermal systems in Moldova has been strengthened.
- Key policy barriers evaluated and ways forward to enable model replication developed.

In the agriculture sector:

Under the "Modernization of agricultural machinery and equipment" project, 2021-2026:

– It is envisaged to facilitate the access of agricultural producers to performing agricultural machinery and to encourage young entrepreneurs and women to procure machinery in installments.

4.7.5. Stages of the supported technology cycle, including technology research and development, demonstration, implementation, dissemination and transfer

As known, there are four stages in the technology lifecycle: innovation stage, growth stage, maturity stage, and decline stage. The innovation stage is the earliest stage of the technology lifecycle, characterized by the initial development and introduction of a new technology. In this direction, the support received from the development partners was targeted towards the academic institutions, including the Technical University of Moldova, the State University of Moldova, the Academy of Economic Studies, etc., and the total grant commitment was US$ 4.5 million over the entire period 2011-2023, with US$ 4.5 million grant for 2011-2023 already disbursed, which was also partially distributed for the demonstration of some of the samples developed by research institutions. Due to the low interest of local enterprises in scientific cooperation and their minimal capacity to absorb research results, that is, the ability to identify, assimilate, transform and use external knowledge, research and practices, as a rule, the developed samples did not find their proper implementation, and the support received for technology transfer was mostly targeted towards implementation, dissemination and dissemination of advanced Western technologies. To this end, during the years 2011-2027, the partners committed to fund foreign technology transfer projects with US$ 446.5 million as grants, and US$ 988.6 million as loans. Respectively, between 2011 and 2023, US$ 287.1 million grants and US$ 597.5 million loans have already been disbursed.

4.7.6. Support received for development and technology transfer

Generalizing the entire spectrum of support for technology transfer received from development partners in the period 2011-2027, the following can be noticed.

According to Table 4-13, the development partners' commitments in technology transfer for the Republic of Moldova during 2011-2027 amounted to a total of US$ 1,435.2 million, including US$ 446.5 million as grants and US$ 988.6 million as loans. Respectively, US$ 281.3 million as grants and US$ 676.7 million as loans were received for mitigation; US$ 97.9 million as grants and US$ 101.0 million as loans were received for adaptation; and US$ 67.3 million as grants and US$ 210.9 million as loans for cross-cutting actions.

Table 4-13: Development partners' commitments on climate change technology transfer for the Republic of Moldova during 2011-2023, US$ million

Areas	Commitments			Disbursements		
	Grant	Loan	Total	Grant	Loan	Total
Energy						
Mitigation	74.2	252.7	326.9	73.54	167.27	240.81
Adaptation	1.3	0.0	1.3	1.01	0.00	1.01
Cross-Cutting	0.9	0.0	0.9	0.00	0.00	0.00
TOTAL	**76.4**	**252.7**	**329.1**	**74.55**	**167.27**	**241.82**
Transport						
Mitigation	38.7	409.4	448.1	34.44	240.85	275.29
Adaptation	0.1	0.0	0.1	0.08	0.00	0.08
Cross-Cutting	0.0	0.0	0.0	0.00	0.00	0.00
TOTAL	**38.8**	**409.4**	**448.2**	**34.52**	**240.85**	**275.37**
Industry						
Mitigation	0.3	0.0	0.3	0.27	0.00	0.27
Adaptation	0.0	0.0	0.0	0.00	0.00	0.00
Cross-Cutting	0.1	0.0	0.1	0.12	0.00	0.12
TOTAL	**0.4**	**0.0**	**0.4**	**0.39**	**0.00**	**0.39**
Agriculture						
Mitigation	28.1	14.7	42.7	24.81	0.00	24.81
Adaptation	24.0	55.1	79.1	13.31	24.24	37.55
Cross-Cutting	58.9	183.9	242.8	59.79	135.69	195.48

Areas	Commitments			Disbursements		
	Grant	Loan	Total	Grant	Loan	Total
TOTAL	111.0	253.6	364.6	97.91	159.93	257.84
Water and sewage						
Mitigation	0.4	0.0	0.4	0.44	0.00	0.44
Adaptation	53.9	26.1	80.0	20.62	3.44	24.06
Cross-Cutting	0.1	0.0	0.1	0.08	0.00	0.08
TOTAL	**54.4**	**26.1**	**80.5**	**21.14**	**3.44**	**24.58**
Education						
Mitigation	0.8	0.0	0.8	0.36	0.00	0.36
Adaptation	0.3	0.0	0.3	0.29	0.00	0.29
Cross-Cutting	4.5	0.0	4.5	4.19	0.00	4.19
TOTAL	**5.6**	**0.0**	**5.6**	**4.84**	**0.00**	**4.84**
Health						
Mitigation	81.5	0.0	81.5	0.05	0.00	0.05
Adaptation	3.4	0.0	3.4	0.20	0.00	0.20
Cross-Cutting	0.0	0.0	0.0	0.00	0.00	0.00
TOTAL	**84.9**	**0.0**	**84.9**			**0.25**
Cross-Cutting						
Mitigation	57.4	0.0	57.4	38.95	0.00	38.95
Adaptation	14.9	19.9	34.8	11.81	0.00	11.81
Cross-Cutting	2.8	27.0	29.8	2.76	26.05	28.81
TOTAL	**75.1**	**46.9**	**122.0**	**53.52**	**26.05**	**79.57**
TOTAL						
Mitigation	281.3	676.7	958.0	172.86	408.12	580.98
Adaptation	97.9	101.0	199.0	47.32	27.68	75.00
Cross-Cutting	67.3	210.9	278.2	66.94	161.74	228.68
TOTAL	**446.5**	**988.6**	**1,435.2**	**287.12**	**597.54**	**884.66**

Regarding the technologies support distribution, it can be identified from Table 4-14 where, in addition to the commitments made by the development partners, the actual support received (disbursed) by the country during the years 2011-2023 is also presented.

Table 4-14: Development partners support during 2011-2023 to combat climate change, by technologies, US$ million.

Technology Type	Commitments 2011-2027		Disbursements 2011-2023		Total commitments 2011-2027	Total Disbursement 2011-2027
	Grant	Loan	Grant	Loan		
High Performance Roads	32.9	406.7	31.57	236.84	439.62	268.41
Agricultural Technologies	106.6	131.9	96.74	91.01	238.50	187.75
Development of the Electric Power System Capacity	53.8	173.7	53.66	88.42	227.50	142.08
Energy Efficiency	90.0	21.7	5.06	21.71	111.69	26.77
District Heating Power Plants, Energy Efficiency	0.9	57.3	0.88	57.14	58.13	58.02
Information and Communication Technologies	55.6	0.0	38.16	0.00	55.61	38.16
Water and Sanitation	37.2	16.3	20.95	0.00	53.49	20.95
Waste	15.4	9.8	0.24	3.44	25.20	3.68
Renewable Sources, Energy Efficiency	16.4	0.0	16.39	0.00	16.41	16.39
Transport	5.9	2.7	3.00	4.01	8.58	7.01
Education Equipment	4.4	0.0	4.55	0.00	4.42	4.55
Laboratory Techniques	4.0	0.0	0.78	0.00	4.02	0.78
Health	0.4	0.0	0.39	0.00	0.39	0.39
Other	22.9	168.6	14.79	94.97	191.57	109.76
TOTAL	**446.5**	**988.6**	**287.16**	**597.54**	**1,435.13**	**884.70**

Thus, during the mentioned years, the total effective support received by the country was US$ 884.7 million, of which US$ 268.4 million for construction of high-performance roads (30% of the total); US$ 187.7 million for agricultural technologies (21% of the total); US$ 142.1 million for the increase of electricity transmission

network capacity (16% of the total); US$ 58 million for district heating and energy efficient power plants (7% of the total); US$ 38.2 million for information and communication technologies (4% of the total); US$ 26.8 million for energy efficiency (3% of the total); US$ 21 million for water and sanitation (about 2% of the total); the remaining 17% for technology transfer in RES and EE, waste, transport and health sectors, in education equipment, laboratory techniques and others.

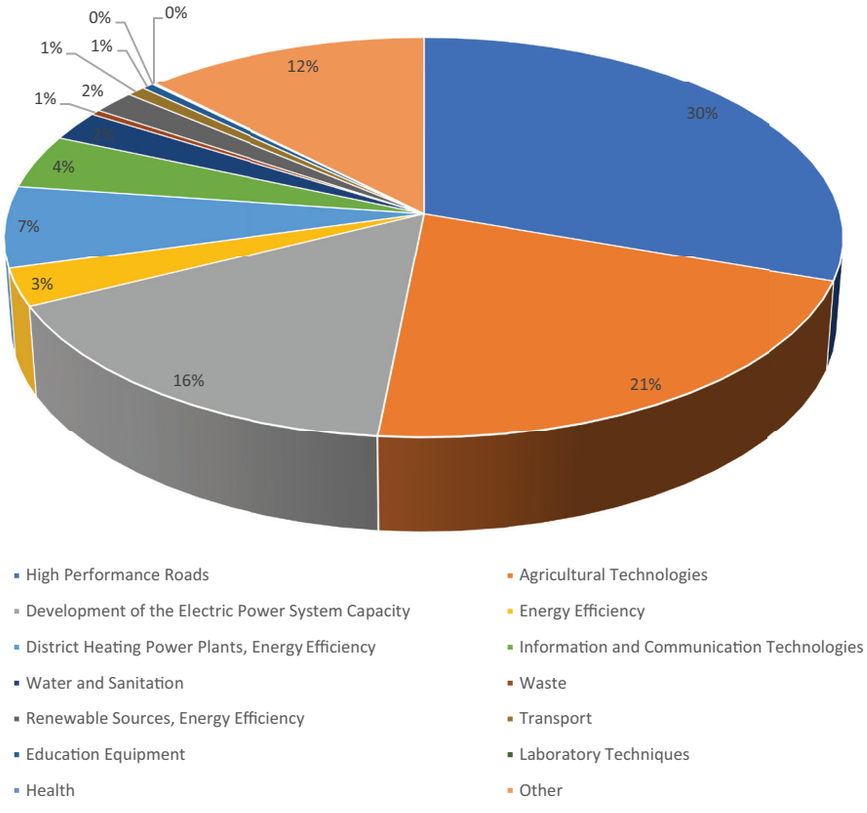


Figure 4-10: Support in percentage of the total disbursed to the Republic of Moldova from development partners for climate change during 2011-2023, by technologies.

More detailed information on the topic can be found in the common tabular reporting format dedicated to the technology development and transfer support received by the Republic of Moldova from the development partners during 2011-2023, which reflects the title of the program or project; description of the program/project; type of technology; timeframe; beneficiary entity; implementing entity; type of support (mitigation, adaptation or cross-sectional); sector; activity status (planned, ongoing or completed); use, impact and expected results.

4.8. Information on capacity-building support needed

According to the UNDP definition, *capacity building* is defined as the process of developing and strengthening the skills, instincts, abilities, processes and resources that organizations and communities need to survive, adapt and thrive in a rapidly changing world[313].

An essential ingredient in capacity development is transformation, which is generated and sustained over time from within; transformation of this type goes beyond the fulfillment of tasks to the change of mentality and attitudes. Sustainable Development Goal (SDG) #17 includes targets for capacity building, including increasing technology and innovation and improving data collection and monitoring to achieve the SDGs themselves.

At the individual level, capacity building refers to the process of changing attitudes and behaviors, which conveys knowledge and develops skills, while maximizing the benefits of participation, knowledge sharing, and ownership.

[313] <https://www.un.org/en/academic-impact/capacity-building>.

At the institutional level, it focuses on overall organizational performance and operating capabilities, as well as an organization's ability to adapt to change.

At a systemic level, it emphasizes the overall policy framework in which individuals and organizations operate and interact with the external environment.[314]

Capacity building at each level is to be carried out by undertaking specific initiatives. Potential capacity building initiatives for each cluster are:

- *Individual:* training programs, business development activities, workshops for in-depth discussions on specific topics; conferences;
- *Institutional:* development of internal policies, organizational and procedural restructuring;
- *Systemic:* support initiatives, consultations, open dialogue, reforms.

All these initiatives relate to climate change, both to climate change mitigation and adaptation.

The Republic of Moldova has established its capacity-building measures in LEDP 2030 and NCCAP 2030, as well as in its reports to the UNFCCC, the most recent being BUR3 (2021) and NC5 (2023). Based on these documents, this report presents the respective measures planned for a period until 2027, which can be extended for a later period as well. Also, the measures were supplemented with the measures formulated by the technical experts' teams during the evaluation of BUR3 and set out in par. 82-85 and 87-89 of the Technical Analysis Report on the BUR3 of the RoM, submitted to the UNFCCC on 21 December 2021.

In Tab. 4-15 and Fig. 4-11 the information on the necessary financial support from the development partners for capacity building on mitigation, adaptation and cross-cutting issues is summarized.

Table 4-15: Grant financing needed by the Republic of Moldova for climate change capacity-building for the period 2024-2027, US$ Million

Sectors	Directions of financial support		TOTAL	
	Mitigation	Adaptation	US$ Million	%
Waste	0.04	0	0.04	0
Energy	0.2	0	0.2	1
LULUCF	0.1	0.7	0.8	6
Water	0	3.96	3.96	29
Health	0	3.091	3.091	23
Transport	0	0.314	0.314	2
Cross-Cutting	1.865	3.312	5.177	38
TOTAL, US$ Million	**2.205**	**11.377**	**13.582**	**100**
TOTAL, %	**16**	**84**	**100**	

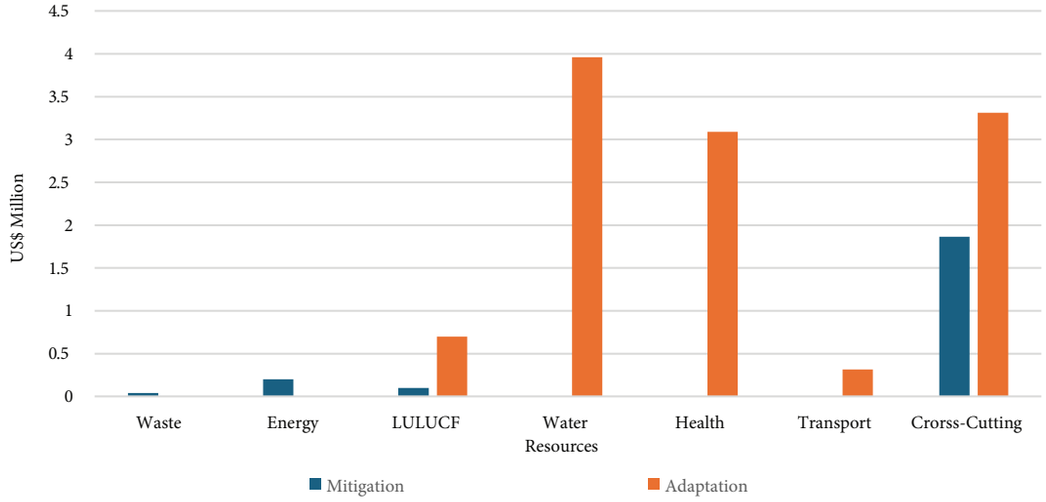


Figure 4-11: Grant financing needed by the Republic of Moldova for climate change capacity building for the period 2024-2027, US$ Million.

[314] <https://www.learlab.com/insights/capacity-building-is-it-only-a-matter-of-training/>.

As seen from the information above, the total amount of support needed to strengthen capacities in climate change for the period up to 2027 is about US$ 13,582 million, the mitigation accounting for 16%, and the remaining 84% for adaptation. The largest support towards capacity building is expected in the cross-cutting area –US$ 5,177 million (38% of the total); water resources – US$ 3.96 million (29% of the total); health – US$ 3,091 million (23% of the total); LULUCF sector – US$ 0.8 million (6% of the total), the rest 4% - in other sectors (waste, energy, transport).

4.8.1. The approach adopted by the Republic of Moldova to increase capacity-building support

In order to get support for capacity building, the Republic of Moldova is guided by the mechanism established in the Regulation on the institutional framework and the mechanism for coordination and management of external assistance, approved by the GD no. 377/2018. At the level of each central public authority (Ministry), the Sector Council on external assistance is established – an advisory body created on the basis of the partnership principle and empowered with sectoral programming and monitoring functions for external assistance projects and programs.

The Council and the sector coordinator of each of the 14 ministries of the Republic of Moldova[315] establish the list of external assistance needed to achieve the priority objectives of each ministry, which are subsequently examined at the level of State Chancellery.

Guided by the objectives of these policies, the Inter-ministerial Committee for Strategic Planning examines the financing proposals from the respective Ministries, and advance them further towards the start of negotiations with the development partners to get the respective funding.

Also, the "Support Platform for the Republic of Moldova" is relatively recently established, which aims to generate immediate political, financial and material assistance, as well as in-depth expertise for the democratic reform process, from the institutions and MSs of the EU, G7 countries, international financial institutions and international organizations, as well as other development partners.

A separate role for increasing funding for capacity building on climate change belongs to the Republic of Moldova Country Program for engaging with the Green Climate Fund for the years 2024-2027. Beneficiaries may apply for financing to the GCF, with the approval of the Ministry of Environment.

4.8.2. Capacity building needs, constraints and gaps

According to the Paris Committee's Capacity Building Toolkit created to assess the gaps and capacity-building needs of developing countries in implementing the Paris Agreement[316], the process of designing a capacity assessment has been divided into two sections: *'Evaluation'* (the process involved in establishing, executing the evaluation and evaluating the results) and *'Action'* (incorporating the findings of the validated evaluations into relevant programmes and strategies and ensuring that appropriate action is taken to monitor and evaluate how the findings are being used as well as reporting progress over time.

In the Republic of Moldova, the 'Evaluation' and 'Action' phases were completed during 2000-2023. As a result, in 2023, LEDP 2030 and NCCAP 2030 were approved and published.

These documents also contain chapters dedicated to the procedures for reporting, monitoring and evaluating the actions in the programs' implementation plans. It should be noted that the LEDP 2030 does not contain all capacity-building measures on greenhouse gas mitigation, but these are specified in BUR3 (2021) and NC5 (2023).

These measures will be included in the updated version of the LEDP 2030, to incorporate the more ambitious economy-wide reduction target from NDC 3.0, which is to be submitted by February 2025.

4.8.3. Increasing public awareness, public participation and access to information in relation to capacity building

For some time now, events, initiatives, discussions, conferences, exhibitions, press campaigns and other actions aimed at strengthening public information and awareness efforts on environment and climate change have

[315] <https://gov.md/ro/link-type/ministere>.
[316] <https://unfccc.int/sites/default/files/resource/PCCB_Toolkit.pdf>.

been taking place in the Republic of Moldova. Some of these have become a tradition for decades, such as regular sanitation and afforestation campaigns. Thematic days held in the country should also be mentioned: International Biodiversity Day, World Environment Day, World Wetlands Day, International Danube Day, International Forests Day, etc.

More specific examples of activities are:

- Earth Hour campaign;
- "Hai, Moldova" campaign;
- The "Plant your future" campaign (the successor to the National "A Tree for Our Lifespan" Campaign);
- Velo Marathon "Eco energy";
- Festival "Straseni, mon amour";
- Climatic box;
- IarmarEco;
- InnSpirECO;
- "Choose NOT to disappear as a species";
- "Clean river from village to village";
- "Clean city with recycled e-waste";
- "Fountain disinfection and cleaning";
- "REP Week in Moldova";
- European Week "Clean, Shared and Smart Mobility";
- Green Week
- Podcasts "Go Green", "Children's World" (eco stories);
- 107 ecological hours – 2,255 people (2018)[317];
- Ecological Education Hour entitled "Global Warming and Climate Change: Causes and Effects";
- Public lecture "Water on EARTH and in the Republic of Moldova: problems and solutions";
- Public Lectures "Study of the World Meteorological Organization", "Climate Change";
- Conferences "Ecological issues in the context of sustainable development of the Republic of Moldova", "Dniester in danger";
- Round table "The efficiency of the application of minimum soil processing technologies in the Republic of Moldova";
- Contests "Local Environment and Sustainable Development", "Green City School";
- The exhibitions "Wherever you look – everywhere is garbage", "Water – the essence of life and well-being", "Water and its mysteries", etc.

Environmental NGOs actively involved in information and public awareness campaigns on environmental protection and climate change include:

- Association of Environmental and Ecological Tourism Journalists of the Republic of Moldova
- Environmental Movement of Moldova
- Media-Grup MERIDIAN (Radio EcoFM)
- EcoVisio
- EcoContact and others
- Periodical publication "Nature"
- Regional Environmental Center (REC Moldova)
- National Environmental Center
- Aarhus Environmental Advisory and Information Centre

[317] The Environmental Strategy implementation report in 2018, Ministry of Agriculture, Regional Development and Environment, <https://mediu.gov.md/sites/default/files/Documente%20atasate%20Advance% 20Pagines/ Report%202018%20Strategy%20environment%20%20%28Annex%29.pdf>.

Among the useful information sources in the Republic of Moldova on environment and climate change, the following should be mentioned:

- https://www.mediu.gov.md/
- https://www.ecocontact.md/
- https://www.eco-tiras.org/
- https://www.ecovisio.org/
- https://www.natura.md/
- http://www.clima.md/
- https://ecopresa.md/
- https://ecofm.md/
- https://sppn.md/
- http://mem.md/

It should be noted that the Republic of Moldova, as a member of regional, global and/or multilateral organizations and signatory of international agreements, including in the field of environment and climate change, constantly participates in joint training and awareness-raising activities organized by authorities, NGOs, media, general public, through the programs, mechanisms and financing instruments of the UN, OECD, OSCE, EU, USAID, etc., which significantly contribute to the implementation of the provisions of the Paris Agreement, the European Ecological Pact, the 2030 Sustainable Development Agenda, the UNFCCC, the Aarhus Convention, the EU-RoM AA, etc.

4.9. Information on capacity-building support received under Article 11 of the Paris Agreement

4.9.1. Case studies, including success and failure stories

The support received by Moldova during 2011-2023 for capacity building was various by form and content, being promoted practically in all sectors. During the period under review, 126 capacity-building projects were launched, of which only four were financed from loans, the other 122 were financed from grants.

The four projects include: the Higher Education in Moldova Project and the Modernization of the Health Sector in the Republic of Moldova (Phase II), funded by the World Bank; the Competitive Agriculture Project (+ 2 additional funding + grant), funded by the International Development Association; the Inclusive Rural Economic and Climate Resilience Programme (IFAD VI), partially funded by the PI "Consolidated Unit for the Implementation of IFAD Programmes".

It is worth mentioning that, in addition to capacity building, these projects also funded other activities. The following are the results of some of the projects meant to strengthen the capacities of the staff in office and of the population as a whole:

1. EU4Climate project, 2019-2023. Donor: European Commission; Beneficiary: Ministry of Environment and its subordinate institutions, including the Environmental Agency, the Environmental Inspectorate, the State Hydrometeorological Service, etc. Implementer: UNDP. Grant received – EUR 1 million.

Project results:

- NDC 2.0 prepared and reported by the Government to the UNFCCC on March 4, 2020;
- LEDP 2030 was developed and approved by the Government in 2023. The document is based on the more ambitious economy-wide reduction targets set out in the NDC 2.0 (2020);
- The 'Report on Strategic Environmental Assessment' for the LEDP 2030 has been prepared;
- Three Sustainable Energy and Climate Action Plans (SECAPs) have been developed for the municipality of Cahul, the communes of Valeni and Giurgiulesti;
- The existing system for monitoring, reporting and verification (MRV) of GHG emissions and other climate change related information has been revised by GD no. 1277/2018;

- Law no. 43 as of March 3, 2023 on fluorinated greenhouse gases was developed and adopted by the Parliament of the Republic of Moldova (it is transposing the EU Regulation no. 517/2014 on fluorinated greenhouse gases);
- The draft Regulation on the monitoring, reporting and verification of GHG emissions from stationary installations and from the aviation sector was developed and approved through GD no. 575/2024;
- An analysis of inconsistencies with the EU climate action acquis has been carried out and a Roadmap for legislative alignment has been developed;
- The National Waste Management Plan 2023-2027 and waste legislation have been revised to integrate climate change considerations and identify measures to reduce GHG emissions from the waste sector at national level;
- The recommendations for streamlining climate change issues in policies, strategies and programs of the energy sector of the Republic of Moldova have been developed;
- EU4Climate assisted in the preparation of the Action Plan for the implementation of the Roadmap for the alignment of Moldova with the climate acquis anticipating the full transposition of the EU ETS Directive;
- The Concept of the Law on Climate Actions was developed and the regulatory impact of the law was assessed;
- The Guideline on integrating climate change into waste sector policies was developed as supporting material for a series of dedicated courses to facilitate the implementation of the Paris Agreement at sectoral level in the Republic of Moldova. It includes information on how to measure the impact on climate change resulting from this sector and how these impacts can be mitigated. Includes an analysis of the interaction between the effects of climate change and the development of waste management infrastructure;
- Capacity building on MRV implementation by training relevant stakeholders on GHG inventory: MRV training on implementation of quality assurance/quality control system, MRV system for waste, energy and LULUCF sectors.

2. The project "ENPARD Moldova - Support to Agriculture and Rural Development", 2015-2022. Donor: European Commission; Beneficiary: Government of the Republic of Moldova. Grant received – EUR 48.956 million.

Project results:

- improved the financial capacity of the Government to achieve the policy objectives in agriculture and rural development;
- improved capacity to promote policies and reforms in agriculture and rural development;
- improved service delivery in the agricultural and rural sector;
- improved governance for agricultural and rural development purposes;
- improved ability to identify the basic needs of the population;
- improved sustainable management of natural resources, including water and biodiversity;
- encouraged cooperation with regions and territorial administrative units with special status.

3. The project "Implementation of the Energy Vulnerability Reduction Fund (EVRF) in the Republic of Moldova", 2022-2023. Donors: SIDA - EUR 8.237 million; Swiss Agency for Development and Cooperation - EUR 0.936 million. Beneficiary: Ministry of Labor and Social Protection.

Project results:

- The project will improve EVRF's invoice compensation system to support households in the cold period by: providing compensation - providing invoice compensation for the most vulnerable energy

households using the EVRF public mechanism, covering at least 100 thousand households in the very high vulnerability category during the cold season;

- Strengthening the capacities of the Ministry of Labor in implementing and improving the EVRF;
- Supporting the Government by the EVRF Team in the EVRF implementation progress and the produced impact;
- Improving the software: improving the *compensatii.gov.md* platform by including new functionalities and modules;
- Supporting the implementation of energy efficiency (EE) activities and programs: implementing additional activities and programs by the EVRF team to stimulate households to reduce overall average monthly consumption and hourly consumption/peak range by using new tools and social norms.

4. The project "Reducing the effects of soil pollution and erosion by expanding wastewater management capacity", 2013-2018. Donor: Ministry of Regional Development and Public Administration of Romania; Beneficiary: Sângera City Hall. Grant of EUR 2.4 million.

The project involved the institutions that are required by the laws of the Republic of Moldova to reduce soil erosion and pollution caused by wastewater. Wastewater management capabilities have been built and expanded to reduce the effects of soil pollution and erosion. Also, within the project, both citizens and representatives of public institutions and businesses were trained on centralized wastewater management to reduce soil pollution and erosion. Specifically, in the project and its activities advertising part, the following were organized:

- 2 cross-border workshops on wastewater management and pollution reduction (1 workshop in Chisinau, with a minimum of 12 participants and 1 workshop in Iasi with a minimum of 12 participants);
- the webpage of the project, which contains two main sections: one dedicated to the activities carried out in the town of Sangera and the other dedicated to the activities carried out in the commune of Dumesti;
- 3000 promotional leaflets: 2,800 for the population, 100 for public institutions and 100 for local businesses;
- 20 small display panels, for each sector where the sewerage system is implemented, 4 press releases, 10 posters.

5. The project "Global Environmental Facility Small Grants Programme - All Operational Stages", 2022. Donor: Global Environmental Fund, Beneficiary: Ministry of Environment. Grant - Euro 0.374 million.

The projects implemented by the non-governmental organizations from the allocated grants, achieved the following:

- Improved practices and actions at community level and reduced negative impact on biodiversity resources in and around protected areas and conservation areas of community interest.
- Benefits generated at community level due to biodiversity conservation in and around the protected areas, conservation areas of community interest.
- Improved sustainable use of biodiversity and terrestrial landscapes at community level by employing community initiatives, framework and market mechanisms, including recognised environmental standards incorporating biodiversity aspects.
- Improved actions and practices at community level and reducing the negative impact on agricultural and forestry ecosystems and ecosystem services, demonstrated to support ecosystem functionality.
- Effective actions and practices, at community level, to prevent, reduce and eliminate POPs, hazardous chemicals and other pollutants, manage contaminated sites in an environmentally friendly way, reduce environmental contamination.
- Synergistic partnerships developed between transboundary water management institutions and structures to support the implementation of the priority actions of the regional strategic action plan.
- Trained community organizations and NGOs and their involvement in the implementation of global conventions.

4.9.2. How the received support has increased the capacity of the Republic of Moldova

Given that capacity is determined as "the ability of people, organizations and societies as a whole to achieve climate change objectives and targets", and capacity building and their development is understood as "the process by which people, organizations and society as a whole fit, strengthen, adapt and maintain over time capacities to achieve positive climate change outcomes"[318], the following can be said about "*How the received support has increased the capacity of the Republic of Moldova*":

Capacity building and development is considered on three levels:

- enabling environment;
- organizational; and
- individual level.

Enabling environment

During 2011-2023 with the development partners support in climate change the country has achieved the following:

- national climate change strategies and action plans have been implemented;
- NDC 1.0 (2015) and NDC 2.0 (2020) have been developed and submitted to UNFCCC;
- open access and effective participation in scientific and technical cooperation with other countries has been established;
- the successful development and updating of national climate change strategies and action plans has been ensured; for example, the approval of LEDP 2030 and NCCAP 2030, which serve as legal instruments to achieve the mitigation targets set out in NDC 2.0 (2020);
- institutional frameworks and arrangements support the implementation of national climate change strategies and action plans; thus, the key institutions, the Ministry of Environment, the Ministry of Energy and the Ministry of Infrastructure and Regional Development have issues related to overcoming climate change on their agenda;
- strategic partnerships, in particular with the EU, and learning networks have increased efforts to mitigate and adapt to climate change aiming at sustainable development;
- high quality programmes and projects that are technically sound, have realistic and achievable plans, address gender and youth considerations and include monitoring;
- effective monitoring and evaluation and learning processes integrated into projects and programmes have emerged to support evidence-based decision making at all levels;
- the basis for creation of strengthened mechanisms has been laid, and investment incentive structures have partly ensured the deployment and maintaining capacities of all types at all levels; though it is true that, due to the exodus of specialists abroad, maintaining of capacities continues to remain a challenge.

Organizational

- structures have been created to ensure the efficient achievement of the NDC objectives; this includes the National Commission on Climate Change, the Environmental Agency, the Energy Efficiency Fund in the Residential Sector, etc.
- cooperation bodies have been established with the Energy Community, the European Union and other international institutions such as the World Bank, EBRD, EIB, etc.

Individual level

- a multitude of climate change information systems have been created;
- as a rule, all climate change or climate change related projects, funded by development partners, had workshops incorporated into their program of deployment, where participants had the opportunity to raise their level of knowledge in various climate-related issues, as well as to gain skills to solve questions in this field;

[318] Adapted from the definition given in "Capacity Development: UNDAF Companion Guidance" United Nations Development Group 2017, available at <https://unsdg.un.org/resources/capacity-development-un-daf-companion-guidance>.

– in educational institutions, subjects dedicated to the sustainable development of the economy and society, etc., have been introduced.

4.9.3. Support received at national level for capacity building, stakeholder participation and involvement

The support received by the Republic of Moldova during 2011-2023 for the implementation of 127 capacity-building projects in the field of climate change is reflected in the common tabular reporting format. Of these, 4 projects were financed from loans, and the other 123 – from grants.

Thus, the projects implemented based on loan funding include:

1. "Inclusive Rural Economic and Climate Resilience Programme" (IFAD VI), 2014-2021, with the loan of US$ 13.1 million disbursed by PI "Consolidated Unit for the Implementation of IFAD Programs". At the same time, a US$ 0.25 million grant was provided. This project was also funded from a US$ 3.65 million grant provided by the GEF, and US$ 4.5 million grant provided by the Kingdom of Denmark. Beneficiary - Congress of Local Authorities of Moldova (CALM), Public Institution Organization for the Development of Entrepreneurship;
2. Competitive Agriculture (+ 2 additional funding + grant), 2012-2022, US$ 45.8 million loan granted by the International Development Association (IDA). As part of this project, the GEF has contributed US$ 4.4 million in grants and the Kingdom of Sweden granted US$ 2.2 million. Beneficiary - Ministry of Agriculture and Food Industry;
3. Program "Modernization of the health sector in the Republic of Moldova" (Phase II), 2015-2020. The US$ 1.5 million loan was granted by the World Bank Group. Beneficiary -Ministry of Health;
4. "Higher Education in Moldova" Project, 2020-2025. The loan is granted by the World Bank Group with a commitment of US$ 38.8 million, with about US$ 0.4 million disbursed by 2023. Beneficiary - Ministry of Education, Culture and Research.

Grants were broken down by sector as reflected in Table 4-16.

Table 4-16: Disbursements in the period 2011-2023 for the Republic of Moldova to capacity building towards climate change mitigation and adaptation

Areas	Disbursements		
	Grant	Loan	Total
Energy			
Mitigation	11.9	0.0	11.9
Adaptation	1.0	0.0	1.0
Cross-Cutting	0.0	0.0	0.0
TOTAL	**12.9**	**0.0**	**12.9**
Transport			
Mitigation	1.9	0.0	1.9
Adaptation	0.0	0.0	0.0
Cross-Cutting	0.0	0.0	0.0
TOTAL	**1.9**	**0.0**	**1.9**
Industry			
Mitigation	0.0	0.0	0.0
Adaptation	0.0	0.0	0.0
Cross-Cutting	0.0	0.0	0.0
TOTAL	**0.0**	**0.0**	**0.0**
Agriculture			
Mitigation	24.8	0.0	24.8
Adaptation	11.7	13.1	24.8
Cross-Cutting	60.4	45.8	106.2
TOTAL	**96.9**	**13.1**	**110.0**
Water and sanitation			
Mitigation	0.0	0.0	0.0
Adaptation	9.0	0.0	9.0
Cross-Cutting	0.0	0.0	0.0
TOTAL	**9.0**	**0.0**	**9.0**

Areas	Disbursements		
	Grant	Loan	Total
Education			
Mitigation	0.3	0.0	0.3
Adaptation	3.6	0.0	3.6
Cross-Cutting	0.4	0.0	0.4
TOTAL	**4.3**	**0.0**	**4.3**
Health			
Mitigation	1.7	0.0	1.7
Adaptation	0.0	0.0	0.0
Cross-Cutting	0.0	0.0	0.0
TOTAL	**1.7**	**0.0**	**1.7**
Multisectorial			
Mitigation	0.2	0.0	0.2
Adaptation	24.0	0.0	24.0
Cross-Cutting	33.1	0.0	33.1
TOTAL	**57.3**	**0.0**	**57.3**
TOTAL			
Mitigation	40.8	0.0	40.8
Adaptation	49.4	13.1	62.5
Cross-Cutting	93.9	45.8	139.7
TOTAL	**184.1**	**58.9**	**243.0**

As seen from the information above, the industry sector did not benefit from direct assistance in capacity building, because it fell under the cross-sectoral capacity building, i.e. covering several sectors.

The country's priorities in climate change capacity building formulated by the country during 2011-2023 can be prompted by the share of assistance received by the sectors concerned. According to the information presented in Figure 4-12, 64.1% of external assistance was directed to agriculture sector.

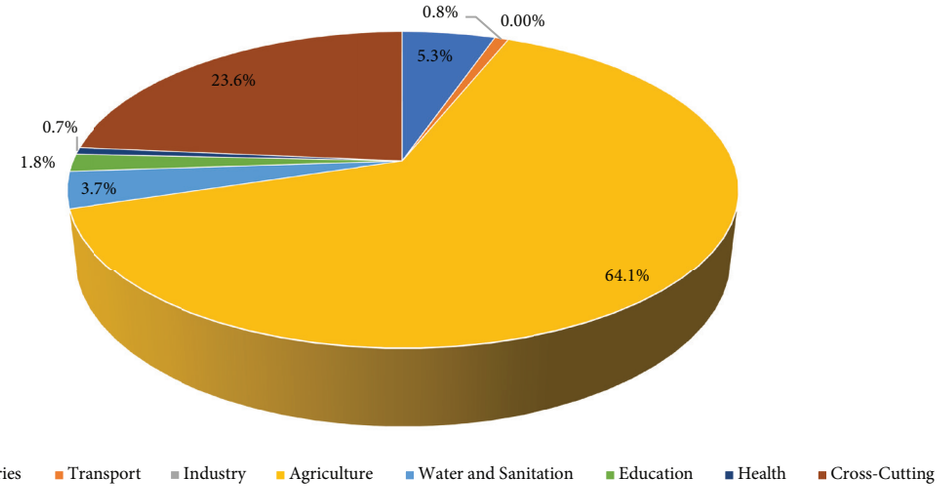


Figure 4-12: Share of disbursements made during 2011-2023 by the DP for climate change capacity building.

However, taking into account, that agriculture is not the leading sector in terms of the level of GHG emissions, it can be considered that the donor assistance was more oriented towards increasing the level of climate change adaptation capacities, given that 57.7% of the country's population lives in the rural area[319]. The cross-cutting component ranks the second in terms of external assistance received for capacity building, with disbursed US$ 57.3 million, equivalent to 23.6% of the total, and energy industry ranks the third, with US $12.9 million, or 5.3% of the total. In total, these three sectors accrue 92% of all external climate change capacity-building assistance disbursed to the country during 2011-2023.

It is worth noting that stakeholders in capacity building are very varied and include academia, public associations, Parliament, Government, Ministries, National Center for Sustainable Energy, energy regulator, municipalities, private companies and others. The entire list of capacity building assistance beneficiaries is also presented in the common reporting tabular format.

[319] <https://statistica.gov.md/ro/populatia-cu-resedinta-obisnuita-in-profil-teritorial-pentru-perioada-9578_59589.html>.

4.10. Information on support required and received for the implementation of Article 13 of the Paris Agreement and transparency-related activities, including for transparency-related capacity building

4.10.1. Support required and received for reporting in accordance with Article 13 of the Paris Agreement

Detailed information on drafting National Communications (NCs), Biennial Updated Reports (BURs), Nationally Determined Contributions (NDCs) and first Biennial Transparency Report is presented in the common tabular reporting format in accordance with Article 13 of the Paris Agreement, and the same information is presented in a more concise form in Table 4-17. As seen from the table, during 2015-2024, about US $2,819 million were allocated to finance the drafting of the NDC, respectively reporting to the UNFCCC, and the actual disbursement to October 2024 was about US $2,629 million.

Table 4-17: Support received by the Republic of Moldova during 2015-2024 for reporting to the UNFCCC

No.	Name	Allocated amount, US$ thousands		Source of funding / Implementing Agency	Execution period	Status
		Commitment	Disbursed			
1.	NDC 1.0 (2015)	200	144	GEF / UNEP	2014-2015	Completed
2.	BUR1 (2016)	352	352	GEF / UNEP	2014-2016	Completed
3.	NC4 (2018)	500	500	GEF / UNEP	2014-2018	Completed
4.	BUR2 (2019)	352	352	GEF / UNEP	2017-2019	Completed
5.	NDC 2.0 (2020)	79	79	EU4Climate / UNDP	2019-2020	Completed
6.	BUR3 (2021).	352	330	GEF /UNEP	2020-2021	Completed
7.	NC5 (2023)	500	481	GEF / UNEP	2019-2023	Completed
8.	BTR1 (2024)	484	391	GEF / UNEP	2022-2025	In Progress
	TOTAL	**2,819**	**2,629**			

4.10.2. Support needed and received to address areas for improvement, identified by teams of technical experts

With reference to the areas of improvement identified by the team of technical experts who carried out the technical assessment and analysis of BUR3 (2021), the following can be mentioned:

With reference to paragraphs 83-85 of the Technical Assessment Report of BUR3 of the Republic of Moldova to the UNFCCC, it should be mentioned that GD no. 1277/2018 on the establishment and operation of NMRS of GHG emissions and other climate change related information, updated in January 2024, has amended the Regulation on the establishment and operation of NMRS of GHG emissions and other climate change related information, which transposes art. 2, art. 45 para. (2), art. 18, art. 19, art. 26. 29, art. 37-40, Annex V, Annexes VII and VIII of EU Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action; Regulation (EU) 2023/857 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 to contribute to climate action to meet commitments under the Paris Agreement and Regulation (EU) 2018/1999; Commission Delegated Regulation (EU) 2020/1044 of 8 May 2020 supplementing Regulation (EU) 2018/1999 of the European Parliament and of the Council with regard to global warming potential values and inventory guidelines, as well as the Union Inventory System; Commission Implementing Regulation (EU) 2020/1208 of 7 August 2020 on the structure, format, submission procedures and review of information reported by Member States, as well as Article 2 and Annex I of Commission Implementing Regulation (EU) 2022/2299 of 15 November 2022 laying down rules for the application of Regulation (EU) 2018/1999 of the European Parliament and of the Council as regards the structure, format, technical details and procedures for integrated national energy and climate progress reports.

As a result, initiatives to improve the MRV system already existing at the date the RoM's BUR3 was submitted to the UNFCCC (2021), in order to comply with the requirements of the enhanced transparency framework of the Paris Agreement, have been implemented.

Regarding the needs for capacity building described by the team of technical experts, set out in paragraphs 87-89 of the Technical Assessment Report of BUR3 of the Republic of Moldova to the UNFCCC (2021), they are also included in the common tabular format for reporting, dedicated to the country's needs for capacity building in the field of climate change.

It is worth noting that the first report reviewing the transparency of public institutions in the Republic of Moldova was published in 2021. The analysis focused both on the quality of legislation in this area and on the practical application of the requirements and standards deriving from the law. The overall assessment of the situation was rather pessimistic, demonstrating significant gaps in legislation and even less positive news about practical applications of the law. The total score in the Freedom of Information Index 2021 did not exceed 50 percent of the available points, indicating the presence of systemic deficiencies in this area.[320]

According to the Institute for European Policies and Reforms (IPRE), the national authorities do not ensure the necessary transparency for the negotiation process, nor a strategic public communication about the value and conditions of external assistance. The long-term experience of the governments of the Republic of Moldova in conducting closed-door negotiations to obtain financial support has fueled citizens' distrust of the authorities.

It is recommended that[321]:

1. The government should ensure maximum transparency and consult civil society on the intention to access external financial assistance. Any financial support (grants or loans) refers to public funds. Thus, the law requires firm decision-makers to ensure transparency, consultation at all stages: negotiation of the agreement, the direction to which the funds will be channeled and others.
2. The government should carry out a comprehensive analysis of economic and financial conditions in the early phase of negotiations, especially in case of sovereign loans. This exercise should include analysis of the sovereign loan's repercussions, in particular controversial loans from the Russian Federation and the People's Republic of China on the country's national security.
3. The donor and development partner community should encourage projects that can provide prompt technical assistance to the Government to assess all types of financial support before and during negotiations. This would also increase transparency, strategic communication and authentic public consultations.
4. The government should use existing dialogue platforms with civil society and expert community to consult potential financial support agreements. This would increase the correct information of the public and minimize any hidden agenda.
5. Government officials and political parties should refrain from over-politicizing the entire financial support management process. Excessive politicization diminishes public support for a loan or investment and creates conditions conducive to misinformation and manipulation.
6. Before announcing certain financial support packages, the Government and political leadership should prepare and publicly present a detailed spending plan, strictly related to the country's development vision. The negotiation of the financial assistance package is also a political exercise and should be seen and communicated as part of a vision for the modernization of the country. Priority should be given to infrastructure projects, industry, business development. This should be presented to society, debated in the Parliament, discussed between CSOs and relevant business associations.
7. The Government and political leadership of the country should emphasize the great value and effectively inform the public about the financial aid that comes under a grant component (World Bank, Romania, EU funds). The conditions imposed under the EU financial assistance should be perceived as opportunities for reform and can be an additional argument in favor of the necessary reforms.
8. The Moldovan authorities, supported by our diplomacy, should take rapid action in establishing an intense political dialogue with the EU, in order to benefit from all potential financial assistance.

[320] <https://freedomhouse.org/sites/default/files/2022-12/fh-Moldova_Access-to-Info-Report-2022_Eng-v5_0.pdf>.
[321] <https://ipre.md/2020/07/03/autoritatile-trebuie-sa-asigure-transparenta-si-o-comunicare-publica-strategica-privind-asistenta-externa-pentru-republica-moldova/>.

CHAPTER 5. MAINSTREAMING GENDER ISSUES IN NATIONAL CLIMATE POLICIES

Gender equality is fundamental for reaching sustainable development, being also a prerequisite in various fields, including those related to climate change mitigation and ensuring resilience to climate change.

Women, men, girls and boys bear a disproportionate burden of the needs and wants, opportunities and threats caused by climate change, such as droughts or floods, extreme variation in temperature or precipitation. Combined, all of these, lead to a higher risk of different encounters and impacts of such events on life or health of women, men, girls and boys.

This chapter presents information on promoting the acceleration of inclusion and sustainable development from the perspective of the gender-sensitive dimension associated with climate change, adaptation to climate change and resilience to climate change. In addition, in this chapter, gender equality is reviewed in the context of combating climate change activities and recommendations are provided to overcome identified gaps.

5.1. Assessment of the legal, institutional and policy framework related to gender issues and combating climate change

Gender equality is an important human right, but it is widely recognized as well as a prerequisite for sustainable development in its three dimensions — economic, social and environmental. Back in 2012, the UN General Assembly had addressed the central role of women and the importance of a sustainable environment for the planet and future generations within the Conference "The future we want" and in line with the UN Resolution no. 66/288[322].

Gender issues - demographic situation and statistical landscape of the Republic of Moldova

As of the beginning of 2023, as in previous years, the total number of women in the country continued to predominate among the population with regular residence (52.7 per cent women versus 47.3 per cent men), with 90 men to 100 women. This ratio differs in various age groups, the difference being more pronounced for the population aged 35-64 and 65 and over, where for 100 women there are 91 and 61 men[323], respectively. At young ages, the number of males predominates over females, thus, in the 0-14 age group, the ratio is 106 boys to 100 girls. In the 15-34 age group, the number of males is almost identical to that of females – 99 men to 100 women. In urban and rural areas, the gender ratio is also in favor of women, with 85 and 94 men to 100 women, respectively.

The average life expectancy in Moldova was 71.9 years in 2023, increasing by 0.5 years as compared to the level recorded in 2022. Life expectancy at certain ages is an important benchmark for formulation of policies that take into account the life cycle for each of the two sexes, such as employment policies, healthcare policies. In addition, life expectancy at older ages is an indicator that reflects the influence of the population's living conditions on the number of years a person can live[324]. Both women and men had predominantly a medium level of education – 57.0 per cent in men versus 52.8 per cent in women.

The Republic of Moldova is undergoing a continuous demographic transition, which involves two complex processes: population decrease and aging[325]. An adequate policy response involves costs and policies tailored to

[322] Un Resolution No. 66/288 of 27 Jully 2012, <https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_66_288.pdf>.
[323] Caracteristici demografice, Biroul Național de Statistică (Demographic description, National Bureau for Statistics) , <https://statistica.gov.md/ro/portretul-statistic-al-femeilor-si-barbatilor-in-republica-moldova-9617_61008.html>.
[324] Durata medie a vieții în anul 2023, Biroul Național de Statistică (Average life duration, National Bureau for Statistics), <https://statistica.gov.md/ro/durata-medie-a-vietii-in-anul-2023-9578_61379.html>.
[325] Teoria Schimbării pentru Reziliența Demografică – adaptare, atenuare, ajustare (Theory of Change for demographic resilience – adaptation, mitigation, adjustment), Chișinău, 2022, <https://social.gov.md/wp-content/

the Republic of Moldova. Without ambitious policy interventions, these trends are set to intensify in a relatively short time.

While the data of the National Bureau of Statistics (NBS), which are official data, consider the image of women in the social, educational, education and training sectors, the labor market, career development in terms of gender, we find that there is no official analysis and there are no disaggregated official data in the Republic of Moldova on the statistical profile of women and men from the perspective of climate change conditions, adaptation to climate change and climate resilience. Likewise, there is no profile of women affected by climate change in urban or rural settings, elderly or young, women with disabilities, women participating in decision-making in the climate change or environmental sector.

The gender equality dimension aims to take into account the specific impacts of political, socio-economic, environmental, educational, or other factors in the context of climate change on the health and well-being of women and men.

Throughout the development of society and diversification of natural and intelligence sources, women have accumulated various knowledge and skills related to natural resources, global warming, factors influencing the climate change phenomenon, and other information. In other words, over time, women have become not only victims of climate change and environmental pollution, but also agents of change and development, including acquisition of a decisive status in sharing of roles and responsibilities at any level and at any stage of decision-making.

Climate change affects women, girls, men and boys differently and disproportionately. Resilience and adaptation to climate change influence behavior differently in adults and youth, women and men. Policies and interventions promoted in the field must take into account gender differences, different capacities to anticipate risks, vulnerabilities and threats, resilience and recovery. In this context, the efficiency of reducing climate change-related vulnerabilities, as well as efficiency in prevention, preparedness and resilience actions, will increase if the degree of vulnerability of different social and gender groups is considered.

The promotion of gender equality in the field of climate change must be viewed from two perspectives: (a) the latent aspect of climate change as a global phenomenon; and (b) crises, disasters or incidents associated with climate change and associated with gender and humanitarian assistance.

In both cases, there is a sine qua non condition to assess needs and wants according to gender and to have legal, institutional and political instruments adapted to such priorities, as officially approved at the country level or international level.

The reduction of gender inequalities related to climate change and, respectively, the empowerment of women becomes an essential factor that contributes to economic and social development.

The issue of stereotypes about the role of women and men in the climate change sector needs to be studied. Strengthening the capacities of central public authorities and local public authorities in understanding and supporting interventions for reducing climate change risks from the perspective of gender needs must become an assumed priority.

The Gender Equality Index data (2024), show that the fields of education, access to resources, perceptions and stereotypes have regressed as compared to the previous year, the latter having decreased by two percentage points.

This is largely due to the fact that attitudes and perceptions of the population towards women's involvement in politics and public life have worsened. Failures and/or difficulties were associated with the general perception that women were not capable or competent to hold a leadership position.

This issue is relevant from the perspective of women's participation in the policy-making and decision-making process in the field of climate change mitigation.

Legal, institutional and policy framework at international and national levels

uploads/2022/09/teoria_schimbarii_pentru_rezilienta_demografica_-_adaptare_atenuare_ajustare.pdf>.

Gender equality is a fundamental human right. Article 1 of the Universal Declaration of Human Rights, adopted by the UN General Assembly on December 10, 1948, states that "*All human beings are born free and equal in dignity and rights,*" and Article 2 states that *"Everyone is entitled to all rights and the freedoms set forth in this Declaration, without distinction of any kind, such as race, color, sex, language, religion, birth or other status".*

Starting with the Beijing Women's Conference in 1995[326] an up-to-date, several priority areas in the field of environment have been mentioned in international documents: consensus building and progress in the field of environment and development, poverty eradication and environmental protection, environmental protection as interdependent components which mutually reinforce each other for sustainability and development, women and the environment. Women have an essential role to play in sustainable development and green consumption and production patterns and natural approaches to resource management, as recognized by the United Nations Conference on Environment and Development and the International Conference on Population and Development and as reflected in Agenda 21. The document acknowledges the climate change impact on humans by specifically pointing out that the use of substances that deplete the ozone layer severely affects the atmosphere, thereby allowing excessive levels of harmful ultraviolet rays to reach the Earth's surface. This has serious effects on people's health, such as higher rates of skin cancer, eye damage and weakened immune systems. It also has serious effects on the environment, including damage to agricultural crops and sea life.

The international community acknowledges that hurricanes, typhoons and other natural disasters and, in addition, destruction of resources, violence, displacement and other effects associated with war, armed conflict, use and testing of nuclear weapons and occupation of foreign territories can contribute to environmental degradation. Natural resource degradation displaces communities, especially women, from income-generating activities while adding much to unpaid work[327]. Thus, the Fourth World Conference on Women[328] in Beijing in 1995 states that women remain largely absent at all levels of policy formulation and decision-making in natural resource and environmental management, conservation, protection and rehabilitation, while their experience and skills in "advocacy" to monitor the proper management of natural resources remains too often marginalized by policy-making and decision-making authorities, as well as in educational institutions and environmental agencies at the managerial level.

Therefore, the "Women and the Environment" section of the 1995 Beijing Platform for Action was visionary in two ways. First, it was one of the first official women's rights documents to include environmental issues. Second, it was one of the first and few multilateral agreements to identify that the environmental sector could be threatened, to highlight the responsibility of industrialized countries' consumption and production as the main driver of planet's unsustainability, and to argue that environmental degradation will produce intersectional and differentiated impacts.

Mainstreaming gender in climate change policies and programs helps to ensure the integration of women's issues, needs and contributions throughout the planning and implementation cycle of climate change policies and projects.

Thus, gender mainstreaming means the process of incorporating a gender perspective into any action, national, regional or international policy document, legislation to ensure that the concerns of all are addressed and that gender inequalities are not perpetuated through institutional instruments. However, the implementation of gender mainstreaming at the global level has not necessarily led to progress for women.

Climate change is a global concern of the 21st century, with an increase in climate change-related events and incidents or disasters. Globally, undeniable evidence is emerging in places subject to climate variability and climate disasters that disaster experiences are gendered and that women are particularly vulnerable during and after climate change-related incidents or disasters.

There are close links between climate change action and disaster risk reduction, highlighting some of the most relevant articles of the "Paris Agreement" (UN, 2015) and the Sendai Framework on Disaster Risk Reduction

[326] <https://www.un.org/womenwatch/daw/beijing/pdf/Beijing%20full%20report%20E.pdf>.
[327] <https://www.un.org/womenwatch/daw/beijing/pdf/Beijing%20full%20report%20E.pdf>.
[328] <https://www.un.org/womenwatch/daw/beijing/fwcwn.html>.

2015-2030. Thus, increasing the ambition to reduce GHG emissions over time, balancing categories and sources of emissions until 2050, developing long-term development strategies with reduced GHG emissions, are interdependent with people affected by disasters caused by climate change, mortality caused by disasters, gender-sensitive national sustainable development strategies[329].

The UN Summit of the Future[330] was addressed in the UN General Assembly Resolution of September 8, 2022, which reaffirms climate change among the priorities and acknowledges the interconnectedness for the well-being, safety, security and welfare of to all nations and peoples, urgently encouraging new efforts in implementation of the UNFCCC and the Paris Agreement[331]. Through the UN General Assembly Resolution of August 30, 2023, 5 main areas of the UN Pact for the Future are included as an initiative: sustainable development and financing for development; international peace and security; science, technology and innovation and digital cooperation; youth and future generations; transforming global governance.

An analysis of gender mainstreaming is essential to understanding how international or national and local institutions could usefully address climate challenges in a gender-sensitive manner. Failure to do so poses risks of exacerbating gender inequalities in post-disaster and reconstruction efforts due to unfair power relations, resource allocations and underlying assumptions on which climate disaster responses are based.

Since 2013, the Republic of Moldova has engaged in a national process of planning adaptation to climate change, in accordance with the Cancun Adaptation Framework, approved during the 16th Conference of the Parties to UNFCCC in 2010.

At the national level, the legal, institutional and policy framework that regulates the gender dimension, as well as other reference regulatory documents relevant to this study for the Republic of Moldova are:

- Law no. 5/2006 on ensuring equal opportunities between women and men[332];
- Law no. 121/2012 on ensuring equality[333];
- Law no. 315/2022 on approval of the National Development Strategy "European Moldova 2030"[334];
- Law no. 298/2012 on the activity of the Equality Council[335];
- Government Decision no. 409/2024 on approval of the Environmental Strategy for the years 2024-2030[336];
- Government Decision no. 624/2023 on approval of the National Program for Climate Change Adaptation until 2030 (NPCCA 2030) [337];
- Government Decision no. 659/2023 on approval of the Low Emission Development Program of the Republic of Moldova until 2030 (LEDP 2030) [338];
- Government Decision on the Program for Accelerating Gender Equality in the Republic of Moldova for the years 2023-2027 and the Action Plan for its implementation[339];
- Government Decision no. 350/2006 on establishment of the Government Commission for equality between women and men[340];
- Government Decision no. 895/2006 on approval of the Regulation of the Governmental Commission for Equality between Women and Men[341];

[329] Disaster resilience Scorecard for Cities (UNDRR), <https://mcr2030.undrr.org/sites/default/files/2021-08/Romanian_Detailed%20Scorecard_Scorecardul%20rezilient%CC%A6ei%20urbane_Evaluare%20detaliata_Nov2020.pdf?startDownload=true>.
[330] <https://documents.un.org/doc/undoc/ltd/n23/252/95/pdf/n2325295.pdf?token=UyMk6jDGNYekvhgiA8&fe=true>.
[331] Resolution adopted by the UN General Assembly on 8 September 2022, <https://documents.un.org/doc/undoc/gen/n22/587/47/pdf/n2258747.pdf?token=BtjtewAW7c8tCfolRq&fe=true>.
[332] <https://www.legis.md/cautare/getResults?doc_id=144448&lang=ro#>.
[333] <https://www.legis.md/cautare/getResults?doc_id=106454&lang=ro>.
[334] <https://www.legis.md/cautare/getResults?doc_id=134582&lang=ro>.
[335] <https://www.legis.md/cautare/getResults?doc_id=120696&lang=ro>.
[336] <https://www.legis.md/cautare/getResults?doc_id=144295&lang=ro>.
[337] <https://www.legis.md/cautare/getResults?doc_id=140163&lang=ro>
[338] <https://www.legis.md/cautare/getResults?doc_id=139980&lang=ro>.
[339] <https://particip.gov.md/ro/document/stages/anunt-privind-consultarea-publica-a-proiectului-de-hotarare-cu-privire-la-aprobarea-programului-de-accelerare-a-egalitatii-de-gen-in-republica-moldova-pentru-anii-2023-2027-si-planului-de-actiuni-pentru-implementarea-acestuia/9991>.
[340] <https://www.legis.md/cautare/getResults?doc_id=86888&lang=ro>.
[341] <https://www.legis.md/cautare/getResults?doc_id=86890&lang=ro#.>.

- Government Decision no. 425/2024 on organization and operation of the National Commission on Climate Change[342];
- Government Decision no. 391/2023 on approval of the National Security Strategy of the Republic of Moldova[343];
- Government Decision no. 95/2024 on initiation of negotiations and approval of signing of the Agreement concluded by exchange of letters between the Government of the Republic of Moldova and the United Nations entity for gender equality and the emancipation of women (UN Women) regarding the *mutatis mutandis* application of the Agreement between the Government of the Republic of Moldova and the United Nations Development Program (UNDP), concluded on October 2, 1992 and on gender equality and emancipation of women (UN Women) in the Republic of Moldova.

From a regulatory perspective, the national legislation provides for exercising equal rights by women and men in all spheres of life guaranteed by the Constitution of the Republic of Moldova, the appointment of a gender unit, which is a qualified specialist with functions to promote equality between women and men in the institution where they work, collection of gender disaggregated statistics.

Although Law no. 5/2006 on ensuring equal opportunities between women and men prescribes general rules for all areas of social life and, by default, for ensuring gender equality in the public sphere (occupation of public positions), socio-economic, mass media, education and healthcare areas, we note that there is no dedicated sectoral area for equal opportunities between women and men in the field of environmental protection or combating climate change.

While the role of drafting gender-sensitive policy documents is assigned to the Ministry of Labor and Social Protection, the national legislation exhaustively provides in art. 19 of Law no. 5/2006 *„Within the specialized central public authorities, the coordinating group in the field of gender operates, with the aim of ensuring the complex approach of equality between women and men in policies and programs in all fields and at all levels of adoption and application of decisions. The members of the coordinating group in the field of gender are the gender units of the subdivisions with competences to develop, promote and monitor policies in the field of activity of the specialized central public authority".* Thus, the Ministry of the Environment and its subordinate institutions or authorities must designate gender units.

In particular, the gender unit has the following competences[344]: a) to submit proposals for mainstreaming of the principle of equality between women and men in policies and sectoral activity plans; b) to identify, study and contribute to solving gender-related discrimination problems in the field of activity; c) to participate in the review of petitions on cases of discrimination based on sex and sexual harassment at the workplace; d) to draw up reports on implementation of the national policy for ensuring equal opportunities between women and men and to submit them for approval to the coordinating group in the gender field; e) to study the international experience; f) to carry out other duties according to the legislation.

While the Law on ensuring equal opportunities between women and men has been in force since 2006, and the obligation to collect, analyze and systematize disaggregated data on gender issues rests with the NBS, according to art. 22 of Law no. 5/2006, there are no data or there are limited disaggregated and reference data on gender equality in the area of environment, including from the perspective of combating climate change. Climate change and related gender issues become an added value and an additional catalyst in the development of the environmental protection sector.

The NDS "European Moldova 2030" is the national long-term strategic vision document, which points out the country's development directions and which adapts the priorities, objectives, indicators and targets of the international commitments undertaken by the Republic of Moldova to the national context. Objective 10 (Ensuring a healthy and safe environment), associated with Objective 6 (A social and inclusive protection system), derives from the modern concept of livelihoods and major issues identified at the national level.

[342] <https://www.legis.md/cautare/getResults?doc_id=143648&lang=ro>.
[343] <https://www.legis.md/cautare/getResults?doc_id=141253&lang=ro>.
[344] Article 19 of Law No. 5/2006 on ensuring equality of chances between women and men, <https://www.legis.md/cautare/getResults?doc_id=144448&lang=ro#>.

According to Law no. 315/2022 on approval of the NDS "European Moldova 2030" the persistence of climate change and associated natural hazards is stated. Global climate change is primarily caused by human activity, which calls for rethinking of the interaction between humans and the surrounding world. The growing greenhouse gas concentrations in the atmosphere cause an increase in global mean temperatures and increasingly unpredictable local climate fluctuations. The global mean temperature is already about 1.2°C above pre-industrial levels, and the 2010–2020 period was the warmest on record. Rising temperatures have led to an increase in the frequency of extreme natural events, including droughts and floods. Climate change and its effects have highlighted the vulnerability of traditional agricultural production systems[345]. Climate change poses significant risks to communities, livelihoods and ecosystems and can multiply disaster risks. There are real opportunities that can be addressed jointly in a connected and consistent manner.

In this sense, the Environmental Strategy for 2024-2030, approved by GD no. 409/2024, is the sectoral strategy for protection of the environment, natural resources and climate change mitigation, and it is an important landmark in the list of public policy documents. Evaluation of the environmental impact on women and men is not described in the national context of the public policy. Although the public policy document includes the need for "Information, awareness and environmental education of the population", these are not accompanied by gender impact data or disaggregated data to establish any findings.

From another perspective, the Strategy describes the situation and the list of vulnerabilities for each environmental protection field. Activities focused on protection of the ozone layer and waste management are also reflected in their category, without providing any disaggregated or gender-related data.

The strategy prioritizes three directions in the climate change dimension: reducing greenhouse gas emissions, adaptation to climate change, preventing and reducing weather and climate disasters and preparedness in response to them. It is also relevant that the Republic of Moldova faces droughts once in every 3-4 years, depending on the geographical location. The frequency of droughts is 1-2 events in 10 years in the northern part, 2-3 events - in the central part and 5-6 events - in the southern part.

In 2007 the country suffered the worst drought in its recent history, which affected 80% of the country's territory and approximately 135,000 people, causing nearly a US$ 1 billion damage[346]. There are no disaggregated statistical data to provide for a clear situational analysis on the way and mode of different factor's impact or causes from the gender perspective.

The Strategy has two objectives (Objective 1 and Objective 7) that can be anchored as sectors associated with the gender perspective where studies, research, analysis, information and awareness campaigns with impact on women and men can be explored.

General objective 1 entitled "Development of a transparent, efficient, inclusive and sustainable environmental governance system that ensures compliance with requirements in the field of environmental protection" implies as one of a set of priority directions "Continuous development and improvement of the regulatory and policy framework in the field of environmental protection and climate change in line with the commitments undertaken under the RoM-EU Association Agreement and with the measures aimed at preparing the country for accession to the EU".

In the context of General Objective 7 "Reduction of greenhouse gas emissions by 2030 by 70% as compared to 1990 according to the unconditional scenario (or by 88% according to the conditional one) ensuring the contribution of Moldova to achieving climate neutrality by 2050 at the European level and increasing the resilience of economic sectors to climate change" of the Environmental Strategy for 2024-2030, three directions are undertaken: (a) achieving the target of reducing greenhouse gas emissions (GHG) in accordance with the national determined contribution in the 7 sectors; (b) increasing the capacity of preparedness and adaptation of Moldova to climate change; and (c) reducing risks of disasters caused by meteorological, hydrological and climatic factors.

[345] Strategia națională de dezvoltare „Moldova Europeană 2030", <https://www.legis.md/cautare/getResults?doc_id=134582&lang=ro>.
[346] <https://gov.md/sites/default/files/document/attachments/nu-85-mm-2024_0.pdf>.

Therefore, the Environmental Strategy for 2024-2030, which is preceded by programs and action plans for the future as public policy instruments, may need to have to mainstream the gender dimension.

The program for accelerating gender equality in the Republic of Moldova for the 2023-2027 years and the action plan for its implementation is the main policy document aimed at expanding the circle of participants in the implementation process, enhancing gender equality, solving pressing problems, involving men in promoting gender equality, achieving more consistent impact indicators.

The policy documents that have been adopted prior to this program have not included specific components dedicated to environmental protection or combating climate change. In the same way, the new public policy document - the Program for Accelerating Gender Equality in the Republic of Moldova for the 2023-2027 period and the Action Plan for its implementation does not exhaustively and expressly provide for specific measures in the field of combating climate change.

In the context, there are no studies of central public authorities responsible for the gender equality area or of the Government that would study, monitor or collect priorities regarding mainstreaming of the gender perspective in the field of combating climate change. The most frequent studies are targeted towards reduction of energy vulnerabilities, work and employment, demographic issues, child protection, combating violence or discrimination. Thus, factors and indicators of climate change impacts on women and men are a must.

In comparative terms, Moldova has undertaken a separate policy document for the law enforcement, security and defense sector, where a National Program for implementation of the UN Security Council Resolution 1325 on women, peace and security for the years 2023- 2027 was enacted by Government Decision.

Reducing structural gender inequalities through gender-sensitive policies and budgets is an overall objective associated with the climate change sector as a cross-cutting matter.

The legal review of the National Climate Change Adaptation Program (NCCAP 2030), approved by GD no. 624/2023[347], focuses on the priority development directions of the sector and the country's development pathway.

The direct climate change impacts on different sectors of social life were reviewed as phenomena or as separate events, or as the case may be, from the perspective of dynamics and gradual evolution. This impact analysis highlights the effects or consequences that climate change may produce if gender-sensitive disaggregated data are not considered. The important issue that the abovementioned National Program covers is that it is relevant as an integral component of the healthcare area. Some approaches which are worthwhile to be covered in this study and which are related to gender sensitivity are the level of state supervision of public health as well as the level of preparedness and resilience of healthcare institutions to public health emergencies, including those caused by climate change impact factors, as well as the level of prevention (such as warning systems) and preparedness (such as educational campaigns on behavior change to deal with extreme climate events, e.g. heat waves, etc.).

The NCCAP 2030, approved by GD no. 624/2023, includes for the first time in the objective "Targeted capacity building on management, use and sharing of climate change data", a specific action *"Identification of climate change data/information gaps, including on gender and climate change issues, migration and climate change, and development of research projects in cooperation with the scientific community",* planned for implementation during the 2023-2024 years, and as a monitoring indicator - development of 6 research projects in cooperation with the scientific institutions to be implemented in order to address the needs of specific information in each priority sector (including from the gender and migration perspective). Within this activity, the Ministry of the Environment, the Ministry of Infrastructure and Regional Development, the Ministry of Health, the Ministry of Agriculture and the Food Industry were designated as institutions responsible for implementation.

At the same time, gender-sensitive activities undertaken within public policy documents related to adaptation to climate change according to NCCAP 2030 are:

[347] HG nr. 624 din 30-08-2023 cu privire la aprobarea Programului național de adaptare la schimbările climatice până în anul 2030. Publicat: 27-11-2023 în Monitorul Oficial Nr. 448-451 art. 1086. <https://www.legis.md/cautare/getResults?doc_id=140163&lang=ro>.

- implementation of capacity building and awareness raising activities for budget planners and program managers (other financial planners), including women and men, in priority sectors, regarding national climate change adaptation (CCA) priorities and contribution of sector policies and projects to such priorities (*over the 2023-2024 period*);
- development of gender-sensitive and migrant- and refugee-inclusive sectoral and sub-sectoral technical guidelines/manuals and standards for climate risk and vulnerability assessment to facilitate integration of CCA aspects into sectoral development planning processes (*over the 2023-2025 period*);
- carrying out an in-depth inter-sectoral gender-disaggregated analysis of the climate change impact on vulnerable groups, with a specific focus on rural women, elderly people, members of migrant families, refugees and internally displaced persons (*over the 2023-2024 period*);
- development of a four-year gender-sensitive communication strategy to generate and increase the level of awareness regarding climate risks and hazards, as well as adaptation and risk reduction options (*until 2025*);
- identification and evaluation of monitoring indicators, including those disaggregated by gender and relevant to migration, to monitor the implementation of adaptation actions at sector level *(until 2026*);
- assessment of costs of healthcare services for people whose health has been affected by climate change (women/men, children, the elderly, migrants, displaced persons and refugees), as well as costs of recovering from climate change impact on infrastructure of the healthcare sector (*over the 2023-2024 period*);
- identifying a set of indicators and targets to reflect the physical processes of climate change, as well as their impact on the infrastructure of the healthcare and public health system, with a particular focus on vulnerable groups (*over the 2023-2025 period*);
- establishment of an efficient environmental and health IT system with focus on climate change issues, including from a gender perspective, for decision-making purposes and public access to information (Automated IT System on Health and Environment).

The LEDP 2030, approved by GD no. 659/2023[348], provides for assumed obligations on data collection and disaggregation. It is remarkable that, as indicators of progress in line with targets on reducing greenhouse gas emissions, some recommendations are included that would contribute to promoting gender equality and increasing the efficiency of climate change initiatives. In this context, the following can be mentioned:

- improving sustainability in the design and implementation of LEDP 2030, by ensuring full and active participation of women and men, including in decision-making in the field;
- mainstreaming of the gender dimension in the actions aimed at basic sectors of this Program;
- identifying and providing solutions to get women and men out of poverty;
- understanding how the differential consumption patterns of women and men affect their carbon footprint (the amount of carbon dioxide and other carbon compounds emitted due to fossil fuel consumption of by a given person, group, etc.);
- encouraging women to capitalize on an equal footing with men on efficient energy technologies in agriculture and households, solar energy, sustainable agricultural land management practices, etc.;
- collecting gender-disaggregated data, in order to estimate the social and gender impact of LEDP 2030.

The paradigm of including the gender perspective as associated with climate change and the new approach to policy documents for the 2030 cycle acknowledges the role and need of women's involvement in all decision-making processes. Thus, the inclusion of gender analysis/gender impact assessment in the design, implementation, monitoring and evaluation stages of LEDP 2030 represents an important prerequisite of an efficient process, a fact transposed in the approved public policy document.

[348] GD no. 659 of 06.09.2023 on approval of the Low Emission Development Program of the Republic of Moldova until 2030. Published: 16.11.2023 in Official Gazette No. 430-432 art. 1022, <https://www.legis.md/cautare/getResults?doc_id=139980&lang=ro>.

However, it is important to note that the Republic of Moldova, as a UN member state and, on the other hand, as a candidate state for EU accession, undertakes political and legal commitments in relation to both organizations, including in the field of environment. Correlation of climate change instruments within the UN and EU shall not be overlooked; on the contrary, it should be synchronized.

The EU and all its Member States have signed and ratified the Paris Agreement (2015) and are firmly committed to its implementation. In accordance with this commitment, the member states agreed to put the EU on a pathway, which would allow it to become the first economy and climate-neutral society by 2050. As a result, Moldova through its ambitious policies and actions both in respect to the UN and the EU sets standards that are getting close to global requirements and determines ambitious climate goals and actions by transposing them into its programs and other national policy documents.

Therefore, the action plan for limiting global warming as the central target of the Paris Agreement (2015) is the guidance for the Republic of Moldova, while its contributions, the ambition to achieve certain results and solidarity must integrate the gender perspective.

5.2. Review of gaps, vulnerabilities, opportunities from the perspective of gender-sensitive actions related to climate change

Inequalities within and across countries have multiplied, fueled by dominant economy patterns, global warming, crises or new types of phenomena that have a diverse impact on human well-being and social inclusion, giving rise to insecurity and exclusion. Surveillance, resource extraction, and other phenomena have expanded in new ways.

One of the gaps identified at the international and national level is that gender and environmental analysis is not significantly integrated into the public policy framework[349]. An eloquent example is that the impact of GHG emissions is not assessed as direct impact on different vulnerable target groups at the national level, such as age and gender categories[350], according to the situation described in LEDP 2030.

The level of implementation of strategic policy documents in the climate change area and gender mainstreaming at program level is not synchronized. According to it, the Gender Equality Acceleration Program for the years 2023-2027 and the Action Plan for its implementation are not synchronized with NCCAP 2030 or with LEDP 2030. On the contrary, the last two programs exceed the priority directions of the Gender Equality Acceleration Program for the 2023-2027 years and of the Action Plan for their implementation, by establishing specific and measurable actions on the link between climate change and the gender perspectives. It should be noted that the level and quality of implementation of the new public policy documents must be monitored and evaluated to determine whether the level of ambition was appropriate.

Moldova ranks as one of the most vulnerable countries in Europe from a climate perspective. The climate change impacts on social, economic and environmental dimensions are projected to intensify in the medium and long term. This fact will have devastating effects on the key economic sector – agriculture, and especially on the rural population, which relies on agriculture as the major source of income and food. Climate change is projected to reduce surface water flows by 16–20% by 2030. Medium-term projections show a continuous increase in mean annual temperature between 2010 and 2040 by 2°C[351]. Moldova ranks among the top ten countries in the world with the highest proportion of people affected by climate disasters.

According to NPCCA 2030, the intensification of climate change effects on human health, associated with an increasing number of diseases related to heat waves (including cardiovascular diseases), transmission of vector-borne gastrointestinal diseases or other diseases, as well as direct or indirect victims of natural disasters are some of the consequences estimated and predicted in the cause-and-effect relationship.

[349] <https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/CSW/64/EGM/UN%20Women%20Expert%20Group%20Meeting%20CSW%2064%20Report%202019.pdf>.
[350] <https://cancelaria.gov.md/sites/default/files/document/attachments/nu-302-mm-2023_0.pdf>.
[351] GD no. 624 of 30-08-2023 on approval of the National Program for Climate Change Adaptation until 2030. Published: 27-11-2023 in Official Gazette No. 448-451 art. 1086. <https://www.legis.md/cautare/getResults?doc_id=140163&lang=ro>.

According to World Bank estimates of 2016, the total cost of inaction on adaptation to climate change amounts to approximately US$ 600 million, equivalent to 6.5% of GDP. It is estimated that this value will double by 2050, reaching about US$ 1.3 billion[352].

The projected scenarios on climate change, temperature increase, changes in the precipitation regime and intensification of the aridification process, are the main types of climate impacts to which the Republic of Moldova is exposed. They are associated with an increase in the frequency and intensity of extreme weather events such as heat waves and frosts, severe droughts, floods, heavy rain and hail storms. These conditions are the starting point for setting priorities for medium and long-term planning, actions and investments for adaptation, along with monitoring of the effectiveness of planned and implemented adaptation measures.

In retrospect, impact narratives on how climate change affects women and men often suffer from being primarily descriptive in nature, elaborating on how women are disproportionately affected by environmental crises. A gender-integrated environmental approach requires a conceptual revitalization that redefines environmental relations from the perspective of social relations, rather than defining the environment in an exclusively physical form.

The demographic crisis, social inclusion, pollution and environmental degradation are interdependent with climate change, which differently influence the adaptation and resilience of women and men.

With reference to the National Security Strategy of the Republic of Moldova, approved by Government Decision no. 391/2023, it expressly provides in item 19 that "the Republic of Moldova faces the following threats to national security: climate change acceleration of as a result of global warming". Additionally, in the list of risks identified in the abovementioned National Security Strategy of the Republic of Moldova, the ecological risks are listed in item 20: a) major industrial incidents or disasters in the country or in the vicinity, involving chemical, biological, radiological or nuclear substances; and b) natural phenomena with cross-border impact in the country or in the vicinity, such as earthquakes, droughts, hurricanes, floods and large-scale fires.

According to the same document mentioned above, the Republic of Moldova faces several vulnerabilities, which are or can be exploited by internal and external destructive actors. Among them, item 21 of the National Security Strategy of the Republic of Moldova exhaustively lists vulnerabilities in the ecological field: a) degradation of the environment as a result of economic activity, especially that which affects the quality of water, soil and air; b) the low level of ecological education of the population; c) quality degradation and continuous pollution of water resources; d) low resilience to climate change; e) reduced waste management capacity[353].

Public policies are necessary to deal with these profound changes, and three approaches must be included as a basis:

- **mitigation policies**, aimed at reducing or mitigating the trends of the climate change phenomenon and the impact on women and men, targeting life, health and the environment, including the development of the country, reducing the sensitive gender gap in the sector, achieving resilience to the impact and consequences of the phenomenon;

  Examples: Investment in critical infrastructure and services; Punctual formations; Needs assessment and needs disaggregated by data, etc.

- **adaptation policies**, aimed at managing climate change effects such as environmental damage, illness or aging of the population as a result of such changes, reducing the impact of natural or man-made disasters, anticipating climate change crises, etc.

  Examples: Diversification of tools and technologies that reduce global warming; Development of initiatives and support programs; Empowerment programs for the most affected areas; Development of special funds, etc.;

- **adjustment policies**, aimed at improving the management and analysis of gender and climate change statistics, its use in the processes of developing sectoral policies, budgets and significant investments in the sector and services.

[352] <https://particip.gov.md/ro/document/stages/anunt-privind-organizarea-consultarilor-publice-asupra-proiectului-programului-national-de-adaptare-la-schimbarile-climatice-pana-in-2030-si-planului-de-actiuni-pentru-implementarea-acestuia/9972>.
[353] <https://www.legis.md/cautare/getResults?doc_id=141253&lang=ro>.

Examples: Development of thematic public policies; Gender-sensitive budgeting at central and local level; Prioritization in local strategies of adaptation and resilience to climate change; Engaging women and girls in expressing their voices and needs.

Moldova has identified several lines of action[354] for mitigation in the field of ecological security and resilience. The most relevant in the list of these directions are: reducing greenhouse gas emissions; promoting regional and international cooperation for a collective approach to global warming related challenges, as well as sharing good practices and expertise in the field of environmental protection; and implementation of EU environmental protection legislation and policies.

It is important to note that the subject of expanding environmental impact assessments of economic activity is becoming one of major interest. Many countries practice environmental impact assessment of projects which involve significant investments.

The inclusion of climate change and the gender perspectives in local development strategies by local public authorities, is an unexplored dimension, although local public authorities benefit from opportunities to access projects from the National Environmental Fund, where they could develop projects and initiatives to adapt to climate change or to enhance resilience, including capacity building or critical infrastructure development. Similarly, other new opportunities are available through calls for project proposals offered to Moldova on a bilateral or multilateral basis. The most recent tool is a Calls for project proposals under the EU LIFE Programme, in which climate change, adaptation and resilience to climate change is a required and future portfolio.

From a long-term perspective, climate change is the subject of multiple external assistance projects, supported by specialized UN agencies.

In conclusion, starting in 2023, climate change policy documents open a new horizon for integrated gender-sensitive approach at the level of regulatory documents and public policies. Undertaking these commitments until 2030 must be focused and developed so that their implementation accelerates the level of adaptation of women and men in an inclusive, secure and development-oriented sector.

5.3. Benchmarking on impact of climate change policies and actions on gender equality and the role of women

Globally, the acceleration of the gender index shows a modest pace. The global gender index score in 2023 for 146 countries was 68.5%[355]. As compared to the constant sample of 143 countries included in the previous year, the global gender gap was reduced by a further +0.1%, from 68.5% to 68.6%. Iceland (93.5%) ranks number 1 and was top of the index for a decade and a half. It also continues to be the only economy to have reduced the gender gap by more than 90%. Of the remaining nine countries in the top 10, eight have closed more than 80% of their gap. The list of the most advanced countries with a gender equality index is also topped by: Finland, Norway, Sweden, Germany, Ireland and Spain.

The Gender Equality Index for the European Union (EU) exceeded 70 points for the first time, showing a 1.6-point increase from 2022. The increase in the EU's overall score is the largest year-on-year increase since the first edition of the index in 2013[356]. The progress indicators in gender equality and the growth in this field are maintained due to access to healthcare services. However, there is no separate index on the consistency between climate change and gender equality.

The role of women is a significant one, they being not only the victims of the climate change impact, but also a strong voice in which their needs or wants can be heard in consultations and translated into public policy documents. Sustainable Development Goal no. 5 "Achieve gender equality and empower women and girls" reflects the essence of women's key needs and priorities that must be reflected in national and local public policies.

[354] <https://www.legis.md/cautare/getResults?doc_id=141253&lang=ro>.
[355] Word Economic Forum, Global Gender GAP 2024, <https://www.weforum.org/publications/global-gender-gap-report-2024/digest/#:~:text=The%202024%20Global%20Gender%20Gap,a%20decade%20and%20a%20half>, <https://www3.weforum.org/docs/WEF_GGGR_2024.pdf>.
[356] Gender Equality Index, <https://eige.europa.eu/gender-equality-index/2023>.

Figure 5-1: Gender equality index in EU in 2023.

The Global Agenda 2030 as well as "Climate Action" focus on stabilizing GHG concentrations at a level that prevents any dangerous anthropogenic interference with the climate system and establishing adaptation actions to current and potential impacts of climate change to reduce vulnerability and enhance resilience to the effects of such changes.

The gender policy goal is to ensure opportunities for women and men to exercise their rights equally, to use and to have control over the benefits of development.

In the context of international standards, given that gender equality can contribute to low-emission development actions and, respectively, to increasing the efficiency of climate change initiatives, it is imperative to implement the following actions: ensuring full and active participation of women and men, including in decision-making; mainstreaming the gender dimension in the actions focused on the basic sectors that need adaptation to climate change; identifying and providing solutions to lift women and men out of poverty; understanding how the different consumption patterns of women and men affect their carbon footprint; encouraging women to capitalize on an equal footing with men on efficient energy technologies in agriculture and households, solar energy, sustainable agricultural land management practices, etc.; collecting gender- disaggregated data, in order to estimate the social and gender impact of the adverse climate change effects[357].

Administrative data disaggregated by gender, age, ethnicity, disability, geographic location and socio-economic context are necessary for a fair assessment of the situation of women, gender inequalities, the extent and nature of forms of violence and the barriers faced by women in rural environment. Women can actively engage in collecting and providing evidence-based data on which to build climate change adaptation architecture and build resilience, so that their needs and wants are known.

The role of women can be framed in the proactive actions of representing the interests and needs of other women. Thus, women can get involved in the process of developing, promoting and implementing socio-economic and environmental development strategies; development programs; action plans; community projects; institutional policies.

In order to ensure equal opportunities, the role of women is also expanded in sectors such as: the CSO, academic or research sector, ensuring equal opportunities in professional and continuous training for women and men; gender sensitive policy planning and gender sensitive budgeting, development and implementation of assistance projects, gender analysis.

In the process of gender analysis, the dedicated role of women can be focused on: mapping traditional stereotypes, vulnerabilities, risks associated with climate change, representing vulnerable people in the decision-making process, providing the power to participate in shaping society based on "eco" systems and safe environment, active involvement of women and men in shaping governance institutions, processes and policies based on gender balance; review of objectives and principles from a gender perspective, gender analysis of practices and impact, identification of problems, then identification of appropriate solutions, "advocacy", etc.

[357] <https://www.undp.org/sites/g/files/zskgke326/files/2022-05/Ghidul%20Egalitatea%20de%20gen%20si%20clima.pdf>.

Since 2015, gender equality is one of the UN's sustainable development goals. Gender inequality is measured annually by the Human Development Reports.

5.4. Findings from benchmarking the impact of climate change policies and actions on gender equality and the role of women

As a result of benchmarking of the impact of climate change policies and actions on gender equality and the role of women, the following were found:

1. Lack of records, data and information, including disaggregated ones regarding the impact or influence of climate change, adaptation to climate change or resilience at the national level in national statistics or in the NBS database ("environment" section: statistical data, thematic publications, infographics, etc.).
2. Lack of a statistical profile of women and men in Moldova from a climate change perspective.
3. The first public policy documents that regulate mainstreaming of the gender dimension associated with climate change are NCCAP 2030, approved by GD no. 624 of August 30, 2023; LEDP 2030, approved by GD no. 659 of September 6, 2023 and the National Development Strategy "European Moldova 2030", approved by Law no. 315 of November 17, 2022.
4. There is no synchronization of environmental or climate change priorities from the perspective of gender mainstreaming between the Program for Acceleration of Gender Equality in the Republic of Moldova for the 2023-2027 years and the Action Plan for its implementation and NCCAP 2030, the latter taking precedence in the gender policy framework.
5. There is no unified monitoring and evaluation framework of NCCAP 2030, based on gender-sensitive indicators, with the aim of improving the collection and distribution of data relevant to climate change adaptation for timely and better-informed decision-making in this interdisciplinary field of policy.
6. The Environmental Strategy for 2024-2030, approved by GD no. 409 of June 12, 2024, does not provide for specific actions and priority directions on mainstreaming of the gender perspective.
7. The inclusion of climate change and the gender perspective in local development strategies is ad hoc and non-homogeneous.
8. Moldova is beneficiary of assistance projects in the field of climate change and there are new opportunities, which gradually and sequentially include gender issues.
9. The phenomenon of climate change, adaptation and resilience is recognized as one of the factors that have an impact on the security of the state and the environment, but there is no clear, defined and agreed methodology, tools for a list of monitoring indicators, collection and interpretation of data and information.
10. Awareness building, information and education campaigns, information products (guidelines, brochures, etc.) are lacking on the impact of climate change as associated with mainstreaming of the gender perspective.

5.5. Findings from benchmarking of the impact of climate change policies and actions on gender equality and the role of women

Upon benchmarking of the impact of climate change policies and actions on gender equality and the role of women, the following conclusions were drawn:

1. There is a need to update the national strategic framework for climate change adaptation from the perspective of gender impact (only few vulnerable sectors from the perspective of adaptation to climate change are considered - agriculture, water resources, health, forestry, energy and transport sectors).
2. At the national level, there is no policy document (strategy, program, action plan) specifically dedicated to the subject of mainstreaming the gender perspective in combating climate change, except for mainstreaming the gender perspective in several public policy documents of the country: NCCAP 2030, LEDP 2030 and NDS "European Moldova 2030".

3. There is limited evidence of monitored (quantified) or disaggregated national statistical data from the perspective of gender equality associated with climate change.
4. The perspective of gender equality in connection with combating climate change is not incorporated as a cross-cutting issue in national policy documents/regulatory documents, such as the Program for accelerating gender equality in the Republic of Moldova for 2023-2027 and the Action Plan for its implementation. There is no synchronization of public policy framework documents on gender equality and climate change.
5. The mainstreaming of gender issues and climate change needs to be harmonized with international treaties and international commitments to which Moldova is a party.
6. Lack of orientation/guidance training for establishing a list of indicators for monitoring and/or evaluating gender issues, collecting and review of disaggregated data, including exercises on gender-sensitive budgeting.
7. There is national will and consistency to change the approach of accelerating mainstreaming of the gender perspective into the environmental field, of climate change priority in setting ambitious goals, such as: carrying out a deep inter-sectoral gender-disaggregated review of the climate change impact on vulnerable groups, with a specific focus on rural women, elderly people, etc.; developing a four-year gender-sensitive communication strategy to generate and increase awareness of climate risks and hazards, as well as adaptation and risk reduction options; identification and evaluation of monitoring indicators, including gender-disaggregated ones to monitor implementation of sectorial adaptation actions; creating an effective environmental and healthcare IT system with climate change focus, including from a gender perspective, for decision-making purposes and access to information for the public.
8. The service provision policy and the list of persons (women, girls, boys and men) affected by climate change is not sufficiently well defined.
9. Mainstreaming of gender issues in projects implemented by specialized UN agencies that manage environmental or climate change issues is a positive practice.
10. Moldova has new opportunities to access funds for combating climate change from the EU Life Program.

5.6. Lessons learned in relation to the interconnectedness of climate change and gender mainstreaming

Upon carrying out a benchmarking exercise, three lessons learned were identified, which influenced the way climate change is interconnected with gender perspective mainstreaming:

1. *Undertaking and acceptance of mainstreaming of the gender perspective into new policy documents on climate change adaptation for the period up to 2030.* This is accounted for by expression of the political will to transpose and acknowledge the impact of climate change associated with the gender perspective, which can lead to a transformative agenda within the sector.
2. *Enhance commitments on the gender dimension of climate change, adaptation and resilience to climate change.* The promotion by the Ministry of the Environment of the gender dimension in policy documents exceeds the level of ambition of the framework program on acceleration of gender equality for the years 2023-2027 undertaken by the Ministry of Labor and Social Protection, thus anticipating the importance and impact of climate change in various sectors of social life.
3. *Synchronization of national and international commitments in the field of climate change* (Paris Agreement and other related treaties).

5.7. Recommendations on mainstreaming of the gender perspective in activities to combat climate change

Upon implementation of the benchmarking exercise, the following recommendations were formulated in respect to interconnection of activities to combat climate change and mainstreaming of the gender perspective:

Table 5-1: List of recommendations on gender mainstreaming and activities to combat climate change

No.	Recommendation	Priority level	Implementation term
1.	Development of a list of indicators for monitoring and evaluation of gender mainstreaming issues	High	Short term
2.	Gender mainstreaming review from the perspective of climate change	High	Short term
3.	Mapping state and non-state stakeholders with relevance to the gender perspective associated with climate change, climate change adaptation and climate change resilience that could inform the NBS data bank	Medium	Medium term
4.	Collection and analysis of data and information for certain cyclic periods and analysis of dynamics in the context of new policy documents in the field of climate change until 2030 (NCCAP 2030, LEDP 2030, other related documents)	Medium	Medium term
5.	Gender-responsive budgeting in climate change area	Medium	Medium term
6.	Mainstreaming of the gender perspective into the new Program and Action Plan for gender equality (accelerating gender equality) for the next policy cycle for the period 2027-2032/or developing a separate Program and Action Plan for accelerating gender equality in the environmental area	Medium	Medium term
7.	Mainstreaming gender issues associated with climate change as a cross-cutting issue in new policy documents and national programs related to the environment, gender equality, safety, healthcare, energy, agriculture, etc.	Medium	Medium term
8.	Mapping the needs and opportunities of women and girls affected by climate change in the Republic of Moldova and in the region	Medium	Medium term
9.	Development and/or strengthening of capacities and skills on climate change and climate change resilience (guidelines, methodologies, standard operating procedures, guidance and orientation materials, awareness building or information, etc.)	Medium	Long term
10.	Creation of a network associated with gender mainstreaming and climate change for sharing information, good practices and transfer of experience, including active communication	Medium	Long term

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CHAPTER 5

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