MINISTRY OF ENVIRONMENT

Jordan's First Biennial Transparency Report (BTR-1) to the United Nations Framework Convention on Climate Change (UNFCCC)

20 Oct. 2025

(version 03)

Table of Contents

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Foreword

It is with great pleasure and sense of responsibility that we present the Hashemite Kingdom of Jordan's First Biennial Transparency Report (BTR1) to the United Nations Framework Convention on Climate Change (UNFCCC). This report marks a major step in Jordan's evolving climate journey—an expression of our national commitment to transparency, accountability, and active participation in the global response to climate change under the Paris Agreement.

As one of the most water-scarce countries in the world, Jordan faces complex and compounding environmental, social, and economic challenges exacerbated by the impacts of climate change. Yet, despite limited resources and mounting pressures—including demographic shifts, regional instability, and the demands of hosting refugees—Jordan has demonstrated unwavering resolve to build a more sustainable and resilient future.

This report is the product of collective effort by national institutions, civil society actors, technical experts, and international partners. It documents our progress in reducing greenhouse gas emissions, strengthening adaptive capacity, and aligning national policies with the global climate agenda. It also outlines the systems and frameworks we are building to ensure robust monitoring, transparent reporting, and continuous learning.

Jordan's updated Nationally Determined Contribution (NDC) reflects an ambitious yet pragmatic vision: to reduce emissions by 31% by 2030, with a strong emphasis on renewable energy, energy efficiency, sustainable transport, and climate-resilient agriculture. We have also prioritized the wellbeing of our communities—particularly the most vulnerable—by advancing our National Adaptation Plan (NAP) and integrating climate risk management into national planning and investment strategies.

The BTR1 is more than a technical report—it reflects Jordan's values: cooperation, innovation, and stewardship of the environment. It is also a call to the international

community to reaffirm its commitment to climate justice, equity, and solidarity. Meeting the goals of the Paris Agreement will require transformative partnerships, meaningful finance, and inclusive development approaches that leave no one behind.

On behalf of the Ministry of Environment, I extend my deepest appreciation to all those who contributed to this milestone achievement. As we look to the future, Jordan stands ready to deepen its engagement, share its experiences, and work in concert with global partners to safeguard our shared planet.

Minister of Environment

Hashemite Kingdom of Jordan

List of Tables

List of Figures

List of abbreviations

AAWDCP	Aqaba-Amman Water Desalination And Conveyance Project
AECID	Agencia Española De Cooperación Internacional Para El Desarrollo
AFOLU	Agriculture, Forestry And Other Land Use
ASEZA	Aqaba Special Economic Zone Authority
BAU	Business As Usual
BOT	Build-Operate-Transfer
BRT	Bus Rapid Transit
BTR	Biennial Transparency Report
CAP	Climate Action Plan
CAPEX	Capital Expenditure
CARC	Civil Aviation Regulatory Commission
CBA	Cost-Benefit Analyses
CBD	Convention On Biological Diversity
CBIT	Capacity-Building Initiative For Transparency
CBIT-GSP	Capacity-Building Initiative For Transparency – Global Support Programme
CCD	Climate Change Directorate
CH4	Methane
CMTC	Comprehensive Multiple Transport Company
CO2	Carbon Dioxide
CoC	Code Of Conduct
CSP	Concentrated Solar Power
CTFs	Common Tabular Formats
DOS	Department Of Statistics
EE	Energy Efficiency
EMEP/EEA	European Monitoring And Evaluation Programme
ETF	Enhanced Transparency Framework
EU	European Union
FAO	Food And Agriculture Organization
FAR	Fifth Assessment Report
FCDO	Foreign, Commonwealth And Development Office
FSRU	Floating Storage Regasification Unit
FX	Flexibility
GAM	Greater Amman Municipality
GAP	Gender Action Plan
GCAP	Green City Action Plan
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEE	Google Earth Engine
GEF	Global Environment Facility
GGA	Global Goal On Adaptation
GHG	Greenhouse Gas
GIS	Geographic Information System

GIZ	Deutsche Gesellschaft Für Internationale Zusammenarbeit
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
ICA	International Consultation And Analysis
ICZM	Integrated Coastal Zone Management
IE	Included Elsewhere
IIP	Inventory Future Improvement Plan
IPPU	Industrial Processes And Product Use
ITS	Intelligent Transport Systems
IWMI	International Water Management Institute
JEF	Jordan Environment Fund
JILMI	Jordan Integrated Landscape Management Initiative
JREEEF	Jordan Renewable Energy And Energy Efficiency Fund
L&D	Loss And Damage
LCAPs	Local Climate Action Plans
LEAP	Low Emission Analysis Platform (Model)
LEDS	Low-Emission Development Strategies
LEED	Leadership In Energy And Environmental Design
LNG	Liquefied Natural Gas
LT-LEDS	Long-Term Low Emission Development Strategy
LTRC	Land Transport Regulatory Commission
LTS	Long-Term Strategy
LU	Land Use
MCM	Million Cubic Meters
MEMR	Ministry Of Energy And Mineral Resources
MENA	Middle East And North Africa
MoEnv	Ministry Of Environment
MoFA	Ministry Of Foreign Affairs
MoLA	Ministry Of Local Administration
MoPIC	Ministry Of Planning And International Cooperation
MoT	Ministry Of Transport
MPGs	Modalities, Procedures, And Guidelines
MRL	Monitoring, Reporting And Learning
MRP	Market Readiness Proposal
MRV	Measurement, Reporting, And Verification
MSW	Municipal Solid Waste
MWI	Ministry Of Water And Irrigation
N2O	Nitrous Oxide
NAP	National Adaptation Plan
NBSAP	National Biodiversity Strategy And Action Plan
NCCC	National Climate Change Committee
NCDs	Non-Communicable Diseases
NDA	Jordan’s National Designated Authority
NDC	Nationally Determined Contribution

NE	Not Estimated
NEEAP	National Energy Efficiency Action Plan
NF3	Nitrogen Trifluoride
NGOs	Non-Governmental Organizations
NIR	National Inventory Report
NMVOCs	Non-Methane Volatile Organic Compounds
NO	Not Occurring
NRP	National Resilience Plan
ODA	Official Development Assistance
OEP	Other Estimation Parameters
OPEX	Operating And Maintenance Costs
PDTRA	Petra Development And Tourism Regional Authority
PFCs	Perfluorocarbons
PHCs	Primary Health Centers
PMR	Partnership For Market Readiness
PMU	Project Management Unit
QA/QC	Quality Assurance And Control
RCP	Representative Concentration Pathway
RE	Renewable Energy
RSCN	The Royal Society For The Conservation Of Nature
RSS	Royal Scientific Society
SBUR	Second Biennial Update Report
SDGs	Sustainable Development Goals
SF6	Sulphur, Hexafluoride
SMRs	Small Modular Reactors
SWH	Solar Water Heaters
SWM	Solid Waste Management
TACCC	Transparency, Accuracy, Completeness, Comparability, And Consistency
TNA	Technology Needs Assessment
UNDP	United Nations Development Programme
UNEP-CCC	United Nations Environment Programme – Copenhagen Climate Centre
UNFCCC	United Nations Framework Convention On Climate Change
USAID	United States Agency For International Development
USGS	United States Geological Survey
WAJ	Water Authority Of Jordan
WEFE	Water-Energy-Food-Ecosystem Nexus
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

BTR1 underscores Jordan's strong political will and sustained efforts toward climate resilience and low-emission development. Through this report, Jordan reaffirms its commitment to the principles of the Paris Agreement and calls on the international community to enhance support for developing countries striving to meet climate goals. Continued progress will depend on strengthened institutional coordination, enhanced technical capacities, and increased international cooperation.

Jordan's First Biennial Transparency Report (BTR1) to the United Nations Framework Convention on Climate Change (UNFCCC) marks a pivotal milestone in the Kingdom's climate reporting, transparency, and commitment to global climate action under the Paris Agreement. The report consolidates Jordan's progress on mitigation, adaptation, support received, and other elements mandated under the Enhanced Transparency Framework (ETF).

As a developing country highly vulnerable to the impacts of climate change—particularly water scarcity, extreme weather events, and ecosystem degradation—Jordan has continued to enhance its institutional, technical, and policy frameworks to address climate change in a transparent, participatory, and evidence-based manner. BTR1 outlines the progress Jordan has made in implementing its Nationally Determined Contributions (NDCs), aligning national climate efforts with sustainable development goals, and engaging stakeholders across government, civil society, and the private sector.

Key Highlights:

- **Greenhouse Gas Inventory:** Jordan has developed comprehensive national GHG inventory for years 2020-2023 in accordance with IPCC 2006 Guidelines.
- Total net emissions amounted to 26,048, 27,962, 30,733.68 and 30,813.44 Gg CO_2-eq respectively, with the energy sector having the biggest shares of the total emissions throughout the years.
- **NDCs Mitigation Measures:** The NDC document highlights implemented and planned mitigation measures across key sectors—energy, transport, waste, agriculture, and industrial processes. These efforts are aligned with Jordan's updated NDC, which commits to reducing GHG emissions by 31% by 2030, including 5% unconditional and 26% conditional reductions.

  As for the overall actual reductions estimated (CO2eq) according to 2024 data obtained formally were as in the following Table 1, as follows:

Table 1: The overall "actual reductions" estimated as (CO2eq) according to 2024 data

Measures	Sector	Cumulative[1] Emission Reduction (Gg CO_2eq)
Increased Percentage of Electricity Generated from Renewables: 28.5% by 2024 (2771 MW total installed capacity)	Energy- RE	8,939
PVs (Schools, Municipalities, Worship places and Health and public places)	Energy- RE	11.59
Solar water Heaters (SWH) Project for 37401 Houses	Energy- RE	148.79
Solar Pumps-Agriculture	Energy- RE	4.64
Energy Efficiency Projects in industry	Energy-EE	1.85
Energy Efficiency Projects in Hotels	Energy-EE	0.66
Promoting Car-hybrid and electric at national level -including 50% of the Public fleet will be EVs- and assuming annual increase in private cars adoption by 2%)	Energy - Transport	149.79
Implementing composting units for pre-segregated bio-waste in 6 Areas with a total capacity of 10,300 tonnes/year	Solid waste	0.71
Urban tree Plantations (32500 trees)	AFOLU	0.91
Rangeland restoration (10,000 dunums)	AFOLU	0.30
Forest tree Plantations (1,000,000 trees) 3-4 years	AFOLU	10.7
24.8% out of 31% (total accumulated reduction of 9269 Gg CO2e)		**9,269**

Adaptation Measures: Jordan has developed a National Adaptation Plan (NAP) and sector-specific strategies to enhance resilience in water, agriculture, health, and biodiversity. Adaptation actions are prioritized to reduce climate-related vulnerabilities and integrate climate risks into national planning.

Support Received and Needs: Jordan details the financial, technological, and capacity-building support received from bilateral and multilateral partners. It also outlines critical needs for future implementation of NDCs, emphasizing access to climate finance, technical assistance, and institutional strengthening.

[1] Discounted (8%) Projected emission for the period (2012-2024)
Grid Emission Factor (0.537 KgCO2e/KWh), Fourth National Communication 2023

The development of the Support needed and received Support required conducting a national climate finance needs assessment to determine the nature and scope of financial needs per NDC priority sectors and analysis of the needs of the concerned sectors, access to climate finance, and knowledge and technical gaps. Chapter IV presents a summary of the national climate finance needs assessment, the NDC cost requirement per sector, the available climate finance flows readily budgeted and the financing gap that needs to be addressed for Jordan to finance its entire commitments under the Paris Agreement, until 2030.

Transparency Arrangements: The report describes efforts to establish a robust Measurement, Reporting, and Verification (MRV) system and data-sharing platforms to facilitate consistent and transparent climate reporting.

National Circumstances and Institutional Arrangements

This chapter describes Jordan’s national context/circumstances that are related to climate change.

➢ Overview

Jordan’s unique geographical and climatic conditions demand integrated strategies that balance resource scarcity with the pressures of a growing population. The current focus on renewable energy, water efficiency, and adaptive governance provides a promising framework for resilience. Nonetheless, compounded challenges—including environmental hazards, socioeconomic vulnerabilities, and additional pressures such as refugee influxes and COVID-19 recovery—underscore the need for sustained international support and continuous innovation in policy and technology.

Jordan's varied topography is categorized into five physiographic regions. The Jordan Valley and Wadi Araba Rift (Ghors), encompasses the Earth's lowest point at the Dead Sea (-430 m). Conversely, the Highlands are productive regions characterized by a Mediterranean climate, accommodating around 75% of the nation's population. The Central Desert (Arid Plains), receiving annual precipitation of 200–350 mm, is essential for rainfed agriculture and barley cultivation. The Badia Region constitutes 90% of Jordan's territory as a semi-arid plateau, confronting considerable threats of desertification. The Aqaba-Wadi Shihan Depression holds strategic significance owing to its 26 km coastline along the Red Sea, which facilitates maritime access.

The climate of Jordan is primarily semi-arid, characterized by significant unpredictability. Annual rainfall in the country fluctuates significantly, spanning from 50 mm to 500 mm. The western highlands receive between 400–600 mm of precipitation, whereas the Badia regions receive less than 200 mm. Temperature fluctuations are extensive, with winter averages in the highlands between 9–13°C and summer temperatures in the Jordan Valley escalating from 28–39°C.

The distinctive geographical and climatic characteristics of Jordan necessitate integrated methods that reconcile resource constraint with the demands of a burgeoning population. The present emphasis on renewable energy, water efficiency, and adaptive governance offers a promising framework for resilience. However, compounded challenges—such as environmental risks, socioeconomic vulnerabilities, and extra demands like refugee influxes and COVID-19 recovery—highlight the necessity for ongoing international support and persistent innovation in policy and technology.

➢ Governance Structure

Jordan has implemented a systematic governance framework to tackle climate change, overseen by the Ministry of Environment (MoEnv). This structure encompasses essential institutions tasked with policy formulation, execution, and intersectoral coordination. The governance framework is underpinned by national policies and strategies designed to mitigate greenhouse gas (GHG) emissions and bolster climate resilience. Nevertheless, obstacles such as institutional coordination, financial limitations, and data deficiencies persist in obstructing efficient implementation. The subsequent parts include a comprehensive review of Jordan's climate governance structure, essential policies, strategic initiatives, difficulties, and prospective orientations.

Institutional Framework

- National Climate Change Committee (NCCC): Founded in 2001 and codified under Climate Change Bylaw No. 79 (2019), the NCCC guarantees the alignment of national climate policy with the United Nations Framework Convention on Climate Change (UNFCCC). Presided over by the MoEnv, it comprises 16-line ministries to enhance cross-sectoral coordination
- Directorate of Climate Change (MoEnv): Established in 2014, this directorate supervises national climate activities, encompassing policy formulation, greenhouse gas inventories, and international reporting.
- Sectoral Climate Change Units: Key ministries such as Water and Irrigation, Agriculture, and Transport have integrated climate-focused directorates to mainstream climate action into their sectoral plans.

Policy and Regulatory Frameworks

Jordan’s climate governance is reinforced by comprehensive policies and legal frameworks, including:

- Climate Change Bylaw No. 79 (2019): Defines institutional roles, mandates NCCC oversight, and establishes Jordan’s Measurement, Reporting, and Verification (MRV) system for tracking emissions.
- Updated Climate Change Policy (2021–2050): Aims for low-carbon growth, climate resilience, and alignment with Sustainable Development Goals (SDGs) and Paris Agreement targets.

- National Adaptation Plan (NAP, 2021): Focuses on climate adaptation measures in key sectors such as water, agriculture, health, and urban planning to address vulnerabilities related to droughts and floods.
- Green Growth Action Plan (2021–2025): Encourages climate-smart investments in energy, water, and waste management to promote a circular economy.
- Nationally Determined Contribution (NDC) Update (2021): Jordan raised its GHG reduction target from 14% to 31% by 2030, emphasizing renewable energy (solar and wind), energy efficiency, and sustainable transport.
- Urban Resilience: Cities like Irbid and Aqaba have developed Local Climate Action Plans (LCAPs) that integrate flood risk management and green infrastructure.

Domestic Measurement, Reporting, and Verification

During 2016, Jordan with the support of the World Bank has submitted its market readiness proposal (MRP) to the Partnership for Market Readiness (PMR) initiative. Jordan's MRP outlined a plan for implementing the market readiness components that will be necessary to support the development of appropriate market-based instruments.

The PMR initiative in Jordan is led by the Ministry of Environment, in collaboration with an inter-ministerial technical working group. At the current phase, the PMR initiative, has identified the energy and water sectors as priority sectors for mitigation actions (with energy efficiency (EE) and renewable energy (RE) identified as pilot cross-sector interventions). The initiative aimed at fulfilling three components:

- A National MRV system and registry for climate mitigation measures.
- Designing a platform for private sector financing in EE and RE.
- Exploring the potential for market-based instruments for climate mitigation measures.

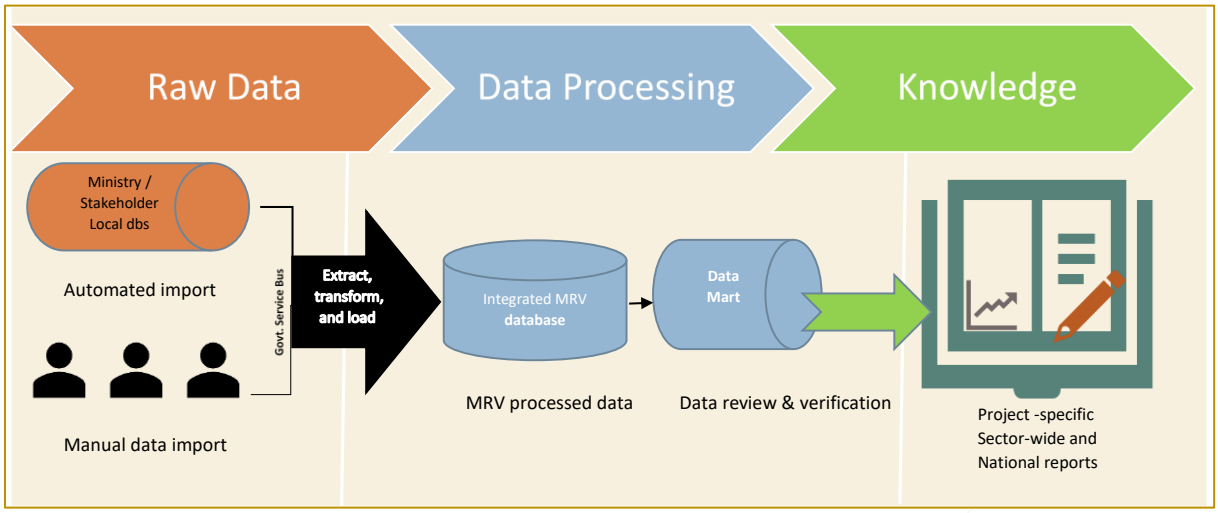

Figure 1: The main functions of the MRV system (adopted from PMR initiative Brochure, 2018).

In February 2018, the first milestone was achieved with the development of a multi-tiered integrated MRV system. The first version of the system - still in the experimental phase - covers the public sector energy projects (RE and EE). Adding GHG data and support data at sectoral and national level from different sectors will serve in tracking progress towards NDC commitments.

Data Extracting, Transforming & Loading: the system acts as database for GHG emissions at project, ministry, sectoral and national levels, with main functions of; metadata[2] viewing and editing, reference[3] data monitoring, emissions data monitoring and uploading data in a standard format or automatically importing data.

Data Processing: the system provides a database of validated emissions and reduction, with main functions of pre-determined calculations of data compared to previous years and calculation of GHGs and emission reduction based on proxy data[4] and modelled scenarios.

Data Review and Verification: the system provides approved GHG emissions database

- Validated GHG emissions and emission reductions data based on reviews and verification (by third party, if applicable)
- Status of emissions and GHG emission reductions and browse/change data values.

Data Reporting: the system provides a database for final GHG emissions.

[2]A set of data that describes and gives information about other data.
[3] Data used to classify or categorize other data

[4]Data that measures the cause and effect relationship between two variables indirectly.

- Data are reported and shared in a standard format available in graphics and tables.

The following figures (**Error! Reference source not found.**) illustrates the designed MRV system. The key stakeholders listed below have several roles and functions and are engaged at different levels with various access levels granted according to their role at the national level:

- Ministry of Environment (MoEnv)
- Ministry of Energy and Mineral Resources (MEMR)
- Ministry of Water and Irrigation (MWI)
- Ministry of Local Administration (MoLA)
- Ministry of Finance (MoF)
- Ministry of Planning and International Cooperation (MoPIC)
- The Greater Amman Municipality (GAM)
- Jordan Renewable Energy & Energy Efficiency Fund (JREEEF)
- Department of Statistics (DOS)

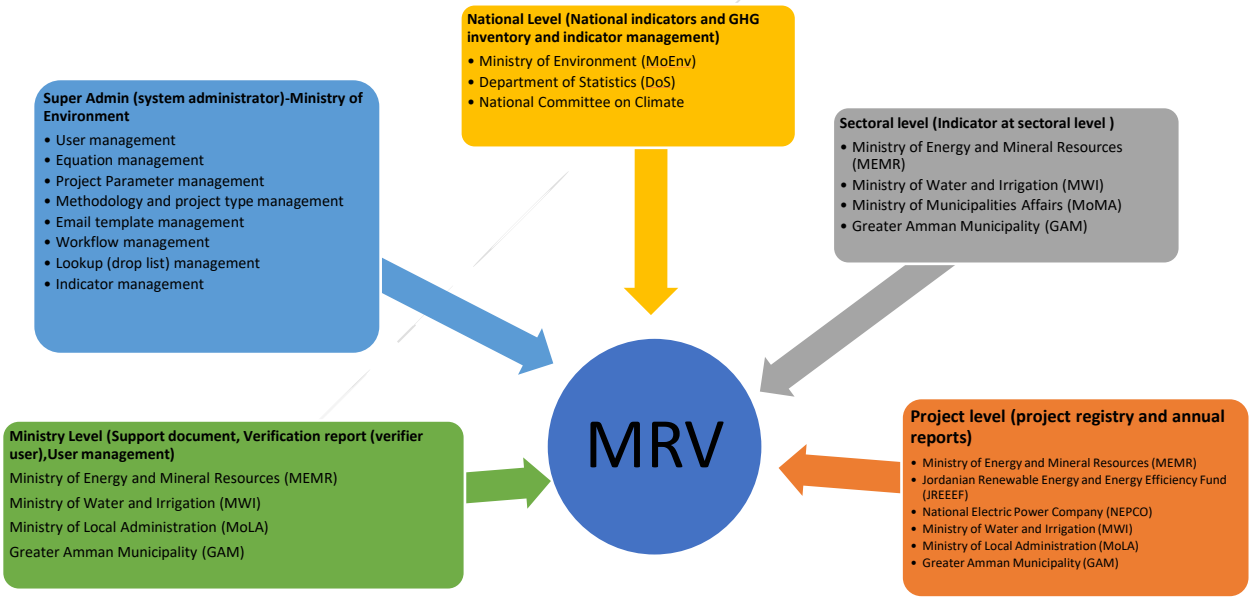

Figure 2: Key stakeholders involved in Jordan's MRV system

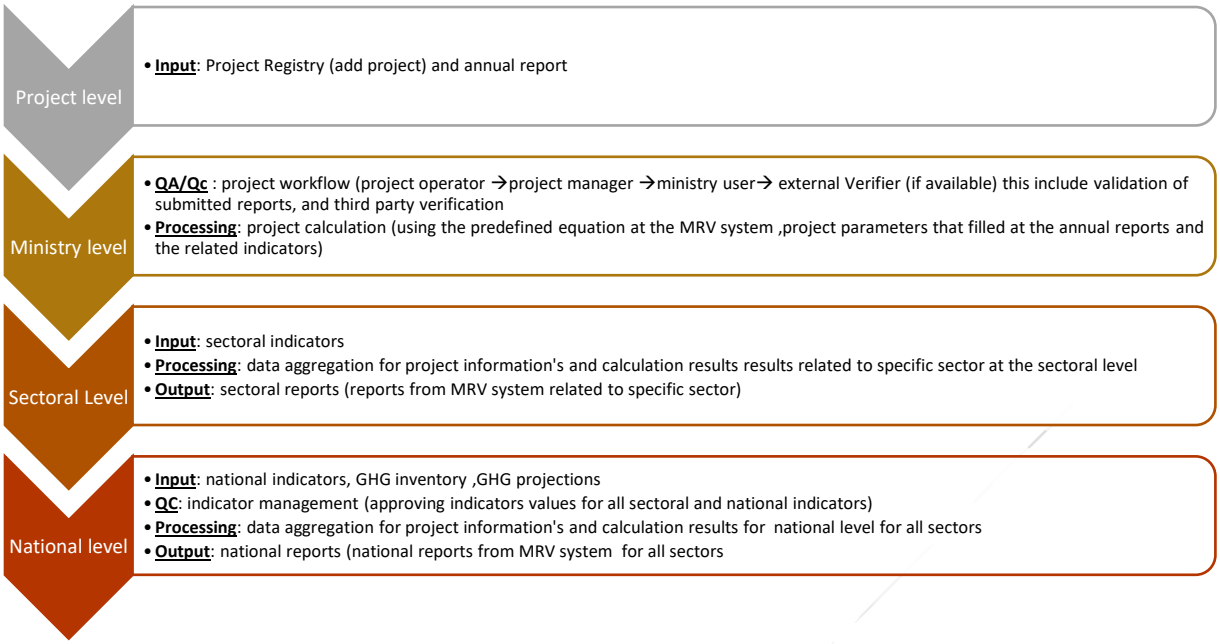

Figure 3: Roles and functions of stakeholder's at different levels

Jordan's MRV future plans

Currently, the MoEnv along with MoPIC released a tender for "Maintenance and Support for the Monitoring, Reporting & Verification System for Greenhouse Gas Emission Reduction Projects (MRV)" with the objective of having the system operational.

➢ Constraints, Gaps and Technology Development and Transfer

This section provides a description of the current and proposed enabling environment for the development and implementation of the BTR, NDC and other national activities related to Paris Agreement ETF and climate change in general, as well as how Jordan is integrating climate change and national climate action reporting findings in sustainable development programmes.

In accordance with the requirements outlined in Article 13 of the Paris Agreement and Decision 18/CMA.1, this chapter provides updated information on constraints and gaps, as well as related financial, technical, and capacity-building needs. It also includes information on financial resources, technology transfer, capacity-building, and technical support received from developed country Parties, multilateral institutions, and other relevant entities. The information presented aligns with the reporting requirements under the Enhanced Transparency Framework (ETF) and builds upon previous reports, including the Second Biennial Update Report (SBUR) and fourth National Communication in addition to highlighting newly emerging challenges.

In its NDCs, while a significant proportion of this is likely to come from international sources of finance, one of the key sectoral actions for the energy sector is attracting private sector finance and reducing administrative obstacles to support investments at early stages.

In Jordan, the role of the private sector is crucial and essential in achieving our NDC, the very high ratio of (Debt: GDP) makes it difficult for the Government to obtain loans. Therefore, the government is considering the role that the mobilization of private investment can play a role in implementing and achieving our NDC.

The country identifies, tracks, and reports support needed and received through an inter-institutional coordination mechanism led by the Ministry of Environment, in collaboration with sectoral focal points and supported by development partners. The national system includes:

- Sectoral line ministries and institutions identify climate finance, technology, and capacity-building needs based on national strategies such as the NDC, National Adaptation Plan (NAP), and other climate action frameworks. These are compiled through stakeholder consultations and technical assessments.
- Support received is tracked through national budget codes (where possible), official ODA reports, and donor coordination mechanisms. The Ministry of Planning and International Cooperation (MoPIC) plays a key role in aligning external support with national priorities and tracking disbursements. Data is reported through biennial transparency reports (BTR), NDC progress reports, and donor-specific reporting systems.
- Challenges and Limitations:
    - Lack of a centralized MRV system for climate finance and support.
    - Fragmented data sources and inconsistent reporting formats across institutions.
    - Limited capacity to track non-financial support (e.g., technology transfer and capacity building).
    - Dependency on donor reporting systems that may not align with national priorities or definitions.

Moreover, Jordan is currently exploring the development of a national climate finance registry and integrated MRV framework to improve accuracy, transparency, and coordination in support tracking.

<u>National Priorities Related to the NDC Implementation</u>

1. Energy Sector Transformation:
    - Accelerate renewable energy deployment to reach the target share of renewables in the energy mix.

    - Enhance energy efficiency measures across industrial, building, and transport sectors.
2. Water Security and Resilience:
    - Address growing water scarcity through non-conventional water resources, energy-efficient desalination, and wastewater reuse.
    - Climate-proof critical water infrastructure and improve water governance.
3. Transport Sector Decarbonization:
    - Expand public transport infrastructure and promote low-emission and electric vehicles.
    - Develop regulatory and financial incentives to shift toward sustainable mobility.
4. Waste Management and Circular Economy:
    - Enhance solid waste collection, recycling, and methane capture from landfills.
    - Promote green job creation through waste valorization and circular economy principles.
5. Land Use and Agriculture:
    - Support sustainable land management and climate-smart agriculture.
    - Combat land degradation and desertification.
6. Health and Climate Resilience:
    - Strengthen health systems' preparedness and response to climate-related risks (e.g., heatwaves, vector-borne diseases).
7. Just Transition and Gender Equality:
    - Ensure a fair transition for workers and communities affected by climate action.
    - Integrate gender-responsive climate planning and support youth engagement.

<u>Support Needed to Achieve NDC Goals and Financial Gaps and Constraints</u>

According to NDCs, the Government of Jordan has proposed sectoral mitigation policies and programs to achieve a 31% reduction in GHG emissions by 2030 compared to the baseline scenario. The 31% reduction of GHG emissions is divided into two parts. The first part seeks to achieve a 5% reduction in GHG emissions through national sources, while the remaining 26% reduction is contingent and conditional on receiving international financial support.

To meet its conditional mitigation and adaptation targets, Jordan requires:

- Climate Finance:
    - Scaled-up concessional finance and grants to cover the cost gap between unconditional and conditional targets.
    - Access to predictable, long-term financing mechanisms, including Green Climate Fund (GCF) and other multilateral/bilateral channels.
- Technology Development and Transfer:
    - Support for advanced clean technologies in energy, water desalination, and early warning systems.
    - Strengthening national innovation and technology adaptation capacity.

- Capacity Building and Institutional Strengthening:
    - Enhancing national and local technical capacities for MRV, climate risk assessment, and green investment planning.
    - Support for data systems and digital tools to mainstream climate change across sectors.
- Policy and Regulatory Support:
    - Technical assistance in developing low-emission development strategies (LEDS), carbon pricing mechanisms, and MRV frameworks.
    - Legal and policy advisory support for sector-specific climate action plans.

➢ Demographic and Socio-economic Profile

According to the Jordanian DOS statistics, in 2023, Jordan's population reached 11.4 million, with an average household size of 4.8 individuals. The survey indicates that female-headed households constitute 12.5% of the total households. A notable 76.4% of female-headed families experience economic inactivity when children under six are present. Larger households often have fewer working female heads. Proposed strategies encompass the enhancement of social safety nets through child care assistance and vocational training.

Gender inequalities persist as a significant concern: Male economic participation is 71.2%, whilst female engagement is at 21%. Despite more than 50% of employed women possessing university degrees, just 11% attain formal employment. The gender ratio at birth is documented as 112.5 males for every 100 females.

Table 2: Educational Attainment Levels Among Females and Heads of Households in Jordan (2022–2023)

			2022	**2023**
All Females	Kingdom	Illiterate	8.6	8.5
		Read & Write	3.4	3.7
		Elementary	8.5	8.9
		Preparatory	16.7	16.4
		Basic	25.7	24.7
		Vocational Apprenticeship	0.1	*
		Secondary	18.5	19.0
		Intermediate Diploma	8.7	8.5
		Bachelor	9.4	9.8
		Higher Diploma	0.1	0.1

		Master Degree	0.4	0.4
		PH.D	0.1	0.1
Head of Household	Kingdom	Illiterate	32.6	31.2
		Read & Write	9.1	9.8
		Elementary	12.8	12.8
		Preparatory	19.2	18.0
		Basic	4.4	4.8
		Vocational Apprenticeship	0.1	0.1
		Secondary	8.3	8.8
		Intermediate Diploma	7.9	8.7
		Bachelor	4.7	5.4
		Higher Deploma	0.2	0.1
		Master Degree	0.4	0.4
		PH.D		

Note 1: Slight differences in the totals of some tables are due to weighting procedures and rounding of figures

Internal migration patterns reveal that Amman, Aqaba, Balqa and Mafraq are key destinations owing to superior economic prospects. Significant observations indicate a low migration rate of 5.4%, implying overall population stability. Urban regions, especially Amman, which accommodate 42% of the population, experience considerable infrastructural strain due to a high urbanization rate of 89%.

The unemployment crisis is acute. The unemployment rate index is considered one of the most important indicators tracked through the Labor Force Survey (employment and unemployment) conducted by the Department of Statistics. The survey results showed that there has been a disparity in the unemployment rate during recent years between decline and increase, as it reached (24.1%) in 2021, while it decreased in 2022 and reached (22.8%).

Youth unemployment for individuals aged 20 to 24 reached a peak of 47%. University graduates encounter an unemployment rate of 31.1%, exacerbated by the COVID-19 pandemic's effects on tourism and small to medium-sized enterprises.

Table 3: Unemployed Persons Age 15+ Years by Sex, Governorate & Nationality (Percentage Distribution, 2022).

Governorate	Total	Male	Female
Amman	37	35.9	1.1
Zarqa	13	8.6	4.4
Madaba	2.1	1.9	0.2
Irbid	22.5	22.5	0
Mafraq	9.2	8.2	1
Jarash	3.2	2.6	0.6
Ajloun	3.1	2.1	1
Karak	5.1	3.8	1.3
Tafiela	1.9	1.3	0.6
Maan	2.1	2	0.1

Disability impacts a significant portion of the population. Approximately 11.1% of Jordanians aged 5 and older have impairments. The predominant limitations are visual (6%) and motor (4.8%). Regions such as Aqaba and Tafila exhibit elevated disability rates.

Self-sufficiency in agricultural production is one of the cornerstones of ensuring food security in any country. This concept relates to a country's ability to independently meet its food needs from domestic production, without relying heavily on imports. In light of the economic and social challenges facing Jordan, self-sufficiency in agricultural production has become a pressing issue, especially as the country faces significant challenges such as limited natural resources, climate change, population growth, and heavy reliance on imports of basic foodstuffs.

Jordan achieves self-sufficiency in vegetables (144%) and dairy products. Child stunting impacts 7.7% of children under five. The country's significant dependence on food imports (80%) renders it vulnerable.

Poverty and food insecurity persist as critical challenges. In 2018, absolute poverty was recorded at 15.7%, with rural regions disproportionately impacted at 22.8%. In 2020, 12.8% of Jordanians experienced extreme food insecurity, and 55% of households decreased meal frequency. Food expenditure accounts for 41% of household income.

- ## Economic Context

The economic environment of Jordan is influenced by resource scarcity, geopolitical volatility, and climate-related concerns. The Fourth National Communication Report indicates that the country is experiencing increasing pressures from its unstable environment, notably the enduring Syrian refugee crisis, which has resulted in over 1.3 million migrants entering Jordan. This has considerably stretched national resources, especially in the water and energy sectors. Jordan's renewable freshwater availability is alarmingly low, with merely 74 cubic meters per capita year, much beneath the water poverty level. Moreover, inconsistent energy imports and dependence on fossil fuels render the nation vulnerable to external supply interruptions.

The COVID-19 pandemic intensified pre-existing economic vulnerabilities, resulting in a 1.5% contraction in GDP in 2020 and a significant decrease in tourism, which had previously accounted for 13.5% of GDP. Unemployment escalated to 24.8% in 2021, exacerbating economic vulnerabilities. Jordan has emphasized energy diversification in its 2020–2030 Energy Strategy, aiming for a 20% renewable energy share and having attained 1,425 MW of built capacity by 2021. Improving regional grid interconnections is a crucial method for stabilizing supply.

The National Resilience Plan (NRP) aims to secure $4.295 billion in international assistance to enhance infrastructure in the health, water, and energy sectors, thereby bolstering resilience in vital areas. Mitigating water shortages is a crucial concern, with an annual shortfall of 265 million cubic meters (MCM). In 2017, Jordan increased its dependence on treated wastewater, reusing 146.7 million cubic meters (MCM). Nonetheless, extensive initiatives like as the Aqaba-Amman Water Desalination and Conveyance Project (AAWDCP) encounter financial and execution obstacles.

Jordan is incorporating climate adaptation into economic development. The National Climate Change Policy (2022–2050) underscores resilience-building initiatives across many sectors, including agriculture, which accounts for 3% of GDP. Climate-smart initiatives emphasize drought-resistant crops and effective irrigation techniques. The Economic Modernization Vision seeks to attract green investments and foster public-private partnerships to mitigate Jordan's debt burden, which was 42% of GDP in 2020.

➢ Water Profile

Jordan's water sector is characterized by acute scarcity and is acknowledged as the second most water-stressed globally. Jordan is one of the world's most water-scarce countries: its renewable fresh water per person is about **61 cubic meters/year** in 2021, far below the absolute scarcity threshold of 500 m^3. According to the National Water Strategy, by 2040 Jordan's per capita share may drop further to **35 cubic meters/year** due to population growth and declining water resources.

The water budget, indicates that the overall supply amounted to 1,031 MCM, derived from several sources: surface water (28.6 m^3/capita), renewable groundwater (34.2 m^3/capita), non-

renewable fossil aquifers (14.6 m^3/capita), and treated wastewater (16.7 m^3/capita). (MWI website, 2017).

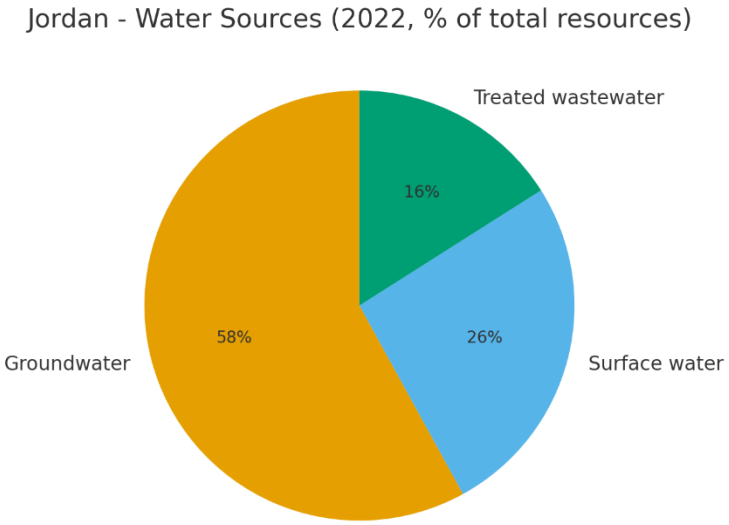

Figure 4: Jordan – Water Sources (2022, % of total resources)

Nonetheless, these statistics conceal a substantial disparity; demand continually exceeds supply. The water system is under significant strain, with an annual deficit of 265 MCM across all sources, and a more pronounced shortfall of 422 MCM when exclusively considering renewable resources. Furthermore, unsustainable practices are apparent in the groundwater sector, where extraction has escalated to 728 MCM, above the safe yield of 478 MCM, hence posing significant hazards of aquifer depletion and salinization (MWI - Annual report 2022)

Water shortage in Jordan is a chronic problem and will continue to be so for years to come. If current domestic, agricultural, and industrial water-use practices are not improved, the water supply in Jordan will deplete in quantity and quality over time. Overdraft of groundwater and surface water is creating a tremendous stress on the water supply in Jordan. The reduced flow of surface water to the Dead Sea is also a source of concern.

The **National Water Carrier Project** (also known as the *Aqaba-Amman Water Desalination and Conveyance Project*) is a major initiative by the Jordanian government to literally carry desalinated seawater from Aqaba to Amman (and other northern governorates) to address severe water scarcity. When completed, it is expected to produce 300 million cubic meters of potable water per year**,** benefitting about 4 million people**.** It will include a large desalination plant (reverse-osmosis) in Aqaba, a water conveyance pipeline of roughly 445 kilometers, booster pumping stations, reservoirs and a solar energy component to supply part of its power needs. It is being implemented as a public-private partnership (BOT: Build-Operate-Transfer) with major

international partners. The project is considered the largest water infrastructure effort in Jordan's history, and is central to the country's National Water Strategy and efforts to reduce reliance on overdrawn groundwater and inconsistent surface sources.

➢ Agriculture Profile

Jordan is primarily characterized by arid and semi-arid conditions, with almost 85% of its area categorized as non-vegetated, consisting of rock, basalt plains, chert plains, and sparsely vegetated desert. Merely 4.5% of the land is conducive to agricultural endeavors, which are classified into three principal categories: rainfed agriculture (2.78%), predominantly yielding cereals, olives, and vegetables; irrigated agriculture (1.07%), primarily situated in the Jordan Valley and Badia regions, dependent on groundwater and treated wastewater; and fragmented forest areas (0.42%), which are progressively endangered by urbanization and climate stressors. (Ministry of Agriculture Annual Report , 2019).

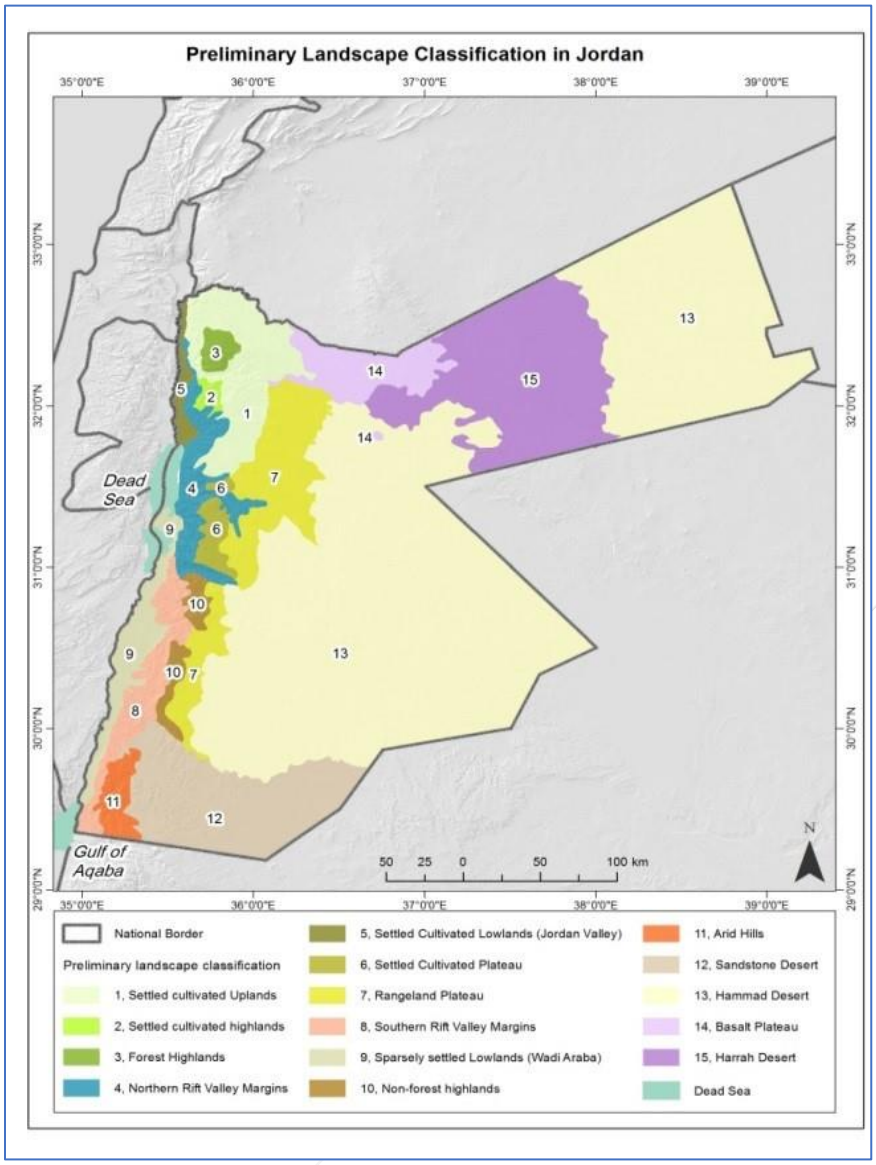

Figure 5: Climatic regions in Jordan (RSCN-personal communication, 2016)

Accelerated urbanization and consequent land fragmentation—aggravated by population expansion and substantial refugee influxes—have resulted in a decline of arable land, particularly in areas that generally have more precipitation. These issues are exacerbated by the effects of climate change, such as heightened droughts, heatwaves, and unpredictable rainfall patterns. The agricultural sector in Jordan accounts for about 3% of the national GDP, however it is essential for food security and rural livelihoods. The sector comprises both rainfed and irrigated systems, with merely 4.5% of the area allocated to agriculture. (DOS, 2019).

Essential attributes encompass:

- Vegetables: 144% self-sufficient.
- Olives: 102% self-sufficient
- Fruits: 97% self-sufficient
- Sheep: Approximately 3 million heads
- Goats and poultry also provide important functions.

Moreover, the sector encounters obstacles including water scarcity, climate variability, and fragmented landholdings. More than 56% of the nation's water usage is allocated to agriculture, predominantly sourced from overexploited groundwater and restricted surface water, resulting in an annual renewable water deficit of 422 MCM. (MWI annual report, 2019).

➢ Energy Sector Profile

The nation's energy security is susceptible to external shocks, shown by the cessation of Egyptian gas supplies in 2011, which compelled Jordan to transition to costly and carbon-intensive heavy fuel oil for electricity generation.

The energy sector is a vital sector due to its significant impact on sustainable development. Despite the challenges it has faced, it has achieved numerous accomplishments over the past period. These achievements did not come out of nowhere, but rather were the result of planning, implementation, and a collaborative approach between all sector institutions, stakeholders from the private sector, civil society organizations, and donors. This approach aims to strengthen the sector's vision of achieving sustainable energy security, while considering the royal directives in this regard. One of the most significant challenges facing the sector is the lack of local energy sources and its reliance on imports. Jordan imported approximately 76% of its total energy needs in 2023, compared to 95% in 2016. It was noted that a decrease in imported quantities, offset by an increase in reliance on local sources. This is the result of adopting a clear policy aimed at diversifying energy sources and forms, increasing the contribution of local energy sources to the overall energy mix, increasing the efficiency of energy use in all sectors, reducing the cost of energy for the national economy, and developing the energy sector system in Jordan to make it a regional centre for energy exchange in all its forms.

Regarding increasing the contribution of local energy sources to the overall energy mix, the Ministry of Energy and Mineral Resources has worked to develop the renewable energy sector by building an attractive legislative and procedural basis for investment. This has led to a significant increase in the percentage of renewable energy in the energy mix, whether through the establishment of commercial projects and the signing of a number of power purchase agreements under the direct supply system, or through the use of solar energy to cover sector-specific consumption. Various projects have been implemented through net metering and transit systems, increasing the capacity of renewable energy projects to approximately (2,681) megawatts by the end of 2023, representing (26.28%) of the total electricity generated, compared to less than 1% until 2014. This represents a success story for Jordan, both regionally

and globally. The value of Jordan's investments in the renewable energy sector has exceeded 2.17 billion Jordanian dinars.

These goals are in line with the priorities of the Economic Modernization Vision, contributing to the achievement of national goals of achieving sustainable growth rates, creating an attractive investment environment, reducing poverty and unemployment rates, and building an effective social protection system. These goals also include improving the level of services provided to citizens and ensuring fair distribution of services, in accordance with the directives of His Majesty King Abdullah II Ibn Al Hussein, who emphasized that energy is the backbone of the economic process.

Jordan has prioritized the advancement of solar and wind energy initiatives to diversify its energy portfolio. In 2020, renewable energy accounted for around 20% of total electricity generation, featuring significant projects like the 117 MW Tafila Wind Farm and multiple solar power plants in development.

To enhance energy efficiency and minimize waste, Jordan implemented the National Energy Efficiency Action Plan (NEEAP), aimed at decreasing energy demand in the construction, industrial, and transportation sectors. The strategy encompasses initiatives such as the enforcement of green construction codes (including LEED certification), the implementation of LED street lighting retrofits, and the execution of industrial energy audits. The energy efficiency activities are projected to yield yearly CO_2 reductions of roughly 214,000 tons by 2025, aiding the nation's overarching emissions reduction objectives.

The Energy Strategy for the period 2020-2030, was approved in March 2020: focused on developing an effective energy policy and strategic objectives towards sustainable energy and energy security by diversifying energy supply, developing and utilizing traditional and renewable local energy sources, improving energy efficiency and developing the energy sector system in Jordan to make it a regional center for energy exchange. Further measures include liberalizing energy markets and encouraging private investment in energy infrastructure projects.

Jordan has adopted the following conclusions and recommendations in the base case scenario for achieving its strategic objectives. This includes supporting and encouraging the use of natural gas in other sectors and the development of distribution networks in major cities.

The energy sector in Jordan is undergoing a strategic transformation aimed at diversifying resources, increasing domestic production, attracting foreign investment, and enhancing overall efficiency. In the oil sector, efforts are focused on diversifying crude oil import sources through the Aqaba terminal, land transportation, and the planned Iraqi oil pipeline. There are ongoing initiatives to develop the Hamza Oil Field and attract international companies to invest in oil exploration across open areas, including projects targeting oil shale retorting. Furthermore, Jordan aims to establish and construct pipelines for crude oil and oil products, enhance existing interconnection projects, and launch new infrastructure ventures.

To strengthen the downstream oil market, Jordan is working to open new markets for oil products while aligning local fuel standards with the latest international specifications. The government is also encouraging refining activities that operate under market pricing principles, liberalizing the pricing structure to transition from a regulated to an open market. Efforts are being made to increase oil product storage capacities in line with international standards and bolster Jordan's role as a logistics hub for the transportation of oil products to and from neighboring countries.

In the natural gas sector, Jordan seeks to meet its gas needs through existing supply agreements that are expected to suffice until 2030, while simultaneously developing the Risha Gas Field. The country is also inviting global investment in both traditional and non-traditional gas exploration activities in open areas. Liquefied natural gas (LNG) imports via the Sheikh Sabah Al Ahmad Terminal in Aqaba remain a vital part of energy security planning, with a focus on exploring cost-effective alternatives to the Floating Storage Regasification Unit (FSRU). Additionally, there is a national push to increase the use of natural gas and compressed natural gas in the industrial and transport sectors to reduce reliance on oil products and lower emissions. This is accompanied by plans to expand natural gas distribution networks in major urban areas.

Improving energy efficiency is another pillar of Jordan's energy strategy. This includes updating legislation and advancing the implementation of the National Energy Efficiency Action Plans. Specific programs target reductions in electricity consumption in the water sector by 15% by 2030. Enhancements to public transportation systems—such as rapid bus and railway networks—are also part of efforts to optimize energy use. The country aims to boost efficiency across residential, industrial, governmental, commercial, and service sectors.

Strategically, Jordan is positioning itself as a future hub for green hydrogen production. The vision involves making green hydrogen and green ammonia production competitive by lowering costs and establishing a supportive regulatory framework with clear incentives for investors. A critical step in this direction has been the amendment of electricity laws to incorporate renewable energy storage and the development of dedicated transmission lines connecting renewable energy sources directly to hydrogen production facilities. Jordan continues to prioritize upgrades to its electricity transmission infrastructure to reduce technical losses and accommodate the intermittent nature of renewable energy sources. However, the absence of smart grid technologies and large-scale energy storage remains a significant challenge in integrating higher shares of renewables into the national grid. Addressing these gaps is essential for ensuring the long-term stability, efficiency, and resilience of Jordan's energy system.

Domestic Resource Exploitation, Jordan holds the sixth-largest oil shale reserves in the world. The government has initiated trial projects, including the Atarat Power Plant, designed to produce 470 MW of power. Nonetheless, oil shale development encounters considerable environmental issues and financial limitations.

Small modular reactors (SMRs) are being evaluated as a sustainable way to diminish Jordan's dependence on foreign fuels. Discussions are under progress to evaluate the viability of nuclear power within the national energy policy. Jordan's energy transition roadmap anticipates a substantial alteration in the energy composition. In the baseline scenario, the proportion of oil in total energy consumption is anticipated to decline from 43% in 2018 to 33% by 2050, while natural gas is expected to rise and renewables are forecast to constitute 24% of the energy mix. In the mitigation scenario, Jordan seeks to attain a 20% decrease in emissions by 2055 via expedited renewable energy implementation and improved energy efficiency initiatives.

➢ Transport Sector Profile

The transportation sector has a major and pivotal role in advancing the Jordanian economy and supporting the gross domestic product, and certainly plays an essential component in the daily life of Jordanians. Both passenger and freight transport demand are growing rapidly due to economic growth within the country and the region, and is concentrated on parts of the transport networks, close to the main urban areas and along key corridors. Consequently, part of the network is under pressure, and performance is below the needed. Without interventions, the situation will worsen. At the end of the next decade, part of the system will no longer be able to withstand the increasing Jordanian economic demand and daily life of the population. Unreliability and delays will increase, thus causing costs to people and business activities and, ultimately negatively affecting the country's economic performance. The transport sector in Jordan is mainly dominated by road transport, as there are a marginal number of domestic flights in Jordan between the capital city and Aqaba, and there is no form of navigation. The modes of air transport and marine transport are limited to international transport only. In the land transport sector, the use of private cars, in general, dominates the transport of passengers, and the use of trucks is dominant in transporting goods.

<u>Climate Change Strategies and Mitigation Policies in the Transport Sector</u>

Nationally, the Ministry of Environment launched **Jordan's National Green Growth Action Plan (NGGAP) 2021-2025**, to draw a roadmap for the country's transition towards a sustainable and low-carbon economy. It aims to integrate green growth principles into six main sectors, of which the Transport sector is one along with other sectors like Agriculture, Energy, Tourism, Waste, and Water. This NGGAP outlines specific targets for each sector, with clear roles and responsibilities

for government agencies, the private sector, and civil society. Additionally, the NGGAP is guided by a set of key driving principles: Transparent Governance, incentivized green growth, an integrated planning process that values societal impacts, and behavior shift. The transport sector's NGGAP consists of 13 green growth actions that will contribute to increased access, increase public-private dialogue, enhance the enabling environment, and reduce GHG emissions.

At the national level, the Greater Amman Municipality (GAM) has developed various climate change plans that aim at reducing GHG emissions and enhancing resilience. The key plans are:

The Amman Green City Action Plan (GCAP), released in May 2021, was developed based on GAM's effort to improve environmental performance and take a more systematic approach to addressing its existing and emerging urban environmental challenges. The plan aims to support the city in identifying, prioritizing, and addressing the city's most acute climate change and environmental challenges, including solid waste management, water and wastewater, urban transport, and building energy efficiency. As a result, the city has elaborated on 37 initiatives that are now to be implemented until 2025. The GCAP was developed by integrating the recommendations of the Amman Resilience Strategy 2017 and Amman's inaugural Climate Action Plan.

Amman Climate Action Plan (CAP) demonstrates the commitment of the Greater Amman Municipality to integrate climate adaptation and mitigation measures across all its operations to enhance citizens' quality of life. The plan aligns with the Climate Change Policy (2022-2050) and the C40 CAP Framework, presenting Amman's Vision 2050 as a carbon-neutral and climate-resilient city driven by a green and circular economy.

In response, the **Ministry of Transport updated the General Policies for Transportation Document 2024** to outline key strategies aimed at improving the efficiency, sustainability, and governance of the transport sector a dedicated transport policy was introduced, aimed at Increasing the transportation sector's contribution to economic and social development to achieve the goals of the economic modernization vision, Enhance the competitiveness of the transportation sector at the regional and global levels, Create a safe, integrated, sustainable, effective, and efficient transportation system, Update transportation-related legislation, by abolishing, adding, amending, and/or creating, to achieve the vision of economic modernization to ensure the stability of the legislative environment. This policy is built on clear measures that promote renewable and alternative energy while providing the necessary infrastructure for these modes, ultimately reducing energy consumption and protecting the environment. In the same context, **the Ministry of Transport developed the Strategic Plan for the transportation sector 2024-2028,** which outlined a comprehensive plan to advance sustainable transport such as a railway network and BRT, attract investment, and integrate smart technologies into the transport

network, Sustainable and green transportation. These efforts are aligned with Jordan's commitments to the Nationally Determined Contributions (NDCs) under the Paris Agreement and the United Nations Sustainable Development Goals (SDGs). Jordan is committed to reducing greenhouse gas emissions, promoting clean energy, and fostering sustainable development across all sectors, including transport.

The strategic plan for the transportation sector in Jordan 2024-2028 aims to achieve several main goals, in line with the Kingdom's economic modernization vision. And the most prominent areas the strategy focuses on are:

- Improving the national road network by improving existing roads and creating new ones to improve connectivity and reduce travel times.
- Developing the national railway network: Expanding and modernizing the railway system to facilitate efficient transportation of goods and passengers.
- Expanding and modernizing airport infrastructure: increasing airport capacity and improving services to accommodate increasing air traffic and boost tourism.
- Investing in public transportation systems: improving public transportation services in urban areas, encouraging sustainable means of transportation, and enhancing accessibility.
- Enhancing the efficiency of logistics and supply chains by improving logistics operations to enhance business competitiveness.

Greater Amman Municipality introduced its Strategic Plan (2022-2026), as part of its efforts to develop the transport sector, aligning with national efforts to enhance the efficiency and sustainability of the sector. The strategy outlines several key projects, including the implementation of the second phase of the Bus Rapid Transit (BRT) system, covering 43 km, updating the city's transport mobility master plan to provide necessary guidance on the priority of transport sector projects within the city, and developing advanced traffic management systems to improve traffic flow efficiency.

Organizational structure of the transportation sector

The Ministry of Transport (MoT) is the leading government institution responsible for setting transport Policy and strategic planning and guiding the development of Jordan's transport sector. MoT does not, however, have a direct responsibility for the implementation of projects, and relies on many other institutions to manage and operate transport infrastructure and services. Each mode of transport (rail, road, maritime, civil aviation, and logistics) has their own set of institutions responsible for planning and managing infrastructure development, regulation and service provision. MOT is responsible for rail, civil aviation, and maritime transport, with the support of its affiliated commissions (Land Transport Regulatory Commission (LTRC), Jordan Maritime Commission, Civil Aviation Regulatory Commission (CARC), Jordan Hejaz Railway

Corporation), while implementing and maintaining infrastructure is entrusted to a the Ministry of Public Works and Housing. Municipalities are primarily responsible for planning and implementing public transport projects, but support is also provided by Land Transport Regulatory Commission (LTRC). Some special jurisdictions, such as the Aqaba Special Economic Zone Authority (ASEZA) and Petra Development and Tourism Regional Authority (PDTRA), are responsible to manage for transport issues within their boundaries.

Public Transport Characterization and Key Challenges

With a growing population of approximately 11.56 million, highly concentrated in the Capital city of Amman, mobility demand in Jordan has been increasing over the past 15 years. However, demand has not been met with the required infrastructure development or public transport. Public transport modal-share is significantly low, at approximately 13 percent (separated into 5% of trips via public buses and 8% of trips via service taxi). Jordan's population relies heavily on private vehicles, with around 33% of trips using private vehicles, and the number of private vehicles almost doubled between 2008 and 2018, reaching over 3.4 million vehicles in 2023. In contrast, the number of public vehicles only grew by 45 percent within the same period. In addition to conventional taxis, ride-hailing services through mobile applications have emerged in the past few years, such as Uber, Careem, Petra Ride, and.

The public transport system in Jordanian cities is uncoordinated with low frequencies and lacks sufficient coverage. Public transport vehicles operating in the country amount to approximately 1,440 buses, around 3900 mini busses, and over 4,000 service taxis (white shared taxis), in addition to over 16,000 conventional yellow taxis. About 85% of buses and taxis are individually owned and operated, except for Amman, where the main bus operator, the Comprehensive Multiple Transport Company (CMTC), runs 130 buses on 17 routes under the AutoBus brand and 287 buses on 39 lines in a consortium with Turkish company Gürsel under the name Amman Bus system.

Tackling public transport challenges with realistic and feasible solutions is key to improving the efficiency of the transport system in Jordan and reducing Greenhouse Gas emissions(GHG). Annual costs due to inefficiencies of transport are estimated to be at least six percent of Jordan's GDP, including the cost of traffic congestion, fatalities and injuries as well as environmental degradation, not counting the adverse impact that poor transport services pose to access to employment, particularly in the case of women.

The transport sector also contributes significantly to Jordan's energy bill. While the country's energy imports amounted to US$3.74 billion in 2019, its imports of refined petroleum products came to US$1.4 billion in the same year.

The Government of Jordan has been taking steps towards enhancing public transport and is currently engaged in several projects and initiatives to meet this objective. In recent years, the government has introduced several initiatives to enhance public transport. In 2017, a new public transport law set the framework for much-needed reforms with the mandatory grouping of small operators, thereby opening the door to better route coordination and service contracts with key performance indicators on quality, safety, green mobility, and service reliability. Although the reform process supported by the 2017 law could not yet be implemented, although discussions with operators have been conducted in a few cities, and service level agreements have been drafted, Amman and Amman-Zarqa BRT is the first initiative that aims at improving the public transport service through highly-dense areas and routes focusing on the Amman Governorate. Digitization of government services could also be a contributor to reducing vehicular trips and reducing pressure on transport infrastructure. GAM has recently expanded the use of e-services. Lastly, ensuring that transport options cater to the different needs of males and females can serve as an equalizer between men and women in terms of access to economic opportunities. In this regard, the Government of Jordan also adopted in 2019 a Code of Conduct (CoC) for public transport. This CoC is the first ever of its nature in the sector, and aims at regulating the conduct of passengers, drivers, and operators in public transport to benefit all users, particularly women. The CoC is now being implemented through the Mashreq Gender Facility grant with World Bank support to the Ministry of Transport, in close collaboration with the Jordanian National Commission for Women.

yet, there are challenges in the transport sector that need to be addressed and shed light on:

1. Increasing population and dominance of the private car, resulting in a high level of GHG emissions and energy consumption from the sector
2. Fragmentation of the sector at the operational level, with 85% individual ownership
3. Lack of integration in terms of both services and fares, leading to high costs and trip durations
4. Limited and low-quality public transport infrastructure and facilities for non-motorized users
5. Limited investment and resources from both the public and the private sectors

In response to these challenges, Jordan's transport sector has undergone significant developments, particularly in passenger transport. In 2021, the soft operation of the first 17 km BRT route was launched, to the readiness of the infrastructure, the remaining routes have been introduced, and by the end of 2024, the network reached 132 km. The network consists of six routes, of which three operate within Amman, and the other three connect Amman with the city of Zarqa, which is considered one of the most densely populated cities in Jordan. The population of these two Jordanian cities altogether represents around 56% of Jordan’s population.

This system operates with a fleet of 165 buses powered by environmentally friendly Euro 5 diesel, transporting approximately **100,000 passengers daily**. The total cost of the project reached **350 million JOD (**Jordanian dinars), with 139 JOD allocated for the public transport routes within Amman, and 211 JOD for the routes connecting Amman and Zarqa.

Additionally, the Greater Amman Municipality (GAM) launched the "Amman Bus" project, which aims to connect various districts of Amman while also supplying the BRT network as feeder services. This project covers a network of 760 kilometers, consisting of 36 routes, and operates with a fleet of 150 buses running on Euro 5 fuel. The system serves around 50,000 passengers daily, supported by GAM with an annual budget of 10 JOD.

The passenger transportation sector has also witnessed technological development by introducing intelligent transportation systems. These systems include the installation of surveillance systems, electronic tracking, and electronic payment systems on over 700 buses operating in Amman and Aqaba, managed under the "Vision Amman Transport" company.
In the second quarter of 2025, Amman will witness the first deployment of electric buses on BRT routes. The purchase of 15 electric buses has already been completed, marking the initial phase of studying and evaluating the performance of these E-buses in Jordan. This move is part of Jordan's strategy to reduce carbon footprint for the transport sector, enhance air quality, and contribute to its sustainability goals in alignment with the sustainable development goals.

Just as Jordan stepped into 2025, it was announced to reform the PT service of the cities and governorate centers from the capital, Amman (Karak, Irbid, Salt, Jerash) through fixed route schedules (frequencies) and provide operational financial support for operators to ensure a profit margin (7%) in addition to installing electronic collecting-fare payment systems and to installing tracking devices to ensure monitoring the services provided to passengers. As for freight and the transport of goods in Jordan, it plays an important role in driving the economic wheel and has environmental and social impacts. Shipping within Jordan relies entirely on a fleet of trucks with an average age of around 20 years. However, the Jordanian government is interested in finding multiple means of transportation in the field of freight transport, such as a railway project to link the industrial port and the phosphate port in Aqaba and the mining areas (the phosphate mine in Al-Shidiya and the potash factories in the Ghor Al-Safi area).

The length of the proposed potash railway is about (196) km, aiming to link the potash factories in the Ghor Al-Safi area and the Wadi Al-Yatam area to transport potash from the factories in Ghor Al-Safi to the southern industrial port in Aqaba. The most important expected positive impacts of the project are increasing Jordan's logistical and export capabilities with a volume starting from 16 million tons of phosphate and potash, including 13 million tons of phosphate and 3 million tons of potash, and establishing a cooperative framework in the railway sector, contributing to the transfer of expertise and technical skills in the fields of railway construction

and operation. It will also contribute to increasing cargo handling capacity, reducing transportation costs, improving competitiveness, reducing road maintenance costs, creating new job opportunities, and stimulating growth in industries, especially mining, by increasing the ability to export/transport products and import goods at a lower cost and with greater ease than currently. The project will also contribute to activating the role of free zones, logistics, and land ports in trade and logistics services. It will also improve road safety, reduce accidents on main roads, and mitigate greenhouse gas emissions resulting from the transport of goods by trucks. The preliminary engineering studies required for the railway tracks and the requirements for handling potash and phosphate materials will be completed during the second quarter of 2025, it is also expected that the implementation and construction works of the project will begin after that directly.

Another sustainable Transport project will be taking place in Petra region where they will be operating green electric buses in the tourist city of Petra and the surrounding historic and touristic areas, this project aims to stimulate and enhance comfortable and clean transportation for tourists within the archaeological area. it includes 16 electric buses working in the touristic area to provide comfortable electric transport for tourists, it is expected to start operating in 2026.

➢ Industrial Profile

The industrial sector of Jordan is categorized into two main subsectors: extractive industries (mining and quarrying) and manufacturing industries. The sector is essential to the economy, enhancing employment, export revenues, and technical progress. Nevertheless, it encounters structural obstacles related to resource dependency, energy inefficiency, and climate change obligations. The extractive sector concentrates on the mining of phosphate, potash, limestone, and oil shale. In 2018, overall production amounted to 10.4 million tons, mostly consisting of phosphate (5.2 million tons) and potash (2.3 million tons). Oil shale drilling is emphasized for energy security, with initiatives such as the Attarat Power Plant targeting the generation of 470 MW of power by 2025.

Manufacturing encompasses fertilizers, cement, chemicals, and pharmaceuticals. In 2018, the sector generated 6.8 million tons, predominantly from cement (4.1 million tons) and fertilizers (1.2 million tons). These sectors are significantly dependent on imported raw materials and energy, rendering them vulnerable to fluctuations in the worldwide market.

➢ Solid Waste and Wastewater Management

Waste Generation and Composition

Jordan produces 4 million tons of MSW each year, equating to a per capita rate of 0.95 kg per day. Organic trash constitutes 50–60%, followed by plastics at 12–15%, paper at 10%, and building debris. Industrial and hazardous waste accounts for 5%, predominantly from the manufacturing and healthcare sectors. The arrival of 1.3 million Syrian refugees has resulted in a 25% rise in urban garbage production, straining municipal infrastructure in northern governorates such as Irbid and Mafraq.

Jordan depends on 18 landfills; however, only 3 (Al Ghabawi, Al Akeeder, Al Hassan) are equipped with liners and methane capture systems. More than 90% of municipal solid waste is disposed of in landfills, with minimal recycling efforts.

Wastewater Production and Reutilization

Jordan processes 164 million cubic meters (MCM) of wastewater per year, with 90% repurposed for agricultural use. The As-Samra Wastewater Treatment Plant manages 70% of the national flow, facilitating irrigation in the Jordan Valley. Elevated salinity (>2,000 ppm) and pathogen concentrations in treated wastewater restrict agricultural output and jeopardise soil integrity. More than 60% of sewer systems exceed 30 years in age, resulting in leaks that pollute groundwater.

➢ Health Profile

The health sector in Jordan is fundamental to national resilience, tackling the effects of climate change and public health crises. As of 2020, the healthcare infrastructure comprises 372 Primary Health centers (PHCs), 188 hospitals, 50 maternity and child health centers, and 431 dental clinics linked with the Ministry of Health. Primary Health Centers are essential for providing services to both urban and rural populations; nevertheless, inequities remain in remote governorates such as Mafraq and Ma'an. Non-communicable diseases (NCDs) constitute 78% of deaths, primarily due to cardiovascular illnesses, diabetes, and respiratory conditions. The COVID-19 pandemic stressed resources, further intensified by the requirements of 1.3 million Syrian refugees in host towns. Elevated temperatures and water shortages have exacerbated climate-sensitive diseases, such as waterborne infections (e.g., cholera) and heat-related ailments.

Climate change intensifies health hazards due to elevated temperatures (anticipated to rise by 1.1–4.7°C by 2100), water shortages, and severe weather events. Heatwaves jeopardize outdoor laborers and at-risk populations, while diminished groundwater recharges (-10%) and surface water (-15%) exacerbate the threat of diarrheal infections. Floods and droughts impede healthcare accessibility and exacerbate food insecurity.

Refugees (89% residing in metropolitan locales) and economically disadvantaged groups in Amman, Irbid, and Mafraq experience increased susceptibility due to congested infrastructure, poverty, and restricted adaptive capacity.

Jordan's strategies for 2021 prioritize policy integration and emergency response. The National Climate Change Policy (2022–2050) emphasizes health adaptation, encompassing heatwave preparedness and disease surveillance, whilst the National Adaptation Plan (NAP) enhances primary health care resilience in drought-prone regions. Responses to COVID-19 encompassed enhanced vaccine accessibility for refugees and rural communities, as well as telemedicine systems to alleviate clinic congestion. These strategies seek to reconcile pandemic recovery with climate adaptation.

Plans following 2022 emphasize systemic resilience. Improvements in surveillance encompass early warning systems for climate-sensitive diseases, such as malaria, and the incorporation of meteorological data into health systems. Infrastructure enhancements entail outfitting hospitals with cooling systems and augmenting wastewater treatment to mitigate contamination. Intersectoral partnership with the Ministry of Water and Irrigation seeks to ensure access to clean water in drought-affected areas, while community initiatives educate health workers on climate risk communication. Innovations such as climate-health modelling and sustainable clinics (solar energy, rainwater collection) are prioritized.

➢ Biodiversity and Ecosystems

Jordan, notwithstanding its arid environment and constrained natural resources, hosts a varied array of ecosystems and species. The nation's distinctive geographical position at the intersection of Asia, Africa, and Europe has provided it with diverse habitats, from the fertile Jordan Valley to the arid deserts of the Badia region. These ecosystems sustain a diverse range of flora and wildlife, some of which are peculiar to the area. Jordan's biodiversity is significantly threatened by climate change, urbanization, overgrazing, and water constraint. This report offers a comprehensive examination of the present condition of biodiversity and ecosystems in Jordan, as well as the tactics and methodologies employed to tackle existing and foreseeable difficulties.

The ecosystems of Jordan can be classified into many principal groups, each possessing distinct traits and biodiversity. Forests encompass roughly 0.4% of Jordan's total geographical area, predominantly situated in the northern highlands. These woods are primarily composed of oak and pine species and are essential for biodiversity conservation, soil preservation, and water control. Deforestation, land fragmentation, and droughts produced by climate change pose substantial risks to these ecosystems. Urban sprawl and agricultural intrusion further intensify the predicament.

The Badia region, encompassing over 90% of Jordan's territory, comprises dry and semi-arid rangelands. These regions sustain many plant species adapted to extreme conditions and are essential for cattle grazing.

The present condition of Jordan's wetlands, such as the Azraq Oasis and the Dead Sea, constitutes essential habitats for migratory avifauna and many wildlife species. These habitats are crucial for water retention and filtration.

The Gulf of Aqaba represents Jordan's sole marine habitat, distinguished by its abundant coral reefs and varied marine fauna. This ecosystem is essential for tourism and fishing.

Jordan has enacted many methods and policies to tackle the difficulties confronting its biodiversity and ecosystems. These plans correspond with national and international obligations, notably the Convention on Biological Diversity (CBD) and the Sustainable Development Goals (SDGs). The NBSAP delineates Jordan's dedication to biodiversity conservation, the sustainable utilization of natural resources, and the equitable distribution of benefits derived from genetic resources.

The marine environment of Jordan is a vital but geographically restricted aspect of its natural resources, limited to the 27 km coastline in the Gulf of Aqaba (Chapter 1.6.5.1). This region is ecologically vital, containing coral reefs, seagrass beds, and a variety of marine animals, however it confronts increasing stresses from climate change, urbanization, and anthropogenic activity. This document presents a comprehensive study of the sector's current condition, strategies, and difficulties, based on data from Jordan's Fourth National Communication Report (2022).

The Gulf of Aqaba is a semi-enclosed region with a maximum depth of 1,850 meters, exhibiting high salinity (40.5–41.5 PSU) and stable temperatures (21–28°C). The Gulf sustains more than 300 coral species, 1,200 fish species, and essential habitats such as mangrove forests and seagrass meadows (Chapter 1.6.5.2). Notable species are the endangered hawksbill turtles and commercially significant fish such as the grouper.

➢ Urban Context

The urbanization rate in Jordan exceeds 89%, with the majority of the population concentrated in the Amman, Irbid, and Zarqa governorates. Jordan accommodates 1.3 million Syrian refugees, predominantly in metropolitan areas such as Amman and northern governorates, intensifying strain on housing, water, and public services. Urban families are smaller (average size: 4.8 individuals) than those in rural areas, however they have greater water and energy demands owing to dense infrastructure. Urban regions utilize 40% of Jordan's water resources but encounter shortages attributed to deteriorating infrastructure and significant leakage rates, with home supply losses reaching 48%. Urban growth has fragmented agricultural fields in high-rainfall areas, diminishing green spaces and elevating flood hazards. (UN-Habitat Report, 2023).

Chapter I: National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases.

1.1 National Context and Institutional Arrangements

The Ministry of Environment is the focal point for issues relevant to the UNFCCC and is responsible for seeing that Jordan's commitments are met. Preparation of Jordan's First Biennial Transparency Report (BTR-1) was coordinated by the Ministry of Environment in partnership with UNDP and the Royal Scientific Society (a national non-governmental, non-for-profit scientific organization). The GHG inventory development was accomplished with the participation of a pool of national experts representing different national ministries and entities.

The national greenhouse gas (GHG) inventory was prepared in accordance with the Modalities, Procedures, and Guidelines (MPGs) for the transparency framework under the Paris Agreement, as adopted in Decision 18/CMA.1. The inventory follows the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and incorporates the 2019 Refinement where applicable, ensuring consistency, comparability, and transparency of data. Emissions and removals are reported for all relevant sectors—energy, industrial processes and product use (IPPU), agriculture, forestry and other land use (AFOLU), and waste—covering all key categories using the best available data and methods. Quality assurance and control (QA/QC) procedures have been applied throughout the inventory development process to enhance the reliability and credibility of the reported information. The GHG national inventory chapter addresses emissions of carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), Those gases are supported by the software and the Intergovernmental Panel on Climate Change (IPCC) 2006 Guidelines. Non-methane volatile organic compounds (NMVOCs) emissions resulting from the solvents subsector were estimated using European Monitoring and Evaluation Programme (EMEP/EEA) air pollutant emission inventory guidebook 2019.

1.2 Methodology and Inventory Estimation

Covered Years

According to the MPGs (par. 58), Parties shall report a consistent annual time series starting from 1990. Those developing country Parties that need flexibility in the light of their capacities have the flexibility to instead report data covering, at a minimum, the reference year/period for their NDC, and, in addition, a consistent annual time series from at least 2020 onwards.
Jordan opt to use flexibility and will not cover all years from 1990 in this report. Jordan will apply flexibility provision and so consistent time series will be covered: 2012-2022. Jordan will

report on them by a standalone report (the National Inventory Report (NIR)). A summary of the main sectors outcome was as follows:

For the current report, the national GHG emissions were estimated for the year 2023 according to 2006 IPCC Guidelines and the 2019 Refinement[5] to the 2006 IPCC. The estimation of the overall national inventory was done using the IPCC Inventory Software for Parties not included in Annex I of the UNFCCC (ver. 2.96, released on March 2025). Then a Json file was uploaded to create the CRTs for Jordan Inventories using the UNF CCC ETF reporting tool (Annex I).

The sectors and subsectors that were considered are the following:

1. Energy:
    - Stationary Combustion
    - Mobile Combustion
    - Fugitive Emissions
2. Industrial Processes and Product Use (IPPU):
    - Mineral Industry Emissions
    - Chemical Industry Emissions
    - Metal Industry Emissions
    - Non-Energy Products from Fuels and Solvent Use
    - Emissions of Fluorinated Substitutes for Ozone Depleting Substances and Other Product Manufacture and Use
3. Agriculture, Forestry, and Other Land Use (AFOLU):
    - Cropland and Forest Land
    - Emissions from Livestock and Manure Management
    - N_2O Emissions from Managed Soils, and CO_2 Emissions from Lime and Urea Application
4. Waste Generation, Composition, and Management Data
    - Solid Waste Disposal
    - Biological Treatment of Solid Waste
    - Incineration and Open Burning of Waste
    - Wastewater Treatment and Discharge

Inventories were prepared on a gas-by-gas basis and in units of mass. Estimates of anthropogenic emissions of the direct GHGs of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) were assessed by sources and removals by sinks. Most sectors and subsectors used Tier 1.

[5] All updates, supplements and/or elaborates on the 2006 Guidelines were identified and adopted in this chapter.

Indirect GHGs were estimated, whenever the activity data were available, using the EMEP Guidelines and methodology.

For reporting purposes, the notation keys NO (not occurring) or NE (not estimated) and NA (not applicable) were used as necessary in the inventory reporting tables.

Emissions were estimated in Gigagrams (Gg) for all direct and indirect gases, as well as in Gg of CO_2-equivalent (CO_2eq) for all direct gases. For the conversion from Gg of different GHGs to Gg of CO_2eq, the Global Warming Potential (GWP) values provided in the IPCC Fifth Assessment Report (FAR) temporal horizon 100 years were used (according to the MPGs (par. 37), Parties **shall** use GWPs values of the 5AR for BTR. The following sections report Jordan's GHG inventories by sector and on a gas by gas basis.

Table 4: Used NHVs for the Energy Sector

Fuel	NHVs [TJ/kton]				Notes *
	2020	2021	2022	2023	
Crude Oil	41.738	41.738	41.738	41.738	CS
Motor Gasoline	42.542	42.538	42.534	42.525	CS
Other Kerosene	42.479	42.488	42.563	42.479	CS
Jet Kerosene	43.338	43.354	43.329	43.333	CS
Gas/Diesel oil	42.458	42.454	42.454	42.458	CS
Residual Fuel Oil	42.102	42.169	42.082	42.061	CS
LPG	46.789	47.063	46.748	46.747	CS
Natural Gas (dry)	49.252	49.251	49.264	49.252	CS
Coking Coal	28.2	28.2	28.2	28.2	D
Biomass (Other Primary Solid Biomass)	11.6	11.6	11.6	11.6	D
Oil Shale / Tar sands	-	-	4.01	4.01	CS
Naphtha	43.73	43.73	43.73	43.73	CS
Refinery Gas	48.15	48.15	48.15	48.15	CS
* D: IPCC Default, CS: Country Specific					

1.3 GHG Inventory Quality Control/Quality Assurance and Review

Jordan acknowledges the need for having a manual for national QC/QA procedures for GHG inventory estimation. This has been listed in Jordan's future improvement plans (chapter VII). Also, during the preparation of the GHG Inventories, the inventory team and the BTR project management team carried out the following QC tasks:

- Overall assessment technical reviews, and accuracy checks performed by the compilers to ensure consistency, accuracy, completeness and avoid double counting.
- Checking the accuracy of data input from the original references and confirm that correct references were used as well as ensuring that no transcription errors exist.
- Checking that parameter and emission units are correctly recorded and that appropriate conversion factors are used and checking as well for consistency if more than one expert used same conversions and factor among various subsectors.
- Checking that the movement of inventory data among processing steps is correct
- Checking that inventory data are archived and stored to facilitate detailed review.

In terms of quality assurance, the national GHG inventory chapter was subjected to an international review which was coordinated by the UNDP-UNEP Global Support Program (CBIT-GSP) and was conducted by Dr. Fernando Farias: chapters Inventory)

The review examined mainly the adherence of the inventory chapter to the requirements indicated in the UNFCCC MPGs, and to the advice of the IPCC Guidelines and Guidance. The outcomes of the review resulted in several direct actions to improve the chapters and an inventory future improvement plan (IIP); described in details in chapter VII.

1.4 Total National Emissions and Removals for years 2023

According to the overall GHG Inventory estimates, Jordan contributed 31039.35 Kton CO2-equivalent (CO_2eq) in 2023. A breakdown of Jordan's total emissions of GHGs by sector indicated that the Energy Sector is the major emitter accounting for around 70% of total national emissions followed by the IPPU Sector with a contribution of around 16%. GHG emissions by sector are shown the following Table 10 and Figure 3.

Table 5: greenhouse gas source and removals (Kton CO2eq), 2023.

GREENHOUSE GAS SOURCE AND REMOVALS (Kton CO2eq)	31,039.35
Energy	23,441.6
Industrial processes and product use	5,440.80
Agriculture	572.62
LULCF	-1,144.77
Waste	2729.1

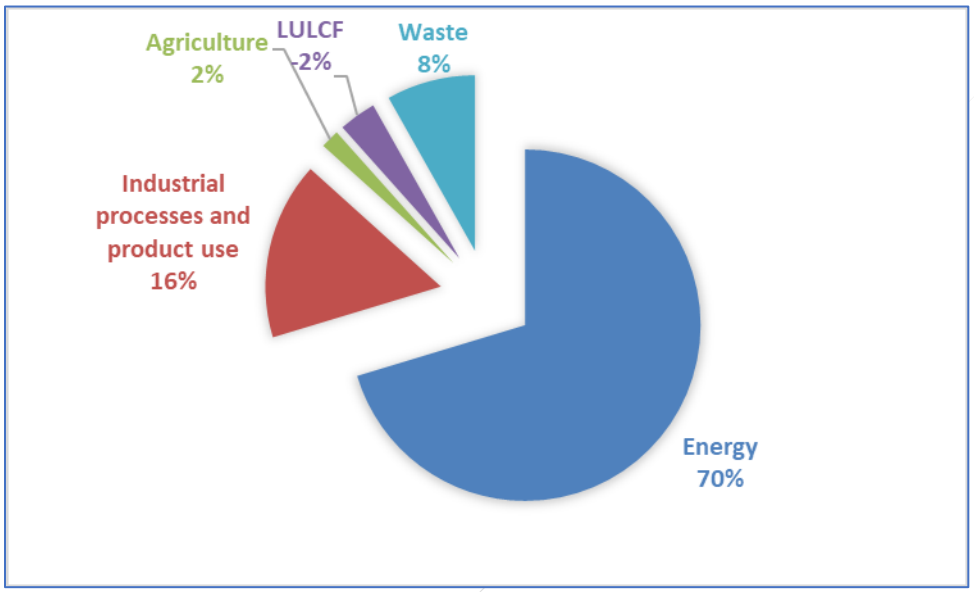

Figure 6: greenhouse gas source and removals, 2023

1.5 Summary Table

Table 6: Summary Table (Inventory Year 2023)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES JOR-CRT-2025-V1.2	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	Total
	CO_2 equivalents (kt) [2]								
Total (net emissions) [1]	**25,177.36**	**3,721.57**	**467.25**	**1,673.12**	**FX**	**FX**	**0.05**	**FX**	**31,039.35**
1. Energy	**22,723.95**	**596.31**	**121.34**						**23,441.60**
1.A. Fuel combustion	22,694.85	86.56	121.29						22,902.69

GREENHOUSE GAS SOURCE AND SINK CATEGORIES JOR-CRT-2025-V1.2	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	Total
	CO_2 equivalents (kt) [2]								
1.A.1. Energy industries	10,714.14	4.73	17.37						10,736.24
1.A.2. Manufacturing industries and construction	1,917.98	2.58	4.00						1,924.56
1.A.3. Transport	7,261.57	56.83	94.55						7,412.95
1.A.4. Other sectors	2,801.15	22.42	5.37						2,828.94
1.A.5. Other	NE,NO	NE, NO	NE,NO						NE,NO
1.B. Fugitive emissions from fuels	29.10	509.75	0.05						538.91
1.B.1. Solid fuels	NE,NO	NE, NO	NE						NE,NO
1.B.2. Oil and natural gas and other emissions from energy production	29.10	509.75	0.05						538.91
1.C. CO_2 transport and storage	NE,NO								NE,NO
2. Industrial processes and product use	**3,559.62**	**NA, NE**	**208.01**	**1,673.12**	**FX**	**FX**	**0.05**	**FX**	**5,440.80**
2.A. Mineral industry	2,858.76	NE	NE						2,858.76
2.B. Chemical industry	NE	NE	192.49	NE, NO	FX	FX	NE	FX	192.49
2.C. Metal industry	681.52	NE	NE	NE, NO	FX	FX	NE	FX	681.52
2.D. Non-energy products from fuels and solvent use	19.34	NA, NE	NA,NE						19.34
2.E. Electronic Industry			NA,NE	NE, NO	FX	FX	NE	FX	FX,NA,NE, NO
2.F. Product uses as ODS substitutes				1,673.12	FX	FX		FX	1,673.12
2.G. Other product manufacture and use	NE	NE	15.52	NO	FX	FX	0.05	FX	15.56
2.H. Other	NE	NE	NE	NO	FX	FX	NE,NO	FX	FX,NE,NO
3. Agriculture	**12.41**	**560.11**	**0.10**						**572.62**
3.A. Enteric fermentation		543.24							543.24
3.B. Manure management		16.87	0.01						16.88
3.C. Rice cultivation		NE							NE
3.D. Agricultural soils		NA	0.09						0.09

GREENHOUSE GAS SOURCE AND SINK CATEGORIES JOR-CRT-2025-V1.2	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	Total
	CO_2 equivalents (kt) [2]								
3.E. Prescribed burning of savannahs		NO	NO						NO
3.F. Field burning of agricultural residues		NE	NE						NE
3.G. Liming	NE								NE
3.H. Urea application	12.41								12.41
3.I. Other carbon-containing fertilizers	NE								NE
3.J. Other	NO	NE	NE						NE,NO
4. Land use, land-use change and forestry [1]	**-1,144.77**	**NA,NE,NO**	**IE,NA,NE,NO**						**-1,144.77**
4.A. Forest land	34.09	NE	NA,NE						34.09
4.B. Cropland	-170.46	NE	IE,NA,NE						-170.46
4.C. Grassland	NA,NE	NE	IE,NA,NE						IE,NA,NE
4.D. Wetlands	IE,NA,NE	NA,NE	NA,NE						IE,NA,NE
4.E. Settlements	-1,008.41	NE	NA,NE						-1,008.41
4.F. Other land	NA,NE,NO	NA,NE,NO	NA,NE,NO						NA,NE,NO
4.G. Harvested wood products	NE,NO								NE,NO
4.H. Other	NO	NO	NA,NO						NA,NO
5. Waste	**26.15**	**2,565.15**	**137.80**						**2,729.10**
5.A. Solid waste disposal		2,528.82							2,528.82
5.B. Biological treatment of solid waste		0.05	0.03						0.08
5.C. Incineration and open burning of waste	26.15	17.35	2.21						45.71
5.D. Waste water treatment and discharge		18.93	135.57						154.50
5.E. Other	NA,NO	NO	NO						NA,NO
6. Other *(as specified in summary 1)*	**NE**	**NE**	**NE**	**NE**	**FX**	**FX**	**NE**	**FX**	**FX,NE**

Memo items: [3]									
1.D.1. International bunkers	970.42	0.19	7.19						977.80
1.D.1.a. Aviation	970.42	0.19	7.19						977.80

GREENHOUSE GAS SOURCE AND SINK CATEGORIES JOR-CRT-2025-V1.2	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	Total
	CO_2 equivalents (kt) [2]								
1.D.1.b. Navigation	NE,NO	NE, NO	NE,NO						NE,NO
1.D.2. Multilateral operations	NE	NE	NE						NE
1.D.3. CO_2 emissions from biomass	166.54								166.54
1.D.4. CO_2 captured	NE								NE
5.F.1. Long-term storage of C in waste disposal sites	13,647.56								13,647.56
Indirect N_2O			NE						

Indirect CO_2 [4]	NE	

	Total CO_2 equivalent emissions without LULUCF	**32,184.12**
	Total CO_2 equivalent emissions with LULUCF	**31,039.35**
	Total CO_2 equivalent emissions, including indirect CO_2, without LULUCF	**32,184.12**
	Total CO_2 equivalent emissions, including indirect CO_2, with LULUCF	**31,039.35**

1.5.1 Energy Sector

Jordan has limited energy resources, leaving the country heavily dependent on energy imports to meet a growing demand.

Moreover, rapid economic growth, population growth, and the successive influx of refugees over the last decade have all imposed additional demands on energy resources. The costs of energy imports have increased as has the risk of interruptions in energy supplies. This has spurred governmental action to improve energy efficiency and search for additional energy resources.

Jordan imports 93% of its oil and gas, accounting for 10-15% of the annual gross domestic product (GDP). This has made the country economy vulnerable to fluctuations in the global energy market. The current energy strategy is to transform the energy mix from one heavily reliant on oil and natural gas to one more balanced with a higher proportion of energy supplied by renewable sources.

Energy-related activities have a dominant share of GHG emissions in Jordan. Emissions from this sector are classified into two main categories:

- Emissions from fuel combustion with highest shares for electricity generation and Road Transport, and
- Non-combustion (fugitive) emissions.

1.5.2 IPPU Sector

The industrial sector in Jordan is considered one of the main pillars for the Jordanian economy. The industrial sector contributed directly to about 25-28% to the national GDP between 2020-2023 to become the second-largest economic sector after the services sector. The sector has also contributed directly and indirectly for 40% of GDP through linkages with other key sectors such as transport, insurance, and trade.

The industrial sector consists of two subsectors, manufacturing and mining. The manufacturing (converting) subsector includes chemicals, electrical, engineering and construction, food and beverages, glass and ceramic, tobacco and cigarettes, paper and cartoon, pharmaceuticals and medical, printing and packaging, and textile and leathers. The mining subsector includes phosphate, potash, salt, carbonate, lime and limestone, fertilizers, cement and construction materials. Mineral extraction from mines and quarries is also included.

1.5.3 Agriculture and Land Use Sector

Jordan is located about 100 km from the south-eastern coast of the Mediterranean Sea. It has a land area of about 89 200 km^2 and is rated among the world's most water poor countries.

Natural ecosystems in Jordan support human activities in agriculture, forestry, animal husbandry, tourism, traditional and pharmaceutical health products, and traditional medicine, among others. According to the Ministry of Agriculture reports, less than 5% of the country's total area is arable land while grazing land makes up 90% with 100–200 mm of annual rainfall. Natural and human-made forests cover around 1% of the country's total area. The number of farm holdings is 80,000, at an average area of 40 dunum per holding (56,000 are plant production holdings and 14,000 are animal production holdings). Plant production holdings are mostly field crops, olives, fruit trees, and vegetables.

The contribution of agriculture to GDP in relative terms declined sharply from 40% in the 1950s to 3% in 2022. Irrespective of how humble the contribution of agriculture is to national GDP and

economic performance, farming remains important. The importance of agriculture stems from the fact that it is not only a major source of food, in particular dairy products, fruits, and vegetables, but it is also a source of livelihood for 25% of the total poor population (livestock keepers, smallholder farm households, and landless former agriculturalists) living in rural areas.

Methodology used for Estimation of Emissions of Land (3-B)

Land Use (LU) data for Jordan were extracted for the years 2004, 2014, 2016, 2019, and 2024, following the IPCC 2006 guidelines. Satellite imagery was obtained from both the United States Geological Survey (USGS) Earth Explorer platform and Google Earth Engine (GEE). Landsat 5TM imageries were used for 2004, while Landsat 8 OLI imageries were used for 2014, 2016, 2019, and 2024. For each year, 11 images were selected to ensure complete coverage of Jordan, and two seasons were selected for each year (fall and spring) to capture seasonal variability and improve differentiation between LU classes, particularly cropland and grassland. All imagery underwent pre-processing using ERDAS IMAGINE and GIS tools. The pre-processing steps included georeferencing correction, band composition, mosaicking, clipping to Jordan's borders, and merging seasonal datasets. LU classification was conducted using a supervised classification approach. Training samples for each land use class were selected through visual interpretation and reference datasets. The classification followed the six IPCC (2006) categories: ***Settlement, Cropland, Grassland, Forestland, Wetlands, and Other land***. To improve classification accuracy, both fall and spring images were analyzed, with the spring datasets used for the final LU extraction due to clearer vegetation signatures. Post-classification refinement was performed using the Reclassify tool to correct inconsistencies. All datasets were processed using the UTM Zone 37N coordinate system to ensure spatial consistency and positional accuracy.

For the years 2013, 2015, 2017, and 2018, splicing techniques were used to estimate LU data in accordance with the IPCC 2006 guidelines. For 2015, 2017, and 2018, the interpolation method was applied to estimate LU based on the classified years 2014, 2016, and 2019.

For 2013, the extrapolation method was employed to estimate cropland, settlement, and forest classes, as these categories demonstrated consistent trends across multiple years. In contrast, grassland and wetland areas were calculated using a surrogate data approach based on rainfall data between 2013 and 2014. Whereas the other land category was determined by subtracting the total area of the remaining LU categories from the total area of Jordan, ensuring that the national land area balance was maintained.

The following table shows the final LU results by year (area in Hectares):

Table 7: The Final LU results by year (area in Hectares)

Year / Class	Cropland	Forest	Grassland	Other land	Settlement	Wetlands
2003	113,035.8	67,151.2	390,333.5	8,253,477.2	52,809.8	8,193.8
2013	139,643.0	65,570.0	225,565.3	8,390,842.2	58,884.0	4,495.0
2014	143,761.0	65,501.3	200,786.5	8,405,524.1	65,425.5	4,001.2
2015	147,879.2	65,432.1	163,371.3	8,428,730.8	71,968.1	7,618.0
2016	151,997.4	65,362.9	125,956.2	8,451,937.5	78,510.7	11,234.8
2017	147,779.1	64,494.3	129,701.5	8,451,518.5	82,673.2	8,832.9
2018	143,560.8	63,625.6	133,446.7	8,451,099.6	86,835.7	6,431.0
2019	139,342.5	62,757.0	137,192.0	8,450,680.6	90,998.2	4,029.2
2023	106,100.8	61,290.5	334,857.5	8,214,148.6	162,818.0	5,784.6

1.5.4 Waste Sector

Solid waste management (SWM) in Jordan is a complex sector due to the wide variety of solid waste types and the involvement of different entities. The main responsible entities are the Ministry of Local Affairs, the Ministry of Environment, Greater Amman Municipality, and the Special Economic Zones of Aqaba and Petra.

Solid Waste Management is a major challenge in urban and rural areas, the concern for safe and effective SWM has been steadily increasing in Jordan, due to the political, demographic and economic conditions as well as the large numbers of refugees. The Kingdom lacks integrated practices for the collection, transportation, transfer, treatment, and disposal of MSW. While the existing municipal solid waste collection system is considered to be adequate in urban centers, services tend to be poor or non-existent in small towns and rural areas. Municipal and industrial solid waste is primarily dumped at landfills. At present, there are 18 official dumpsites in Jordan, most of which are not properly designed or operated, demonstrated by their lack of proper lining, leachate collection system, or LFG (landfill gas) management system. Al-Ghabawi is the only sanitary landfill in Jordan.

In terms of wastewater management, Jordan operated its first sewage collection system in Amman in the late 1960s. The system was meant to collect wastewater and dispose of it either in liquid dumps or randomly in Wadis. The system had adverse impacts on water resources and the environment, leading to the construction of the first wastewater treatment plant in Jordan at Ain Gazal in 1968. The government has since expanded the construction of wastewater treatment plants to increase coverage across Jordan. The country has 33 public working wastewater treatment plants that are either operated by the Water Authority of Jordan (WAJ) or

controlled by the Project Management Unit (PMU) at the Ministry of Water and Irrigation. Samra Wastewater Treatment Plant (WWTP) receives more than 70% of wastewater diverted to WWTPs while Mansourah WWTP for septic tanks receives around 0.005% of the total wastewater discharged in 2012. The Jordan water strategy 2016-2025 considered treated wastewater as a source of water to replace part of good quality water for agricultural purposes.

1.6 Reference Approach

The Reference Approach and the Sectoral Approach often yield different results because the Reference Approach is a top-down approach using the country's energy supply data and has no detailed information on how the individual fuels are used in each sector. This approach provides estimates of CO_2 to compare with estimates derived using a Sectoral Approach. The Reference Approach provides an upper bound to the Sectoral Approach '1A Fuel Combustion', because some of the carbon in the fuel is not combusted but is released as fugitive emissions (as leakage or evaporation in the production and/or transformation stage). Calculating CO_2 emissions with the two approaches can lead to different results for some countries.

The Reference Approach was used to calculate energy sector emissions in 2023 and the results were compared to those of the Sectoral Approach. The gap between the two approaches should be relatively small (5% or less). For Jordan, the calculated differences were acceptable; 1%, as indicated in the following Table.

Table 8: Reference approach vs sectoral approach for the year 2023

Year	Reference Approach	Sectoral	Difference
	CO_2 Emissions (Gg)		%
2023	22817.60	22694.85	1

NID – JORDAN'S BTR1 (2023): DETAILED REPORT
TOTAL NATIONAL EMISSIONS AND REMOVAL

Table 9: NID – Jordan's Btr1 (2023): Detailed Report Total National Emissions and Removal

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	Total
	CO_2 equivalents (kt) [2]								
Total (net emissions) [1]	**24,635.03**	**3,742.09**	**450.75**	**1,985.52**	**FX,NA,NE,NO**	**FX,NA,NE,NO**	**0.05**	**FX,NE,NO**	**30,813.44**
1. Energy	**22,184.41**	**595.80**	**120.45**						**22,900.66**
1.A. Fuel combustion	22,155.31	86.05	120.40						22,361.76
1.A.1. Energy industries	10,174.61	4.22	16.48						10,195.31
1.A.2. Manufacturing industries and construction	1,917.98	2.58	4.00						1,924.56
1.A.3. Transport	7,261.57	56.83	94.55						7,412.95
1.A.4. Other sectors	2,801.15	22.42	5.37						2,828.94
1.A.5. Other	NO	NO	NO						NO
1.B. Fugitive emissions from fuels	29.10	509.75	0.05						538.91
1.B.1. Solid fuels	NO	NO	NE						NE, NO
1.B.2. Oil and natural gas and other emissions from energy production	29.10	509.75	0.05						538.91
1.C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	**3,556.83**	**NO**	**192.49**	**1,985.52**	**FX,NA,NE,NO**	**FX,NE,NO**	**0.05**	**FX,NE,NO**	**5,734.89**
2.A. Mineral industry	2,858.76	NO	NO						2,858.76
2.B. Chemical industry	NO	NO	192.49	NO	FX,NO	FX,NO	NO	FX,NO	192.49
2.C. Metal industry	678.73	NO	NO	NO	FX,NO	FX,NO	NO	FX,NO	678.73

2.D. Non-energy products from fuels and solvent use	19.34	NO	NO						19.34
2.E. Electronic Industry			NO	NO	FX,NO	NO	NO	FX,NO	FX,NO
2.F. Product uses as ODS substitutes				1,985.52	FX,NE,NO	NE,NO		FX	1,985.52
2.G. Other product manufacture and use	NO	NO	NO	NO	FX,NA,NE,NO	NE,NO	0.05	FX,NE,NO	0.05
2.H. Other	NO	NO	NO	NO	FX	NE,NO	NE,NO	NE,NO	FX,NE,NO
3. Agriculture	**12.41**	**554.20**	**0.01**						**566.62**
3.A. Enteric fermentation		537.37							537.37
3.B. Manure management		16.84	0.01						16.85
3.C. Rice cultivation		NE							NE
3.D. Agricultural soils		NA	0.00						0.00
3.E. Prescribed burning of savannahs		NO	NO						NO
3.F. Field burning of agricultural residues		NE	NE						NE
3.G. Liming	NE								NE
3.H. Urea application	12.41								12.41
3.I. Other carbon-containing fertilizers	NE								NE
3.J. Other	NO	NE	NE						NE,NO
4. Land use, land-use change and forestry (1)	**-1,144.77**	**NA,NE,NO**	**IE,NA,NE,NO**						**-1,144.77**
4.A. Forest land	34.09	NE	NA,NE						34.09
4.B. Cropland	-170.46	NE	IE,NA,NE						-170.46
4.C. Grassland	NA,NE	NE	IE,NA,NE						IE,NA,NE
4.D. Wetlands	IE,NA,NE	NA,NE	NA,NE						IE,NA,NE
4.E. Settlements	-1,008.41	NE	NA,NE						-1,008.41
4.F. Other land	NA,NE,NO	NA,NE,NO	NA,NE,NO						NA,NE,NO
4.G. Harvested wood products	NE,NO								NE,NO
4.H. Other	NO	NO	NA,NO						NA,NO
5. Waste	**26.15**	**2,592.08**	**137.80**						**2,756.04**
5.A. Solid waste disposal		2,528.82							2,528.82
5.B. Biological treatment of solid waste		0.05	0.03						0.08

5.C. Incineration and open burning of waste	26.15	17.35	2.21						45.71
5.D. Waste water treatment and discharge		45.86	135.57						181.43
5.E. Other	NA,NO	NO	NO						NA, NO
6. Other *(as specified in summary 1)*	**NE**	**NE**	**NE**	**NE**	**NE**	**NA**	**NE**	**NE**	**NA, NE**

Memo items: [3]									
1.D.1. International bunkers	970.42	0.19	7.19						977.80
1.D.1.a. Aviation	970.42	0.19	7.19						977.80
1.D.1.b. Navigation	NO	NO	NO						NO
1.D.2. Multilateral operations	NO	NO	NO						NO
1.D.3. CO_2 emissions from biomass	166.54								166.54
1.D.4. CO_2 captured	NE								NE
5.F.1. Long-term storage of C in waste disposal sites	13,647.56								13,647.56
Indirect N_2O			NE						

Indirect CO_2 [4]	NE								

	Total CO_2 equivalent emissions without LULUCF	**31,958.22**
	Total CO_2 equivalent emissions with LULUCF	**30,813.44**
	Total CO_2 equivalent emissions, including indirect CO_2, without LULUCF	**31,958.22**
	Total CO_2 equivalent emissions, including indirect CO_2, with LULUCF	**30,813.44**

Precursors (2023)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	**NO_x**	**CO**	**NMVOC**	**SO_x**
	Kt			
Total national emissions and removals	**33.52**	**119.76**	**45.97**	**7.17**
1. Energy	**33.52**	**119.76**	**21.07**	**7.17**

1.A. Fuel combustion	33.52	119.76	15.04	7.17
1.A.1. Energy industries	NE	NE	NE	NE
1.A.2. Manufacturing industries and construction	NE	NE	NE	NE
1.A.3. Transport	33.52	119.76	15.04	7.17
1.A.4. Other sectors	NE	NE	NE	NE
1.A.5. Other	NE	NE	NE	NE
1.B. Fugitive emissions from fuels	NE	NE	6.03	NE
1.B.1. Solid fuels	NE	NE	NE	NE
1.B.2. Oil and natural gas and other emissions from energy production	NE	NE	6.03	NE
1.C. CO_2 Transport and storage				
2. Industrial processes and product use	**NE**	**NE**	**24.90**	**NE**
2.A. Mineral industry	NE	NE	NE	NE
2.B. Chemical industry	NE	NE	NE	NE
2.C. Metal industry	NE	NE	NE	NE
2.D. Non-energy products from fuels and solvent use	NE	NE	21.03	NE
2.E. Electronic industry				
2.F. Product uses as substitutes for ODS				
2.G. Other product manufacture and use	NE	NE	NE	NE
2.H. Other [4]	NE	NE	3.87	NE
3. Agriculture	**NA,NE**	**NA,NE**	**IE,NA,NE**	**NE**
3.A. Enteric fermentation				
3.B. Manure management			IE,NE	
3.C. Rice cultivation			NE	
3.D. Agricultural soils	NA	NA	NA	
3.E. Prescribed burning of savannahs	NE	NE	NE	NE
3.F. Field burning of agricultural residues	NE	NE	NE	NE
3.G. Liming				
3.H. Urea application				
3.I. Other carbon-containing fertilizers				
3.J. Other	NE	NE	NE	NE
4. Land use, land-use change and forestry [5]	**NA,NE**	**NA,NE**	**NA,NE**	**NA**
4.A. Forest land [5]	NE	NE	**NE**	

4.B. Cropland [5]	NE	NE	NE	
4.C. Grassland [5]	NE	NE	NE	
4.D. Wetlands [5]	NE	NE	NE	
4.E. Settlements [5]	NE	NE	NE	
4.F. Other land [5]	NE	NE	NE	
4.G. Harvested wood products [5]				
4.H. Other [5]	NA,NE	NA,NE	NA,NE	NA
5. Waste	**IE,NE,NO**	**IE,NE,NO**	**IE,NE,NO**	**IE,NE,NO**
5.A. Solid waste disposal [6]	**NE**	**NE**	**NE**	
5.B. Biological treatment of solid waste	NE	NE	NE	
5.C. Incineration and open burning of waste [6]	NE	NE	NE	NE
5.D. Wastewater treatment and discharge	NE,NO	NE,NO	NE,NO	
5.E. Other [6]	IE,NO	IE,NO	IE,NO	IE,NO
6. Other *(please specify)* [7]	**NE**	**NE**	**NE**	

1.7 Key Category Analysis (2023)

The analysis was carried out based on IPCC 2006 Guidelines and Software. Jordan used "level" key category analysis where the contribution of each source or sink category to the total national inventory level was calculated. The Key categories according to the guidelines are those that, when summed together in descending order of magnitude, add up to 95% of the sum of all level assessment.

In categories that are identified as key, Parties should try to use a recommended method, in accordance with the corresponding decision tree in the 2006 IPCC Guidelines. It is recommended that Jordan searches for alternatives to gradually apply in future inventory submissions, to the extent possible and based on software readiness and national circumstances, Tier 2 methods in the categories identified as key.

As shown in the table 12 below for the year 2023, the key category analysis resulted in thirteen subcategories; the top three Energy subsectors accounting for around half of the total emissions, were:

- Energy Sector/Fuel Combustion Activities subcategories: Road Transportation (Liquid Fuels), and;
- Energy Sector /Energy Industries (Gaseous Fuels)), and;
- Energy Sector /Energy Industries – (Solid Fuels).

Table 10: The key category analysis results for the year 2023

IPCC Category code	IPCC Category	Greenhouse gas	2023 Emissions (Gg CO2 Eq)	2023 Emissions level for the given category	Cumulative Total of Column F
1.A.3.b	Road Transportation - Liquid Fuels	CARBON DIOXIDE (CO2)	7249.46	21%	**21%**
1.A.1	Energy Industries - Gaseous Fuels	CARBON DIOXIDE (CO2)	6575.38	19%	**41%**
1.A.1	Energy Industries - Solid Fuels	CARBON DIOXIDE (CO2)	3598.69	11%	**51%**
1.A.4	Other Sectors - Liquid Fuels	CARBON DIOXIDE (CO2)	2801.15	8%	**59%**
2.A.1	Cement production	CARBON DIOXIDE (CO2)	2627.80	8%	**67%**
4.A	Solid Waste Disposal	METHANE (CH4)	2528.82	7%	**75%**
2.F.1	Refrigeration and Air Conditioning	HFCs, PFCs	1960.35	6%	**80%**
3.B.5.a	Settlements Remaining Settlements	CARBON DIOXIDE (CO2)	-1008.41	3%	**83%**
1.A.2	Manufacturing Industries and Construction - Liquid Fuels	CARBON DIOXIDE (CO2)	939.68	3%	**86%**
3.A.1	Enteric Fermentation	METHANE (CH4)	733.39	2%	**88%**
2.C.1	Iron and Steel Production	CARBON DIOXIDE (CO2)	678.73	2%	**90%**

IPCC Category code	IPCC Category	Greenhouse gas	2023 Emissions (Gg CO2 Eq)	2023 Emissions level for the given category	Cumulative Total of Column F
1.A.2	Manufacturing Industries and Construction - Gaseous Fuels	CARBON DIOXIDE (CO2)	540.42	2%	**92%**
1.A.1	Energy Industries - Liquid Fuels	CARBON DIOXIDE (CO2)	540.07	2%	**93%**
1.B.2.b	Natural Gas	METHANE (CH4)	505.99	1%	**95%**

1.8 Time Series Trends (2012-2023)

The time series analysis of Jordan's total greenhouse gas (GHG) emissions from 2012 to 2023 demonstrates a general upward trend, reflecting both economic growth and increased energy demand, coupled with gradual progress in mitigation actions. Total emissions rose from approximately 26,700 kt CO_2-eq in 2012 to over 31,000 kt CO_2-eq in 2023, marking an overall increase of about 16% across the period.

The CO_2 component consistently dominates national emissions, representing more than 80% of total CO_2-equivalents, primarily driven by the energy and transport sectors. Over time, CO_2 emissions increased steadily, from around 23,400 kt in 2012 to 25,177 kt in 2023, due to rising fossil fuel consumption in electricity generation and transport, despite parallel renewable energy expansion.

Methane (CH_4) emissions showed moderate fluctuations—rising from 2,383 kt in 2012 to 3,721 kt in 2023—mainly linked to the waste and agriculture sectors. The gradual increase correlates with higher solid waste generation and wastewater treatment outputs associated with population growth.

Nitrous oxide (N_2O) emissions remained comparatively minor but stable, ranging between 370–500 kt CO_2-eq, largely originating from agricultural activities and fertilizer application.

Overall, while emissions continue to grow moderately, the rate of increase has slowed in recent years, reflecting early results of renewable energy integration, improved energy efficiency, and waste management initiatives. These trends indicate the importance of sustained implementation of mitigation measures under Jordan's NDC commitments to reverse the growth trajectory in the coming decade.

Table 11: Total GHG Emissions and Trends in Jordan (kt CO_2e), 2012–2023

YEARS	GREENHOUSE GAS SOURCE AND SINKS			
	CO_2 equivalents (kt)			
	CO_2	CH_4	N_2O	Total
2023	25,177.36	3,721.57	467.25	31,039.35
2022	24,387.68	3,658.00	503.51	30,250.86
2021	22,247.65	3,538.20	484.19	27,979.98
2020	20,976.45	3,445.23	500.04	26,462.01
2019	22,582.45	3,370.84	463.33	27,858.61
2018	24,453.67	3,481.04	478.36	29,780.81
2017	27,629.74	3,509.28	506.12	32,938.02
2016	25,846.43	3,450.21	469.20	30,824.71
2015	26,218.77	2,928.72	474.43	30,528.71
2014	26,556.01	2,517.98	434.68	30,307.69
2013	24,765.10	2,450.09	369.71	28,301.89
2012	23,387.44	2,383.27	372.08	26,712.72

1.9 Gaps and GHG Inventories Improvement Plan

Several actions were identified during previous reporting. The improvements are listed below and are rated according to urgency as; immediate, short term and long-term actions:

- The activity data used in the estimate, especially in the subcategories identified as key or significant, should be improved as much as possible, in order to use tier 2. Also, actions to improve data, methods, EF and other estimation parameters (OEP) should be prioritized in key categories to use tier 2 (especially in the subcategory 2F1a, 4A Solid Waste Disposal, 3A1c Sheep and 3B Land). **(short term and long term**)

- The completeness of the inventory should be improved by: **(short term to long term**)

    - Improving the estimation and reporting of precursor gas emissions in future inventory submissions (activity data and EF are mostly available).
    - Incorporating among the precursor gases, the estimation of NH_3 emissions. This would make it possible to calculate in category 5A the indirect N_2O Emissions derived from the atmospheric deposition of Nitrogen from non - agriculture sources.
    - The precursor gas emissions of these subcategories from the second order subcategories 1.A.3.a.i - International aviation and 1.A.3.d.i - International water-borne navigation (international bunkers) should be estimated and should be reported; using the notation key NE (not-estimated) in the reporting tables, as necessary.

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

2.1 Overview of the NDC Process in Jordan

Jordan's updated the submission of its first Nationally Determined Contribution (NDC) outlining the country's commitments to climate action, focusing on greenhouse gas (GHG) emissions reduction by raising the reduction target from 14% in the 1st NDC to 31% in this current updated NDC. Also, the document provided focus on adaptation strategies that are directly linked to the launched National Adaptation Plan (NAP).

The updated NDC also provided a guide for Jordan's post-COVID-19 recovery toward a low-carbon and climate-resilient pathway while setting the stage for a future Climate Change Long-Term Strategy (LTS).

Observed Improvements at the National Level in terms of climate action from 2015-2021

- Jordan’s experience and knowledge in climate change were strengthened.
- The human and institutional capacities are strengthened and the Ministry of Environment in leading the process of reporting to the UNFCCC including the NDC planning.
- Climate Change Bylaw was issued in 2019, which is the legal framework that identifies the mandate of the NCCC, the institutional arrangement including, the roles and responsibilities of the national agencies (ministries, academia, private sector, NGOs).
- More knowledge related to climate finance was gained through the Readiness program with the GCF.
- Jordan witnessed mainstreaming of climate- related objectives in various the sectoral planning.
- The Green Growth plan, and sectoral Action Plans were completed
- The GAM’s Action Plans are in place (Amman Resilience plan, Amman Climate Plan. A vision for 2050, Amman Green City).
- Second Biennial Update Report was submitted in 2020.
- National Adaptation Plan (NAP).

Key remaining challenges

- Enforcement and strengthening the Climate Change Bylaw implementation through putting in place a Stakeholder Consultation Mechanism for NDC development and implementation

- Data sharing and inter-ministerial cooperation and the quality of the data, and the enabling environment
- There is no NDC implementation tracking procedure

2.2 Legal and Institutional Assessment of NDC Implementation Readiness

Within this section, the legal and institutional readiness are analysed to assess the level of implementation of the NDC. Existing laws, regulations, development plans, existing instruments for policy, planning and reporting vehicles, NDC related finance flows, institutional framework, and investment plans were checked and visited.

The institutional framework for climate governance in Jordan is designed to ensure that climate action is integrated across sectors, with strong coordination among government ministries, local authorities, the private sector, and civil society. Climate Change Governance in Jordan is characterized by a combination of institutional, legal, and policy frameworks aimed at addressing both the causes and impacts of climate change through coordinated efforts across national and local levels. Jordan's climate governance approach is driven by national priorities, international obligations (such as the Paris Agreement), and an increasing recognition of climate change as a critical challenge to sustainable development.

The Ministry of Environment is the primary governmental body responsible for climate change policy, planning, and implementation in Jordan. It is tasked with coordinating climate action across the government and other sectors and plays a leading role in fulfilling international climate commitments, including those related to Jordan's Nationally Determined Contributions (NDCs).

A specialized unit within the Ministry- Climate Change Directorate- is responsible for overseeing climate policy development, preparing reports on climate mitigation and adaptation strategies, and monitoring Jordan's progress in meeting its climate targets.

Multiple ministries and agencies are involved in its governance through the National Climate Change Committee (NCCC). The NCCC is a multi-stakeholder committee composed of representatives from key government ministries, such as water, energy, agriculture, planning, and industry. The NCCC is tasked with providing advice, strategic guidance, and oversight for climate-related policies and activities in Jordan. It also plays a role in monitoring the implementation of the National Adaptation Plan (NAP) and the NDC. Moreover, the Ministry of Planning and International Cooperation (MoPIC) plays a critical role as it oversees the integration of climate action into development planning and coordinates with international donors and funding bodies to access climate finance.

Also, the private sector, including businesses, financial institutions, and technology providers, plays an important role in driving green innovation and investment in renewable energy, energy

efficiency, and sustainable practices. Civil society organizations and advocacy groups are involved in raising public awareness, mobilizing communities, and pushing for inclusive and equitable climate policies.

Jordan has developed a set of legal instruments and policies to institutionalize climate governance and guide climate action at all levels. The New Environmental Protection Law- issued in 2017, this law is a key legal framework that regulates environmental protection, pollution control, and sustainable use of natural resources in Jordan. It provides the foundation for climate change policies related to air quality, waste management, and ecosystem conservation. Climate Change Bylaw No. 79 of 2019 is a landmark regulation that provides a legal basis for Jordan's climate actions. It mandates the creation of institutional structures, sets out guidelines for climate finance, establishes the monitoring and reporting framework, and requires sectoral plans for both mitigation and adaptation.

The National Climate Change Policy (2022-2050) was updated in 2022 marks a critical update in Jordan's climate governance, shifting towards a more integrated, sectoral, and long-term approach to climate action. By addressing both mitigation and adaptation, with a focus on sustainable development, climate resilience, and low-carbon growth, the policy aims to position Jordan as a leader in climate action in the Middle East and North Africa (MENA) region. Its success will depend on effective implementation, the mobilization of sufficient resources, and the active involvement of all stakeholders in achieving these ambitious climate goals.

Gaps and Opportunities

- High level support: available involvement at the decision-making level through National Climate Change Committee (16 SGs as members and chaired by the Minister of the MoEnv)
- Legal Framework: Jordan issued its Climate Change Bylaw No. 79 of 2019 which establishes a comprehensive legal framework to guide the country's climate actions in line with its NDC and the Paris Agreement. The bylaw strengthens Jordan's ability to reduce emissions, adapt to climate impacts, and enhance resilience across sectors. This bylaw represents a significant step toward sustainable development and positions Jordan as a regional leader in climate governance.
- Stakeholder and public engagement need to be strengthened.
    - Engage municipalities, communities, interest groups, and the public at large can generate greater awareness and potentially create buy-in from constituencies that support the long-term plan's implementation.
    - Identify vulnerable groups and involve them in the upcoming NDC 3.0 development.

2.3 Narrative Overview of the NDC Document

Jordan's updated NDC contained components related to: National circumstances, GHG mitigation, adaptation measures, financial support and technology transfer, capacity building needs and issues related to transparency. The following paragraphs summarize the key sections.

GHG Emission Reduction Target

Jordan believes that the ambitious NDC's target of 31% of GHG emission reduction will contribute effectively to the country's development while mitigating the GHG emissions if the necessary financial support and other means of implementation made available to the country. The estimated cost of mitigation actions to reach 31% target is totalling USD billion 7.54 from which the government plans to secure USD Million 565 by its own means to meet the unconditional target. Jordan committed to reduce the GHGs emissions by 5% by 2030 unconditionally, and by 26% conditionally subject to the availability of international financial support.

Jordan's participation in cooperative approaches under Article 6 of the Paris Agreement is evolving, with growing interest in leveraging international climate finance and carbon markets to achieve its Nationally Determined Contributions (NDCs). Here's an overview of Jordan's position and involvement in cooperative approaches:

Jordan's interest in Carbon Markets and Bilateral Cooperation
Jordan has expressed interest in participating in Article 6.2 mechanisms, especially those involving carbon markets, to attract climate finance and investment into renewable energy, waste management, and water efficiency sectors.

Jordan's updated NDC (2021) explicitly mentions exploring market and non-market approaches, showing openness to: carbon pricing instruments, results-based finance, Non-market approaches under Article 6.8 that support capacity building, technology transfer, and adaptation.

Finalizing the Article 6 framework and national registry is still underway and the capacity gap should be dealt with.

Opportunities for Jordan

- Attracting international finance for low-carbon infrastructure.
- Strengthening public-private partnerships for climate mitigation.
- Positioning Jordan as a regional leader in Article 6 implementation in MENA.

Adaptation Interventions

The following provides a brief summary of key strategic objectives for increasing adaptive capacity and resilience to climate change impacts in Jordan that should be implemented using national and international resources:

- **Water Resource Management:** Water is the defining sector for adaptation to climate change in Jordan. Being one of the world's most water scarce countries, the multiplier impact of climate change will only add to the complexity of the water demand management challenges Jordan has been facing and will continue to face. NDC has listed strategic objectives as follows: (1) Integrating Climate adaptation and resilience in policy and institutional reforms in the water sector; (2) Improved water demand management and reducing gap between water demand and supply; (3) Improving adaptive capacity of water utilities; (4) Improved efficiency in water use for sustainable development; (5) Improving contribution of non-conventional water resources to the national water budget; (6) Improving rainfall early warning systems and reducing flood risks; & (7) Supporting watershed and basin level management of water resources including transboundary water.
- **Agriculture and Food security**: Jordan is working to increase agricultural resilience by: (1) Integrating Climate resilience in the policy and institutional reforms in agricultural sector; (2) Improving drought management systems; (3) Improving irrigation system efficiency; (4) Shifting to water efficient crops; (5) Supporting hydroponic and other water tolerant agricultural productivity systems; (6) Enhancing productivity of rangeland management; & (7) Improving sustainable productivity of food chains.
- **Biodiversity and Ecosystems**: Ecosystems in Jordan are varied but vulnerable to climate change, the following are strategic approaches for adaptation: (1) Increasing the scope of ecosystem based adaptation and climate-based planning in protected areas and special conservation areas; (2) Using green infrastructure and community participation for ecosystem rehabilitation and restoration; (3) Enhancing the adaptive capacity of ecosystem services against extreme and long term climate change impacts; (4) Improving conservation measures and enforcement for climate threatened species and habitats; (5) Improving conservation measures against emergence and spread of zoonotic infectious diseases; &(6) Improving field research and monitoring of ecosystem vulnerability to climate change.
- **Health**: The main climate related hazards to health sector are represented by temperature and precipitation, NDC mentioned two priority strategic adaptations: (1) Improved understanding of the potential risk on health sector due to climate change; & (2) Enhancing the adaptive capacity of the health sector.

- **Urban Resilience and Disaster Risk Reduction**: Jordan has been affected by many types of climate related disasters (flash floods, landslides, rock falls and droughts) which are becoming more frequent events that cause losses of lives and costs millions of economic losses. The following are priority strategic adaptation: (1) Supporting urban green infrastructure interventions for climate resilience; (2) Improving readiness for climate related disaster risk reduction in urban areas; (3) Enhancing community participation at local urban level for climate change resilience; & (4) Improving building efficiency for adapting to increased heat in urban centers.
- **Coastal Zone Management**: Climate hazards in the Gulf of Aqaba may cause property damage, harm infrastructure, increase disease risk, and lead to economic losses in tourism and fisheries due to biodiversity and ecosystem degradation. The following are priority strategic adaptation: (1) Enhancing the sustainable use of marine protected area for climate change adaptation; (2) Support resilience of coral reefs to climate change impacts; (3) Use of Integrated Coastal Zone Management (ICZM) for enhancing resilience of marine ecosystems; & (4) Improving monitoring capacities for the state of marine ecosystems.
- **Cultural Heritage and Tourism**: Jordan's rich cultural heritage, vital to its economy, faces significant risks from climate change, including damage to archaeological sites, intangible traditions, and ecosystems. The following are two priority strategic adaptations: (1) Enhancing the adaptive capacity of cultural heritage sites and infrastructure; & (2) Integration of climate adaptation measures in the tourism supply chain and infrastructure.
- **Socioeconomic impacts: Climate change disproportionately impacts vulnerable groups,** affecting their access to resources and livelihoods, the following are priority strategic adaptations: (1) Integrating climate resilience in green economic recovery and development plans; (2) Enhancing local adaptive capacity to climate change impacts through local climate action plans; (3) Integrating climate adaptation into national poverty reduction policies; (4) Mobilization of social capital for climate change adaptation; (5) Integration of human rights values and enhancing climate adaptive capacities of vulnerable groups; & (6) Integrating climate change impacts and adaptation into education curricula.

Gender

- The analysis of gender considerations across key climate change documents issued by the Ministry of Environment in Jordan reveals significant gaps and opportunities for integration. The Climate Change Bylaw No. 97, which establishes the regulatory framework for climate action, lacks a focus on gender inclusion, with no standardised

definition or representation of gender-specific institutions in decision-making bodies like the National Climate Change Committee.

- The National Climate Change Policies (2013-2020) included gender in their objectives and actions, emphasising mainstreaming through tools and frameworks, but this emphasis was notably diminished in the updated policy (2022-2050), which grouped women with youth and children, resulting in generalised actions and insufficient gender-focused steps.
- The National Adaptation Plan (NAP) highlights gender mainstreaming as an objective, proposing actions such as gender analyses and the development of gender-sensitive indicators; however, it falls short on actionable steps, capacity-building measures, and detailed implementation frameworks. Jordan's Third and Fourth National Communication plans showed a progression, with the latter including broader gender analyses and recommendations for improving gender participation, though both lacked budget allocations and measurable indicators for gender initiatives.
- The Roadmap for Jordan's Long-Term Low-carbon Strategy (LTS) stands out for its comprehensive integration of gender considerations, offering a clear gender analysis, actionable recommendations, and a dedicated monitoring system to track progress, including a proposed gender task force to oversee implementation. These documents highlight the need for a more consistent and actionable approach to gender mainstreaming across climate policies, with particular attention to capacity building, budgeting, and M&E mechanisms.
- Lastly, the Nationally Determined Contribution (NDC) acknowledges the role of gender inequalities in climate resilience and proposes general actions to support vulnerable groups, yet it does not provide specific plans, budgets, or mechanisms for systematic gender integration. These findings underscore the need for a cohesive, actionable approach to embedding gender considerations across climate policies and frameworks in Jordan.

2.4 Assessment of the NDC Implementation Progress[6]

2.4.1 Business as Usual (BAU) Scenario

The GHG Mitigation analysis and the identified measures within Jordan's first updated NDC follows **IPCC sectors categorization (Energy, industrial processes and product use, agriculture, forestry and land-use, and waste**) and **the target is an economy wide target**.

The Business as Usual (BAU) scenario was developed by using the 2012 GHG inventory as a base year. The 2012 GHG inventory data was compiled according to 2006 IPCC Guidelines and its 2019 Refinement for National Greenhouse Gas Inventories. GWP from AR2 was used.

[6] Detailed CTF tables generated from ETF UNFCCC tool for Tracking NDC implementation Progress can be found in Annex B

The BAU and mitigation scenarios were developed for all sectors using the "Low Emissions Analysis Platform" (LEAP) software.
The covered gases are: CO_2, CH_4, N_2O and the fluorinated greenhouse gases (HFCs). GWP from AR2 was used.
Then the BAU scenario was developed for the period (2012-2030), it considers a future in which no additional measures are implemented (business as usual), resulting in higher energy demands and carbon intensity. It does not consider energy efficiency improvements nor the fuel shift towards natural gas in the residential, commercial, and industrial sectors. Fuel shares are projected based on historical trends, with a constraint of maximum ±1% annual growth.

The main macroeconomic data and figures considered for the baseline scenario were mostly unchanged and they were obtained from official sources – **key updates in the BAU were as follows**:

Economic Growth and GDP

- Economic Growth Rate: The economic growth rate or the Gross Domestic Production (GDP) considered in the baseline scenario was obtained from:

  Actual Years 2019- 2023: Ministry of Planning and International Cooperation (MoPIC) (COVID-19 impact was taken into consideration)

  Projected Years 2024- 2030: Economic Modernization Vision 2022-2033 - Aim to achieve a cumulative GDP growth of 5.5% annually.

- The value-added values for economic sectors was maintained as stated in the "Jordan 2025".
- Jordanian population and non-Jordanian population and the family size, the growth rate for both Jordanian and non-Jordanian were obtained from Department of Statistics-Jordan (2015 Census). BAU scenario considered the medium scenario population projections (DOS, 2016)
- The official discount rate of (8%) was maintained as announced by MoPIC was considered.
- The energy data for historical period were obtained from the Jordan energy balances issued by the Ministry of Energy and Mineral Resources (MEMR) which illustrate the energy flow from supply side, transformation and demand side.
- BAU scenario built on the current Jordan Energy Strategy in terms of energy demands, expansion plan and retirements, energy losses, refinery expansion and EE.

- The energy data for historical period were obtained from the Jordan energy balances issued by the Ministry of Energy and Mineral Resources (MEMR) which illustrate the energy flow from supply side, transformation and demand side.
- Transport sector demand was updated so that it is driven by GDP.
- The historical shares of EVs and hybrid vehicles in the public and private sectors was updated in the model, based on recent data provided by Ministry of Transport (MoT).
- For the baseline projections: Hybrid and EV's assumptions were maintained (a 1% annual increase in hybrids was assumed, and for EVs, a share of 5% in 2025, and then a 1% annual increase).

Table 12: Baseline Scenario Emissions (BAU) (Gg CO_2eq), 2012–2024

Selected YEARS	BASELINE SCENARIO EMISSIONS (BAU)- Updated Emissions
	Gg CO_{2eq}
2012	27,998[7]
2015	33,516
2020	34,955
2024	37,333

2.4.2 Description of indicators

Table 13: Description of Indicators

NDC Targets	To achieve economy-wide emission reduction from the Business as Usual (BAU) scenario.
Target years	The target year for emission % reduction according to the Business as Usual (BAU) scenario is 2030 (Single accumulative year)
Reference points	The reference period is between 2012–2030. The Business as Usual (BAU) projection period is till 2030. The base year is 2012
Time frames for implementation	21 October 2021 – 31 December 2030
Scope and coverage	▪ **Economy-wide.**

[7] Estemated using GWP from IPCC AR2

	▪ **Mitigation policies** cover the energy (Primary, EE and RE), industry, transport, waste, agriculture, and LULUCF sectors. ▪ **Gases** Carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), Sulphur, hexafluoride (SF6) and nitrogen trifluoride (NF3) ▪ **Pools and Reservoirs** AFOLU pools are included in the NDC: living biomass (trees) and Soil carbon reservoir. ** The sectors, gases, categories and pools covered by NDC are based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. It reflects all major anthropogenic GHG emissions and removals as reported in the National GHG Inventory Chapter. ▪ **Adaptation policies** cover the agriculture and forestry, water, disaster risk management, urban, rural development, and public health sectors.

2.4.3 Assessment of the Overall Target Achieved

Within the Updated NDC document submitted in 2021, the 32 mitigation actions analysis outcomes were projected to result in the target of total GHG emission reduction of 31% in 2030 compared to BAU in 2012.

Table 14: Implementation Status of Mitigation Measures under Jordan's Updated NDC (2023–2024)

Measures	Implementation status to 2023/2024[8]
Increased Percentage of Electricity Generated from Renewables (2020, 20% to 2030, 35%) and 9 % Energy efficiency distributed among (residential, services and industry). Implementation through measures listed in the national strategy action plan	28.5 % share of electricity generated from renewables. 0.1 share of EE achieved in
Introduction of concentrated solar power (CSP) of 100 MW and CSP 300 MW	Not valid anymore according to the national strategies of Energy

[8] Meetings were held: MEMR, MoT, GAM, MoA and MoLA (7 Nov to 10 Dec) to collect data.

Measures	**Implementation status to 2023/2024[8]**
Measures in Residential sector: - Natural gas distribution in the main cities (Amman, Zarqa, Aqaba) - Solar water Heaters (SWH) Project FOR 90,000 Houses	Natural Gas: Planned not implemented yet. SWHs- 37,401 achieved
Energy Efficiency Projects in industry:	EE in industry: 12 Industries (MEMR/JREEEF) and 15 (MoEnv/RSS)
185 MW PV for the Aqaba Amman Water Desalination and Conveyance Project (AAWDCP) (50% of the overall needed power demand covered by Wheeling and Net Metering)	Planned to start by 2028
Bus Rapid Transit Project (BRT) as described in Amman GCAP - (2nd phase)	Planned to start by 2027
Electric bus fleet in Amman, Karak, Ma'an and Tafielah	Planned in 2025
Intelligent transport systems (ITS)	Planned in 2025
Promoting Car-hybrid and electric at national level -including 50% of the Public fleet will be EVs- and assuming annual increase in private cars adoption by 2%)	Public Fleet -achieved EVs adoption by Private Owners: 2018-2% 2022- 14% 2023- 18%
Biogas collection and utilization from three domestic solid waste landfills: in Al-Dulail, Al-Salt and Maddaba	Not valid according to new national strategy to be issued in 2025-Waste to energy is not a priority anymore. Focus on four main pillars: private sector engagement, circular economy, governance, and climate change projects (compost, flaring, …)
Biogas generation by utilizing the sludge generated from domestic wastewater treatment plants: in five areas (Ramtha, Madaba, AlSalt, Wadi Arab and Baqa'a)	
Implementing composting units for pre-segregated bio-waste in 4 Areas with a total capacity of 200 tonnes/day	6 unites achieved- with a total of 10,000 tons/ year (the “200 tons” was overestimation)

Measures	Implementation status to 2023/2024[8]
Use of steel slag and/or fly ash to substitute the raw materials needed to produce clinker	No Update- needs validation with cement factories
Increase the percentage of Pozzolana in CEM II	No Update- needs validation with cement factories
Produce new cement product CEM IV with 45% of Pozzolana	No Update- needs validation with cement factories
Use of biomass (MSW or/and Sewage Sludge) as alternative fuels	No Update- needs validation with cement factories
KEMAPCO Project- Reduction of N_2O in Ammonia Production	Planned for 2025
Implementing pilot interventions to scale-up the sustainable use of cooling technologies with climate-friendly gases.	Planned for 2029
Climate smart agriculture	No update
Urban tree Plantations (32500 trees)	Achieved
Rangeland restoration (200,000 dunums)	Achieved 100,000 du
Forest tree Plantations (2,000,000 trees)	Achieved 1,200,000 (3-4 years trees)

As for the overall actual reductions estimated (CO2eq) according to 2024 data obtained formally were as follows:

Table 15: Estimated Actual Cumulative GHG Emission Reductions by Sector and Measure (as of 2024)

Measures	Sector	Cumulative[9] Emission Reduction (Gg CO_2eq)
Increased Percentage of Electricity Generated from Renewables: 28.5% by 2024 (2771 MW total installed capacity)	Energy- RE	8,939
PVs (Schools, Municipalities, Worship places and Health and public places)	Energy- RE	11.59
Solar water Heaters (SWH) Project for 37401 Houses	Energy- RE	148.79
Solar Pumps-Agriculture	Energy- RE	4.64
Energy Efficiency Projects in industry	Energy-EE	1.85
Energy Efficiency Projects in Hotels	Energy-EE	0.66

[9] Discounted (8%) Projected emission for the period (2012-2024)
Grid Emission Factor (0.537 KgCO2e/KWh), Fourth National Communication, 2023

Measures	Sector	Cumulative[9] Emission Reduction (Gg CO_2eq)
Promoting Car-hybrid and electric at national level -including 50% of the Public fleet will be EVs- and assuming annual increase in private cars adoption by 2%)	Energy - Transport	149.79
Implementing composting units for pre-segregated bio-waste in 6 Areas with a total capacity of 10,300 tonnes/year	Solid waste	0.71
Urban tree Plantations (32500 trees)	AFOLU	0.91
Rangeland restoration (10,000 dunums)	AFOLU	0.30
Forest tree Plantations (1,000,000 trees) 3-4 years	AFOLU	10.7
24.8% out of 31% (total accumulated reduction of 9269 Gg CO2e)		9,269

2.4.4 Assessment of Sectoral Targets Achieved

Energy Sector

The reduction achieved within the Energy Sector was mainly from the renewables installed (2771 MW up to Dec. 2024) thus realizing a share of 28.5% of our national electricity generated from renewables.

The reduction realized = 8,939 Gg CO2eq (calculated based on a grid emission factor of 0.537 KgCO2e/KWh). (More details on projects considered (Solar and Wind) can found in Annex 2).

96.44% of the realized reduction is from this measure.

Energy/Transport

- The BTR (phase one was considered within the BAU scenario).
- Modal shift considered in the BAU scenario:

Table 16: Projected Modal Share of Transport in Amman (2022–2030)

	Private car (%)	Taxi (%)	School bus (%)	Private bus (%)	Public transport (%)	BRT (%)
Amman[10]	**45**	**12**	**18**	**7**	**19**	**0**
2022	36	12	18	7	20	7

[10] Amman represents 42% of the population

	Private car (%)	Taxi (%)	School bus (%)	Private bus (%)	Public transport (%)	BRT (%)
Amman[10]	**45**	**12**	**18**	**7**	**19**	**0**
2024	36	12	18	7	20	7
2026	34	12	18	3	20	14
2028	27	12	18	3	20	20
2030	20	12	18	3	20	27

- Reductions resulting from the transport sector was achieved from introduction of hybrid cars and electric vehicles (EVs) within the public sector fleet as well as having a share of 18% of the newly purchased cars (private ownership) as EVs.

1.62% of the realized reduction is from the modal shift in cars.

Waste Sector

In the NDC document, the composting measure was assumed to be implemented in 4 areas with a daily input of 200 tonnes of waste/ day. The assumption proved to be an over estimation. Data acquired from MoLA until 2023, six composting units at the national level were operating with 10,318 tonnes/year and only started functioning in 2023.

Accordingly, recalculation was carried out resulting in 0.71 Gg CO2 eq reduction (representing 0.01% of the realized reduction.

Agriculture Sector

- Urban tree Plantations (32500 trees), GAM achieved the targeted measure since 2022. Variety of trees were planted mainly ornamental type (Large green canopy) with 5-6 years.
- Rangeland restoration (100,000 dunums achieved) in Karak, Azraq, Shobak and Badia
- Forest tree Plantations (2,000,000 trees) Achieved 1,200,000 (mainly Pines 3-4 years trees) in 60% South, 10 Middle and 30% North)

0.13 % of the realized reduction is from the modal shift in cars.

2.4.5 Assessment of the NDC Measures- Gender Lens

Jordan's NDC underscores gender inclusion as crucial for equitable climate action, striving for policies that provide social and economic benefits to all. The document followed a gender-

sensitive approach and it highlights the need for inclusive policies that consider the unique roles, vulnerabilities, and contributions of women in responding to climate change.

Conducting gender-specific vulnerability assessments could help Jordan better understand the differentiated impacts of climate change on women and men, especially in areas prone to extreme weather or resource scarcity. These assessments could inform localized adaptation strategies, ensuring that adaptation measures directly address the needs of women in vulnerable communities and incorporate their knowledge into resilience-building processes.

Gender Sensitivity within Adaptation Measures

On the adaptation side, Jordan acknowledges the disproportionately adverse effects of climate change on women, especially in rural and marginalized communities. The NDC outlines measures to involve women in the planning and implementation of adaptation projects, particularly in water management, agriculture, and community-based resilience programs. By promoting women's leadership in these areas, the strategy aims to address vulnerabilities while leveraging women's knowledge in local ecosystems and resource management.

Given Jordan's arid climate and water scarcity, water management and sustainable agriculture are priority areas in its NDC. Women, especially in rural areas, are often responsible for household water management and play significant roles in agricultural practices. The NDC emphasizes women’s engagement in developing water-saving techniques and in the governance of local water resources, acknowledging that women bring valuable local knowledge to these processes. This inclusion not only enhances resource sustainability but also strengthens women’s adaptive capacity to climate impacts.

Climate-induced events, such as droughts and heatwaves, are identified as they disproportionately affect women, particularly those with limited economic resources. The NDC outlines disaster preparedness initiatives that include women as critical stakeholders, both in community planning and in emergency response teams. These initiatives aim to leverage women’s roles in communities and ensure that disaster response systems consider women’s specific needs, such as safe shelters and access to healthcare.

The NDC underscores the importance of building resilience in rural communities, where women often have essential but vulnerable roles. Training programs on climate-smart agriculture specifically target women, as they are frequently involved in food production and local markets. By supporting these efforts, Jordan’s NDC seeks to bolster food security and create economic opportunities for women, particularly in areas facing heightened climate pressures.

Gender Sensitivity within Mitigation Measures

On the mitigation side, the NDC includes commitments to improve gender balance in the workforce of sectors related to mitigation efforts, such as renewable energy and waste management. This involves creating more job opportunities and capacity-building programs tailored to empower women in these fields, recognizing that women's participation can enhance resilience and accelerate climate action.

The NDC emphasizes the role of women in Energy Transition. The document highlighted the barriers women face in technical fields, it includes policies aimed at closing the gender gap through targeted training and job opportunities in the renewable energy sector.

Jordan's transportation sector is a key focus area for emissions reduction, where the NDC acknowledges the gendered dynamics of mobility. Women often have different transportation needs due to caregiving roles or restricted access to private vehicles, especially in rural areas. The NDC suggests improving public transport options with a focus on safety, accessibility, and reliability, making them more inclusive for women and families. Such measures could improve not only emissions but also social mobility for women.

2.4.6 Potential domestic policies and measures implemented to address the social and economic consequences of response measures

Below are targeted measures that Jordan can adopt, categorized under key themes:

- **Just Transition Framework:** Develop a Just Transition Strategy, Reskilling and Upskilling Programs and Social Dialogue Platforms.
- **Social Protection and Safety Nets:** Climate-responsive Social Protection and Targeted Support for Women and Youth
- **Energy Transition with Equity:** Progressive Energy Subsidy Reform and Access to Clean Energy.
- **Policy Coherence and Institutional Strengthening:** Climate-SDG Alignment and Impact Assessment Tools.
- **Financing and International Support:** Access to Climate Finance for Social Goals and South-South Cooperation.

2.4.7 Identified Barriers to the NDC Implementation

- **Political Instability in the Region:** Conflicts in neighboring countries impact Jordan's resources and capacity to focus on long-term climate planning.
- **Limited Public Resources**: Jordan's economy is under pressure due to factors like high public debt, limited natural resources, and the costs of insecurities in the region.

- **Dependence on External Funding**: Implementation relies heavily on international climate finance and donor contributions, which are often unpredictable or tied to specific conditions.
- **Private Sector Engagement**: Attracting private investments for climate projects is difficult due to perceived risks, lack of incentives, and regulatory barriers.
- **Policy Integration**: Integrating climate policies across various sectors (energy, water, transport) remains a challenge due to institutional silos.
- **Capacity Limitations**: human and technical capacity within government agencies to design, implement, and monitor climate actions effectively need strenghtening.
- **Lack of Comprehensive Data**: Incomplete and inconsistent data for greenhouse gas (GHG) emissions, vulnerability assessments, and climate impacts hinder planning and tracking progress.
- **Knowledge Gaps**: Skills and expertise in emerging climate technologies and methods are still developing.

- **Socioeconomic Priorities**: Issues like unemployment, economic stability, and poverty often take precedence over climate goals.

2.4.8 Emerging Measures

In addition to the direct GHG reduction measures that were presented in the sections above, ambitious combination of policies and technologies can potentially provide a promising GHG emission reduction schemes that can be implemented over the next years which will add to what has already been identified in the sections above.

The following are examples of emerging mitigation measures to be explored, quantified and proposed in the future NDC update cycles in various sectors as follows:

- **Renewable Energy storage**

The acceleration of RE production in Jordan, reaching a share of 13% of electricity production in 2019, and the series of new RE projects that are being either constructed or planned, pushes the RE capacity to a close to saturation of the grid, according to the perspective of the Ministry of Energy and Mineral Resources. By the end of 2021, 1600 MW of PV and 715 MW of wind energy are scheduled to be grid connected; any planned continuation of the growth of RE production requires solid and stable infrastructure of RE storage. Energy storage is becoming more and more an attractive option that will need to become a part of the energy services toolkit of the Jordanian system, as a means of ensuring the provision of stable, high quality power supplies, in particular in the context of increased penetration of variable renewable energy sources. Currently, a few private sector companies are designing storage capacities with market-based investments.

- **Hydrogen**

Thanks to its enormous potential for electricity production from renewable energy, Jordan could prospectively play a significant role in the emerging global hydrogen market. Stepping up hydrogen product will not only open a new export market for Jordan and thereby create new economic opportunities, it will also help the country in decarbonising its own energy supply as well as decrease its dependency on imported energetic commodities. Having similar properties as natural gas, hydrogen is especially useful in replacing carbon-intense fuels in sectors that are hard to electrify, such as maritime transport, aviation, and heavy land transport. In order to partake in the global hydrogen market, however, Jordan must ensure that its production fulfils the sustainability criteria set by import countries with regard to the electricity production for desalination and electrolysis as well as in respect of water demand and ecologic impact. There is additional potential in the hydrogen value by using its derivatives, in particular ammonia. This is relevant for Jordan’s fertiliser industry.

While currently no quantification of the hydrogen potential in Jordan is available, several public and private sector entities are in the process of providing such analyses which are expected to be available latest in the second quarter of 2022.

- **Urban systems**

Adopting a “compact city” planning approach (e.g. developing within the urban boundaries (i.e. infill development close to jobs and public transport) as opposed to rapid urban expansion on the fringes which will add to more transport and infrastructure needs) could lead to a reduction in GHG emissions by 13.8% in Amman (compared to BAU); 11.5% in Irbid; 6.3% in Mafraq; 2.9% in Russeifa; and, 2% in Zarqa. In addition to GHG benefits, the models also show substantial cost savings for municipalities.

- **Climate-sensitive urban design / green infrastructure and increase green spaces**

Complementing the point above, some municipalities show the potential to increase green spaces through planting trees and through implementing neighborhood-level solutions to address better walkability and use of non-motorized forms of transportation, use of urban design, and adoption of more greenery/green/nature-based infrastructure/solutions that not only helps with issues such as flooding, but can also mitigate heat islands and energy load etc. at an urban design scale.

- **Waste**

It is crucial to introduce the whole cycle of solid-waste management in GHG mitigation reduction calculations (including intermediate steps like constructing transfer stations, fleet management, etc.) In addition, constructing new/additional cells in landfills may not be sufficient, if necessary engineered measures in the landfill are not taken and if measures such as landfill gas recovery, etc. are not considered; and (b) whether any interventions to reduce and recycle waste (e.g. residential, reusing construction waste etc.) could be readily implemented and included.

As Jordan’s wastewater treatment plants are progressively being upgraded to fully aerobic systems with enhanced operational efficiency, the greenhouse gas (GHG) emissions from the wastewater sector are expected to decline. Consequently, greater attention is anticipated to shift toward mitigating emissions from the solid waste sector. Although Jordan has already implemented key mitigation projects—such as the Al-Ghabawi and Al-Alkaider biogas-to-energy initiatives—and introduced composting programs, these efforts remain limited by system capacity. To further reduce emissions associated with solid waste, the following actions are recommended:

1. Increase public awareness on minimizing waste volume through educational videos, brochures, and community seminars.
2. Provide training to marginalized municipalities—especially those with long waste transport distances—and their residents on composting organic waste locally.
3. Promote behavioral change in consumption patterns by engaging schools and universities as primary outreach platforms.

4. Implement circular economy principles and encourage waste reduction at the design stage through support programs funded by industry and other sources.

- **Transport**

There are contestability/competition issues in freight and transport of passengers that undermine incentives to modernize the fleet and make it more adequate to the needs of various sectors, including tourism. There could be different actions undertaken to create better incentive system for operators / owners of trucks and buses, from minimum emission standards to providing financing for renewal of fleets, to resolving the market entry barriers.

- **Green Buildings**

There is extensive potential for green building retrofitting of existing building stock (which covers the majority of urban areas) through (a) adoption of green building codes; (b) consider water and/or energy use in buildings; (c) energy efficiency in public buildings and public spaces.

- **Industrial production**

Deep integration and upscaling of energy efficiency, resource use efficiency and reuse as well as circular economy principles and practices can constitute key measures that will enhance GHG reduction in the industrial production sector. A combination of technological advancement and introduction of conducive policy measures could be explored to provide a driving force for a more sustainable and climate friendly industrial production in Jordan. In the business area in general, entrepreneurs could play a major role in disseminating information (e.g., via digital platforms) to households and MSMEs about actions they could take to be more resource efficient; for introducing and rolling out services in high impact segments, for example, in insulation, heating, etc. There is also potential for making it easier for companies to engage in the shared services business models to reduce the carbon footprint, support functions to increase exports of green goods and services.

Chapter III: Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement

Jordan, a semi-arid country with limited natural resources, faces significant challenges due to climate change. Rising temperatures, decreasing rainfall, and extreme weather events exacerbate water scarcity, food security risks, and ecosystem degradation. Jordan has made significant efforts in enhancing its adaptive capacity through institutional frameworks, policy integration, and sector-specific strategies.

3.1 Overview and National Context

Jordan has made significant progress in implementing adaptation strategies and actions consistent with the global goal for adaptation as set out in Article 7, paragraph 1, of the Paris Agreement.

The country's efforts focus on enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change, particularly in light of its arid climate, water scarcity, and socioeconomic challenges were as follows:

(a) Implementation of adaptation actions

Jordan's adaptation efforts are guided by its National Climate Change Policy (2022–2050) and the National Adaptation Plan (NAP), which outline strategic objectives to mainstream climate resilience across all sectors. Implementation has been pursued through sectoral programs in water, agriculture, health, and urban development, aligning with the global adaptation goal. Notable progress includes the expansion of integrated water resource management initiatives, drought preparedness planning, and climate-resilient agriculture in vulnerable rural areas.

(b) Adaptation goals, actions, and programmes

Jordan's adaptation goals emphasize ensuring water security, safeguarding food systems, protecting ecosystems, and improving public health resilience. The Updated Nationally Determined Contribution (NDC 2024) identifies priority adaptation programs, including the Water Substitution and Reuse Project, the National Forestry and Rangeland Strategy, and the Health Adaptation and Early Warning Initiative. These initiatives are supported by partnerships with UNDP, GCF, and regional adaptation funds to strengthen institutional capacity and local resilience.

(c) Integration of science, gender, and local knowledge

Jordan has worked to integrate best available science, gender perspectives, and local and indigenous knowledge into its adaptation planning within its National Communications, National Adaptation Plan and the National Climate Change Gender Action Plan (GAP).

The GAP ensures that adaptation measures address gender-specific vulnerabilities and empower women as agents of resilience. The Ministry of Environment collaborates with universities and research centers to apply climate modeling and risk assessment tools, while community consultations ensure local relevance and ownership.

(d) Development priorities and mitigation co-benefits

Jordan's adaptation policies are closely aligned with national development priorities outlined in Vision 2033 and the Economic Modernization Vision, emphasizing the dual goals of climate resilience and sustainable growth. Several adaptation measures—such as renewable energy use in water pumping, ecosystem restoration, and sustainable land management—also deliver mitigation co-benefits by reducing emissions and enhancing carbon sequestration.

(e) Integration into development policies and capacity building

Adaptation has been integrated into national and subnational planning frameworks, including municipal development plans and sectoral investment strategies. The National Climate Change Committee coordinates efforts among ministries and development partners to ensure climate considerations are embedded in budgeting, infrastructure, and agricultural programs. Capacity-building activities supported by the Capacity-building Initiative for Transparency (CBIT) have improved institutional readiness for adaptation reporting under the Enhanced Transparency Framework.

(f) Nature-based solutions

Jordan is increasingly adopting nature-based solutions to address climate vulnerabilities. Examples include reforestation projects in degraded highlands, ecosystem-based flood management, and restoration of the Zarqa River Basin to enhance natural water retention and biodiversity. These actions contribute both to adaptation and to ecosystem restoration goals under the NDC.

(g) Stakeholder involvement

Jordan's adaptation process is participatory, involving local governments, civil society, academia, and the private sector. The Governorate Adaptation Working Groups promote decentralized climate planning, while partnerships with the private sector—particularly in renewable energy,

water technologies, and green infrastructure—strengthen climate-resilient investment. Continuous stakeholder engagement ensures that adaptation measures are inclusive, transparent, and sustainable.

(h) Institutional and Legal Frameworks

Jordan has institutionalized climate change action under the Ministry of Environment (MoEnv), with support from the National Committee on Climate Change (NCCC). The NCCC coordinates multi-sectoral adaptation and mitigation efforts. Decentralization and community participation are promoted through municipal climate action plans, supported by international cooperation. Also, line ministries and governorates are mandated to integrate climate risks into their development planning.

(I) Existing Adaptation Strategies and Initiatives

Jordan is enhancing its adaptive capacity through integrated water resource management, early warning systems, and climate-resilient agricultural practices. Key strategies include:

Updated Submission of Jordan's 1st Nationally Determined Contribution (NDC)[11]

The following provides a brief summary of key strategic objectives for increasing adaptive capacity and resilience to climate change impacts in Jordan that should be implemented using national and international resources:

- **Water Resource Management:** Water is the defining sector for adaptation to climate change in Jordan. Being one of the world's most water scarce countries, the multiplier impact of climate change will only add to the complexity of the water demand management challenges Jordan has been facing and will continue to face. NDC has listed strategic objectives as follows: (1) Integrating Climate adaptation and resilience in policy and institutional reforms in the water sector; (2) Improved water demand management and reducing gap between water demand and supply; (3) Improving adaptive capacity of water utilities; (4) Improved efficiency in water use for sustainable development; (5) Improving contribution of non-conventional water resources to the national water budget; (6) Improving rainfall early warning systems and reducing flood risks; & (7) Supporting watershed and basin level management of water resources including transboundary water.

[11] Adaptation section within Jordan's Updated NDC (2010) was drafted based on Jordan's NAP.

- **Agriculture and Food security**: Jordan is working to increase agricultural resilience by: (1) Integrating Climate resilience in the policy and institutional reforms in agricultural sector; (2) Improving drought management systems; (3) Improving irrigation system efficiency; (4) Shifting to water efficient crops; (5) Supporting hydroponic and other water tolerant agricultural productivity systems; (6) Enhancing productivity of rangeland management; & (7) Improving sustainable productivity of food chains.
- **Biodiversity and Ecosystems**: Ecosystems in Jordan are varied but vulnerable to climate change, the following are strategic approaches for adaptation: (1) Increasing the scope of ecosystem based adaptation and climate-based planning in protected areas and special conservation areas; (2) Using green infrastructure and community participation for ecosystem rehabilitation and restoration; (3) Enhancing the adaptive capacity of ecosystem services against extreme and long term climate change impacts; (4) Improving conservation measures and enforcement for climate threatened species and habitats; (5) Improving conservation measures against emergence and spread of zoonotic infectious diseases; &(6) Improving field research and monitoring of ecosystem vulnerability to climate change.
- **Health**: The main climate related hazards to health sector are represented by temperature and precipitation, NDC mentioned two priority strategic adaptations: (1) Improved understanding of the potential risk on health sector due to climate change; & (2) Enhancing the adaptive capacity of the health sector.
- **Urban Resilience and Disaster Risk Reduction**: Jordan has been affected by many types of climate related disasters (flash floods, landslides, rock falls and droughts) which are becoming more frequent events that cause losses of lives and costs millions of economic losses. The following are priority strategic adaptation: (1) Supporting urban green infrastructure interventions for climate resilience; (2) Improving readiness for climate related disaster risk reduction in urban areas; (3) Enhancing community participation at local urban level for climate change resilience; & (4) Improving building efficiency for adapting to increased heat in urban centers.
- **Coastal Zone Management**: Climate hazards in the Gulf of Aqaba may cause property damage, harm infrastructure, increase disease risk, and lead to economic losses in tourism and fisheries due to biodiversity and ecosystem degradation. The following are priority strategic adaptation: (1) Enhancing the sustainable use of marine protected area for climate change adaptation; (2) Support resilience of coral reefs to climate change impacts; (3) Use of Integrated Coastal Zone Management (ICZM) for enhancing resilience of marine ecosystems; & (4) Improving monitoring capacities for the state of marine ecosystems.

- **Cultural Heritage and Tourism**: Jordan's rich cultural heritage, vital to its economy, faces significant risks from climate change, including damage to archaeological sites, intangible traditions, and ecosystems. The following are two priority strategic adaptations: (1) Enhancing the adaptive capacity of cultural heritage sites and infrastructure; & (2) Integration of climate adaptation measures in the tourism supply chain and infrastructure.
- **Socioeconomic impacts: Climate change disproportionately impacts vulnerable groups,** affecting their access to resources and livelihoods, the following are priority strategic adaptations: (1) Integrating climate resilience in green economic recovery and development plans; (2) Enhancing local adaptive capacity to climate change impacts through local climate action plans; (3) Integrating climate adaptation into national poverty reduction policies; (4) Mobilization of social capital for climate change adaptation; (5) Integration of human rights values and enhancing climate adaptive capacities of vulnerable groups; & (6) Integrating climate change impacts and adaptation into education curricula.

National Adaptation Plan (2021)

Early 2021, Jordan launched its **National Adaptation Plan (NAP)** focusing on enhancing climate resilience through strategic planning and prioritization of adaptation actions. Its key objectives are mainly; to strengthen Resilience, to mainstream climate adaptation into national development plans and to ensure community participation and equitable adaptation benefits. The NAP identified main components, are as follows:

Institutional Strengthening, Governance and Finance, the plan identified need actions as follows:

- Coordination Mechanisms:
    - Establishment of multi-sectoral committees and partnerships.
    - Integrating adaptation planning across ministries and local governments.
- Capacity Building:
    - Training programs for policymakers, technical staff, and local communities.
    - Knowledge-sharing platforms to disseminate best practices.

- Financing Adaptation Measures: Domestic and International Funding:
    - Mobilizing resources through national budgets, Green Climate Fund (GCF), and international donors.
    - Encouraging private sector investments in adaptation projects.

Vulnerability and Risk Assessment for key sectors namely: Water resources, agriculture, biodiversity, health, and infrastructure. Identified climate risks and vulnerabilities in each sector to inform planning as droughts, water scarcity, heatwaves, and desertification.

Adaptation Priorities and Actions were identified for key sectors, namely:

- Water Security:
  - Efficient water management, desalination technologies, and wastewater reuse.
  - Improving rainwater harvesting and groundwater recharge systems.
- Agriculture and Food Security:
  - Climate-smart agriculture practices and resilient crop varieties.
  - Strengthening irrigation efficiency.
- Biodiversity and Ecosystems:
  - Restoration of degraded ecosystems and afforestation programs.
  - Biodiversity conservation plans to protect species affected by climate change.
- Health Systems:
  - Early-warning systems for heatwaves and disease outbreaks.
  - Capacity building in climate-resilient healthcare services.
- Infrastructure and Urban Resilience:
  - Climate-proofing infrastructure (roads, buildings).
  - Urban planning strategies to reduce vulnerability to flooding and heat.

3.2 Climate Trends, Observed and Projected Impacts in Jordan

Following sections give an overview related to observed trends, climate change impacts and projected impacts in the country based on Jordan's fourth national communication- published in 2023.

Methodology Used

Jordan's vulnerability assessments in the Fourth National Communication (2023) and NAP (2021) used a combination of:

- Climate modelling (e.g., RCP 4.5 and 8.5 scenarios),
- Geographic Information Systems (GIS) for spatial analysis,
- Stakeholder consultations and expert workshops,
- Risk assessment indicators: built around three main components: exposure, sensitivity, and adaptive capacity.

Exposure indicators capture the degree to which natural and human systems in Jordan are subjected to climate-related hazards, such as increasing temperatures, drought frequency, water scarcity, and extreme weather events. These indicators are particularly relevant in water-limited areas and in socioeconomically vulnerable areas, where the physical impacts of climate change are most acute.

Sensitivity indicators reflect how strongly these sectors—such as agriculture, health, biodiversity, and infrastructure—respond to climate stresses based on their existing conditions and dependencies. Sensitivity is assessed through variables like agricultural yield variability, reliance on rain-fed crops, water demand intensity, and the spatial distribution of population and infrastructure in high-risk zones.

Adaptive capacity indicators, on the other hand, measure the ability of communities and institutions to anticipate, cope with, and recover from climate impacts. In the Jordanian context, this includes institutional readiness, access to financial and technical resources, education levels, public health capacity, and the availability of climate-resilient infrastructure.

Together, these three provide an integrated understanding of vulnerability, allowing Jordan to identify priority regions and sectors for adaptation action, inform its National Adaptation Plan, and strengthen national resilience in line with the objectives of the Paris Agreement.

Table 17: Indicators used in Jordan for Exposure, Sensitivity, and Adaptive Capacity

Category	Sample Indicators
Exposure	• Temperature trends (e.g. increasing maximum temperatures) • Changes in precipitation levels • Frequency of droughts • Number of hot days (e.g. days above certain temperature thresholds) • Intensity of extreme rainfall events or very heavy rainfall days • Evaporation rates • Exposure to climate stimuli such as heatwaves, droughts, shifts in rainy seasons
Sensitivity	• Extent of irrigated vs rain-fed agriculture • Agricultural dependence (crop yields, crop types, livestock) • Water demand versus supply balance • Soil types, land cover and land degradation • Population density in climate hazard-prone areas • Topography, groundwater recharge areas, valleys • Distribution of infrastructure, settlements in exposed zones
Adaptive Capacity	• Institutional readiness (existence of policies, plans, adaptation programs) • Access to financial, technical, and human resources • Education levels and public awareness • Health sector capacity (infrastructure, human health services)

Category	Sample Indicators
	• Technology & data availability (climate information and projections, early warning systems) • Social capital / community level capacity • Capacity for integrating adaptation into sectoral development plans

Observed Climate Trends

- Average temperatures increased by 1.3°C since 1960.
- Precipitation decreased by 10–20%, especially in northern and central highlands.
- Extreme events such as flash floods, heatwaves, and prolonged droughts have become more frequent and intense.

Projected Impacts

- By 2100, temperature increases of 2–4°C are projected under high-emission scenarios.
- Anticipated 15–30% reduction in renewable water resources.
- Crop yield declines (wheat, barley) by 20–40% in rainfed areas.
- Public health challenges due to heat stress and shifting disease patterns.

3.3 Key Adaptation Goals and Reference to Global Goal on Adaptation (GGA)

Jordan aligns its national adaptation goals with the Global Goal on Adaptation (GGA) by:

- Enhancing adaptive capacity through institutional strengthening and financing,
- Reducing vulnerability across water, agriculture, health, and urban systems,
- Increasing resilience of communities, ecosystems, and infrastructure,
- Promoting equity and inclusiveness, especially for vulnerable groups (refugees, women, rural poor).

Jordan's adaptation objectives are aligned with its updated NDC (2021) and the NAP and reflected in sectoral goals prioritizing:

- Water security,
- Promoting climate-resilient agriculture,
- Reducing disaster risk in urban areas,
- Enhancing health system adaptation
- Protecting ecosystems and biodiversity.

3.4 Addressing Loss and Damage

Jordan has not yet formally integrated loss and damage (L&D) into its adaptation national strategies. Though Jordan has faced flash floods (e.g., Dead Sea incident in 2018), droughts, and landslides have caused fatalities and significant economic losses. Moreover, Institutional capacity for L&D tracking, assessment, and compensation remains underdeveloped.

3.5 Stakeholder Involvement and Inclusive Approaches

Stakeholder engagement is a key principle in Jordan's adaptation planning including participatory vulnerability assessments at municipal level, multi-stakeholder steering committees for GCF and Adaptation Fund projects, youth and civil society consultations through the Climate Change Citizen Engagement Action Plan (2024), inclusion of refugees and host communities in adaptation project design and implementation, and gender and social inclusion are institutionalized through initiatives like the Climate Change and Gender Strategy (2030).

3.6 Progress in Adaptation Reporting and the Development of the Monitoring, Reporting and Learning (MRL) Framework

Although Jordan's has not yet formally submitted any Adaptation Communication, it is worth mentioning that its key elements are embedded in the sectoral strategies (water, agriculture, health) and the GCF and Adaptation Fund-supported projects, the climate change adaptation chapters within the national communications as well as the NAP document.

Despite these efforts, there remains a lack of systematic tracking and evaluation of effectiveness across sectors and a gap in reporting implementation results against GGA and initial national adaptation goals.

Adaptation actions to date show moderate effectiveness in reducing water stress through non-conventional sources, supporting smallholder agriculture through irrigation upgrades, and expanding early warning systems. Hopefully this will be fixed once the MRL system has been operationalized.

Jordan's emerging MRL Framework (2024), developed with support from the World Bank, aims to track sectoral adaptation progress and impacts using standardized indicators, link adaptation outputs (e.g., infrastructure installed) with outcomes (resilience achieved), embed learning loops and adaptive management, and enable national and local-level reporting aligned with GGA and BTR requirements. The reporting system is not yet ready, Ministry of Environment has developed a primary/ initial framework that is still under validation and expected to be released early 2026

However, for the purpose of reporting within the current BTR (under sections 3.8 and 3.9) mostly focuses on implementation stages (e.g., installed systems), with limited assessment of adaptation effectiveness, sustainability, or behavioural/systemic outcomes.

3.7 Potential Opportunities under Adaptation and challenges limiting effectiveness and sustainability

- Establish a national mechanism for loss and damage accounting, building on disaster risk management systems.
- Leverage international frameworks such as the Santiago Network to support technical capacity and access to financing.

- Fragmented implementation and limited inter-ministerial coordination,
- Insufficient data for outcome-level evaluation,
- Weak integration of adaptation into national budgeting processes.
- Heavy reliance on external financing,
- Limited local capacities for maintenance and scaling.

3.8 Progress Towards Achieving NAP/NDC Measures

Table 18: Progress Towards Achieving NAP/NDC Measures

Water Resource Management				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**	**Not yet**	
Integrate climate adaptation in water sector policies and reforms		X		In progress – mentioned in national plans, limited enforcement mechanisms
Improve water demand management and reduce supply-demand gap		X		Ongoing – part of National Water Strategy, but data on impact not reported
Enhance adaptive capacity of water utilities			X	Planned – policy mentions it, implementation status unclear
Increase water use efficiency		X		Partially implemented – some measures exist,

				but efficiency levels not quantified
Enhance use of non-conventional water resources		X		In progress – desalination and wastewater reuse projects noted
Improve rainfall early warning and flood risk reduction systems		X		Ongoing – early warning system enhancement underway
Support watershed and basin-level water resource management		X	X	Limited – watershed management exists but transboundary coordination weak
Agriculture and Food Security				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**		**Implemented**
Integrate climate resilience in agriculture sector reforms	X			Policy-level commitment – implementation lagging in rural areas
Improve drought management systems		X		In progress – drought policy updated, monitoring systems developing
Enhance irrigation efficiency		X		Partially implemented – drip irrigation expansion reported
Promote water-efficient crops		X		Ongoing – programs promoting drought-tolerant crops active
Support hydroponics and water-tolerant systems		X		Limited – pilot projects for hydroponics underway
Enhance rangeland productivity		X		In progress – 100,000 dunums restored (out of 200,000 target)
Improve sustainable		X		Ongoing – sustainable food chains noted in

productivity across food chains				agri policy, progress unclear
Biodiversity and Ecosystems				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**		**Implemented**
Expand ecosystem-based adaptation in protected areas		X		In progress – protected area plans include adaptation, enforcement gaps remain
Promote green infrastructure and community-based restoration		X		Ongoing – community engagement expanding, still limited in rural areas
Enhance adaptive capacity of ecosystem services		X		Partially implemented – ecosystem mapping enhanced, funding limited
Strengthen conservation for climate-threatened species			X	Weak – enforcement measures not yet updated to include climate threats
Prevent zoonotic disease via improved conservation			X	Limited – zoonotic disease linkage acknowledged but not fully addressed
Enhance ecosystem vulnerability monitoring and research			X	In development – ecosystem research prioritized, monitoring capacity weak
Health Sector				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**		**Implemented**
Understand climate risks to the health sector			X	Initial steps – health adaptation strategy developed, risk mapping ongoing

Enhance adaptive capacity of the health system		X		Partially implemented – health system upgrades underway, gaps in rural areas
Urban Resilience and Disaster Risk Reduction				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**		**Implemented**
Promote urban green infrastructure for resilience		X		Limited – urban greening in GAM, expansion to other cities needed
Improve disaster risk readiness in urban areas		X		In progress – DRM mainstreamed in some cities
Enhance local community participation in urban adaptation		X		Ongoing – local action plans exist but community engagement varies
Improve building efficiency to adapt to heat		X		Weak – energy-efficient building codes **not fully enforced**
Coastal Zone Management				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**		**Implemented**
Support marine protected areas for climate adaptation		X		Limited – MPA management exists but not climate-specific
Enhance coral reef resilience			X	Planned – no data on coral restoration implementation
Apply Integrated Coastal Zone Management (ICZM)			X	Policy exists – ICZM planned for Aqaba, execution not started

Cultural Heritage and Tourism				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**		**Implemented**

Enhance resilience of cultural heritage sites		X		Ongoing – site vulnerability assessments begun
Integrate adaptation in tourism infrastructure and supply chain			X	Limited – tourism adaptation not integrated sector-wide
Socioeconomic Impacts				
Measure	**Status of Implementation**			**Comment/s**
	Implemented	**Partially**		**Implemented**
Integrate climate resilience in economic development plans		X		Partially implemented – green economy and climate resilience mentioned
Enhance local adaptation via climate action plans		X		In progress – local plans being piloted in select municipalities
Integrate climate adaptation in poverty reduction policies			X	Planned – integration into poverty plans proposed, not yet implemented
Mobilize social capital for adaptation		X		Limited – community-based initiatives exist, national scale lacking
Incorporate human rights and vulnerable group support			X	Weak – human rights language in policy not backed by mechanisms
Integrate climate change into education curricula	**X**			**Initial steps – climate education present in some curricula**

3.9 Adaptation Projects-Under Implementation

Jordan has initiated several adaptation projects to address climate change, primarily funded by the Adaptation Fund, FCDO and the Green Climate Fund (GCF). These projects align with Jordan's National Adaptation Plan (2021), which prioritizes adaptation. They reflect Jordan's

commitment to enhancing climate resilience and sustainable development through strategic adaptation projects.

Table 19: Current project implemented through the MoEnv

Current project implemented through the MoEnv					
#	**Project Name**	**Funded/Implemented by**	**Budget (USD)**	**Project Aim**	**Current status/Updates**
1.	Increasing the resilience of both displaced persons and host communities to climate change-related water challenges in Jordan and Lebanon	Funded by: AF/ Regional Project; Jordan & Lebanon Implemented by: UN-HABITAT	13,973,509	1. Reduce the demand of unsustainable water sources such as over-extracted (and often polluted) groundwater, while increasing water supply options from non-conventional and more sustainable sources, incl. rainwater harvesting, greywater treatment and reuse and the reuse of treated wastewater. 2. Focus on responding to climate change-related water challenges by taking a sustainable water	1. (29) greywater treatment systems installed in schools 2. (1) greywater treatment system installed in a mosque 3. (24) rainwater harvesting systems installed in schools 4. (4) rainwater harvesting systems installed in mosques 5. (7) rainwater harvesting systems installed in residential buildings 6. Awareness and capacity-building workshops conducted for schools, local communities, and mosques, in addition to the development of educational materials such as posters, brochures, and social media content on climate change and water.

Current project implemented through the MoEnv					
				management approach.	
2.	Jordan Integrated Landscape Management Initiative (JILMI)	Funded by: GCF/ National Project Through: UNEP (AE) Implemented by: IUCN & Consortium, and MoEnv	60 M (45 Grant with 15 in kind Cont.)	To reduce the negative impacts of climate change on water resources in Jordan through a landscape-level approach. The proposed approach includes: 1. Improved ecosystem management; 2. Managed aquifer recharge; 3. Rainwater harvesting; 4. Evaporation reduction; 5. Improved agricultural practices; and 6. Strengthened governance	PCA between MoEnv and UNEP to be finalize and validated by relevant ministries (MoFA, MoPIC, and MoF) IUCN and the consortium are working on finalizing and approving the action & financial plan.
3.	The Adaptation Fund Climate Innovation Accelerator (AFCIA)	Funded by: WFP HQ Implemented by:		The AFCIA Programme supports innovative climate adaptation solutions addressing food security challenges. Three	launched on June 5, 2024, in Jordan, the project is now advancing to its next milestone following a successful inception workshop and the selection of

Current project implemented through the MoEnv					
				selected ventures will present their solutions during these events, showcasing technologies focused on: 1. Deploy Tech - Advanced water storage systems for smallholder farmers 2. Responsive Drip Irrigation - Smart irrigation solutions 3. Adaptive Symbiotic Technologies - Symbiotic microbial treatments to improve resilience of crops	three climate ventures. The programme is now set to enter the "Accelerate" phase, a nine-month sprint during which the selected ventures will implement their solutions and rigorously test and validate their core assumptions.
4.	JAHEZ (READY) Project	Funded by: In response, the UK Foreign, Commonwealth and Development Office (FCDO) Implemented by: IWMI	Around 7 M	To mainstream learnings into policy implementation, investment strategies and support the design and improvement of technical tools for use by host communities,	**Holding preparatory meetings with representatives of the local community for the project** which will be implemented in Irbid, Ramtha, and Mafraq refugee camps. The project serves as one of the implementation tools of the Climate-Refugee Nexus Initiative launched by His Majesty

Current project implemented through the MoEnv					
				refugees and local authorities.	King Abdullah II ibn Al Hussein during the 27th Conference of the Parties (COP27). The official endorsement of the project happened during COP29. The project steering committee were established.
5.	Developing the "Roadmap for development of Climate Change and Gender Strategy 2030 in Jordan"	Funded by: WB Implemented by: RSS\WANA & Adelphi		1. To support the development of a dedicated gender and climate strategy. 2. The Strategy presents an integrated, multi-level approach through six actionable, gender-sensitive interventions for main-streaming gender in the climate change sector. 3. Each intervention is accompanied by a set of recommendations organized into	First draft of the roadmap developed and shared officially with NCCC.

Current project implemented through the MoEnv					
				short-term, medium-term, and long-term actions, designed to be realistic and practical.	
6.	Enhancing Climate Change Resilience through Water Related Interventions & Non- Conventional Nature-Based Solutions in Areas Hosting Displaced People in Jordan & Lebanon	Funded by: Spanish Development Agency (AECID) Implemented by: UN-HABITAT	270,000	Enhancing climate change resilience in areas hosting displaced people in Jordan and Lebanon through water related interventions and non-conventional nature-based solutions such as rainwater harvesting, Nature based flood mitigation, Agri-voltaic farming and subsequent greening of public spaces.	- Tender for water harvesting system in one school was concluded and work started - Change in one project component was requested and the donor accepted, the change include change in focus area and type of activity from Jerash to Mafraq and from Lagoon to Nature based flood mitigation activity, respectively.
7.	Climate-smart pathways for an Agile and Resilient Economy [CARE]	Funded by: EU Implemented by: RSS and UN-HABITAT	480,000	Enhance the enabling environment for climate change mitigation and adaptation in Madaba through applying an innovative Water-Energy-Food-Ecosystem (WEFE) Nexus approach	- Inception meeting with the Municipality was conducted - Criteria for site selection was prepared and site visit conducted - Indicators were prepared for the Environmental,

Current project implemented through the MoEnv					
				for integrated urban resource management	Social, and Economic Vulnerability assessment
8.	Climate Change Citizen Engagement Action Plan	Funded by: WB Implemented by: UN-HABITAT	$44,999.97	1. Help Jordan involve citizens more in climate change actions. 2. Support the Ministry of Environment to create a Citizen Engagement Action Plan. 3. Study current laws, policies, and how citizens and civil society groups are involved today. 4. Find challenges and opportunities for better citizen participation. 5. Suggest clear steps to improve collaboration between government, citizens, and NGOs.	- Inception report developed - Meeting with governmental, private sector, and international entities representative to build a solid base for the current work on the concept of citizen engagement and what are the opportunities to move forward. - Road map will be developed within 1 months.
9.	Increasing the Resilience of Poor and Vulnerable	Funded by: Adaptation Fund	Around 10 M	Adapt the agricultural sector in Jordan to climate change induced	

Current project implemented through the MoEnv					
	Communities to Climate Change Impacts in Jordan through Implementing Innovative Projects in Water and Agriculture in Support of Adaptation to Climate Change	Implemented by: MoPIC as the accredited entity and other related institutions		water shortages and stresses on food security through piloting innovative technology transfer, policy support linked to community livelihoods and resilience.	

Chapter IV: 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

As outlined by the MPGs paragraphs 119 and 120, each Party should provide information on national circumstances and institutional arrangements relevant to reporting on the provision and mobilization of support; and information, if available, on national circumstances and institutional arrangements for the provision of technology development and transfer and capacity-building support. These requirements are comprehensively addressed in the National Circumstances Chapter of this report, under subsection Institutional Arrangements.

Jordan remains firmly committed to the UNFCCC and Paris Agreement objectives despite being a lower-middle-income, water-scarce country responsible for less than 0.06% of global GHG emissions. The country faces fiscal pressures, rapid population growth, and regional instability, which have increased its reliance on external climate-related support to meet its enhanced Nationally Determined Contribution (NDC) mitigation and adaptation goals.

This chapter outlines the financial, technology, and capacity-building support Jordan has received and requires to implement its climate agenda between 2015 and 2025. It reiterates Jordan's commitment to transparency and accountability under the Enhanced Transparency Framework.

4.2 Country Institutional framework, Strategies and Regulations

The Ministry of Environment (MoEnv), supported by the Climate Change Directorate (CCD), serves as the focal point for climate finance coordination and reporting. The National Climate Change Committee (NCCC), established by Climate Change Bylaw No. 79/2019, facilitates cross-sectoral coordination aligned with national development goals.

The Ministry of Planning and International Cooperation (MoPIC), Ministry of Finance (MoF), and Ministry of Energy and Mineral Resources (MEMR) also play critical roles in resource mobilization and budgetary integration. The Jordan Renewable Energy and Energy Efficiency Fund (JREEEF) and Jordan Environment Fund (JEF) provide domestic financing mechanisms that complement international support.

Jordan's National Designated Authority (NDA) to the Green Climate Fund operates within MoEnv, endorsing projects aligned with national priorities and liaising with key partners such as UNDP, GIZ, FAO, and the World Bank.

4.3 Underlying Assumptions, Definitions, and Methodologies

Jordan's reporting on support needed and received is undertaken in accordance with the Modalities, Procedures, and Guidelines (MPGs) for the Enhanced Transparency Framework (ETF) established by the Paris Agreement (Decision 18/CMA.1). This section outlines the key underlying assumptions, definitions, and methodologies used to ensure the Transparency, Accuracy, Completeness, Comparability, and Consistency (TACCC) of the reported information.

The scope of support needed directly corresponds to the conditional component of Jordan's updated Nationally Determined Contribution (NDC).

B. Definitions and Assumptions

Table 20: Definitions and Assumptions for Support Needed and Received under Jordan's BTR1

Term	Definition in the Context of Jordan's BTR1	Underlying Assumptions
Support Needed	The financial resources, technology transfer, and capacity-building required from international partners to achieve the conditional portion (26%) of Jordan's 31% GHG emission reduction target by 2030, and to implement priority adaptation actions.	Conditional targets cannot be met by domestic resources alone, reflecting Jordan's principle of common but differentiated responsibilities and respective capabilities.
Support Received	Financial, technology, or capacity-building flows, including grants, concessional loans, and in-kind assistance, that directly support the implementation of actions prioritized in the NDC Action Plan.	All reported support has a primary objective of climate change mitigation or adaptation, as defined by OECD DAC Rio Markers or similar national tracking tools.
Reference Scenario (BAU)	The Business-as-Usual (BAU) scenario is the baseline against which mitigation costs and efforts are measured. It assumes a continuation of current national policies and economic trends	The BAU scenario utilizes the same macroeconomic assumptions (e.g., population growth, GDP growth, energy demand) that underpinned the preparation of the NDC.

Term	Definition in the Context of Jordan's BTR1	Underlying Assumptions
	without the specific intervention of the conditional NDC actions.	
Financial Gap	The difference between the total estimated cost of implementing all NDC priority actions (mitigation and adaptation) and the currently available domestic and international financing mobilized by Jordan.	The identified annual financing gap (estimated at JOD 1,095 million, or 3.4% of GDP) reflects a conservative estimate based on existing sector-specific investment plans (e.g., Water Sector Capital Investment Plan) and NDC costing exercises.

C. Methodology for Determining Financial Support Needed

Jordan employs a bottom-up, sector-specific costing methodology combined with a top-down macro-fiscal analysis to estimate its financial needs.

1. Bottom-up Costing (NDC Action Plan):

Phase I: Prioritization and Identification: Priority mitigation and adaptation actions were identified through a participatory approach involving five Sectoral Working Groups (Energy, Transport, Water, Agriculture, Health).

Phase II: Detailed Costing: For each of the identified priority actions, a detailed costing exercise was performed. This involved:

- Investment Costs (CAPEX): Cost of equipment, infrastructure, and technology acquisition.
- Operating and Maintenance Costs (OPEX): Annual costs associated with running the actions.
- Economic Analysis: Where applicable, Cost-Benefit Analyses (CBA) were conducted to ensure actions maximize impact and sustainable development benefits.

Alignment: All costed actions were aligned with the National Climate Change Policy (2022-2050) and the National Adaptation Plan (NAP).

2. Tracking and Reporting:

The total estimated cost for the conditional mitigation and adaptation actions up to 2030 represents the aggregate financial support needed. These needs are continuously updated and

tracked using the NDC Action Plan framework, which is being mainstreamed into the EMV Executive Program to ensure alignment with national budget cycles.

D. Methodology for Tracking and Reporting Support Received

The transparency framework for tracking received support relies on institutional coordination and international standards.

1. Institutional Arrangements:

- The Ministry of Environment serves as the focal point for the UNFCCC and oversees the overall BTR compilation.
- The Ministry of Planning and International Cooperation (MOPIC) tracks official development assistance, including climate finance flows, ensuring consistency with international reporting requirements.
- The Ministry of Finance is working with partners to explore solutions for establishing a dedicated climate finance budget line to better track domestic and international climate-related expenditures.

2. Classification and Verification:

- International Classification: Financial support is classified based on the Common Tabular Formats (CTFs) provided in the ETF MPGs, ensuring comparability with other Parties.
- Verification: All reported support received is cross-referenced with donor data (where available) and verified against the criteria of the NDC Action Plan to confirm its contribution to the NDC targets.
- Technology Transfer: Information on technology transfer received is defined as the adoption of new or significantly improved environmentally sound technologies, measured in terms of specific sector-based deployment (e.g., advanced energy storage, green hydrogen pilot projects).

4.4 Information on Support Needed and Priorities

- Looking forward to 2030, Jordan estimates a total climate finance need of approximately USD 7.5 billion to achieve its NDC targets, divided into approximately USD 4.8 billion for mitigation and USD 2.7 billion for adaptation efforts. The national strategy prioritizes scaling up investments in decentralized renewable energy systems, energy storage, integrated water management including non-conventional resources, and climate-smart agriculture, among other sectors.
- In its updated NDC, Jordan committed to an enhanced GHG emissions reduction target of 31% by 2030 relative to a business-as-usual scenario based on 2012 emissions levels. Of this 31% reduction, 5% is unconditional, while the remaining 26% is conditional upon delivery of financial and technical assistance from the international development community.

- Jordan's NDC lists of priority activities needed to achieve the 31% emissions reduction and climate adaptation targets across sectors and domains of intervention, along with the estimated cost of implementation for each activity. In total, the estimated cost is US$ 7.9 billion, comprised of US$ 7.6 billion for 22 mitigation activities and US$ 329 million for the 21 adaptation related activities (see below Table). The GOJ will secure US$ 565 million of the total mitigation costs by its own means to fund the 5% unconditional emissions reduction target.

Table 21: Estimated Costs of NDC Implementation by Sector and Measure (US$ and JOD)

NDC Implementation Costs	No. of projects	US$ million	JOD million
Mitigation - subtotal	22	7,593	5,423
Energy	4	4,249	3,035
Water	1	2,821	2,015
Transport	4	457	327
Waste	3	33	23
Industry	6	19	13
Agriculture and Forestry	4	14	10
Adaptation - subtotal	21	329	235
Water	11	215	153
Agriculture and Forestry	9	113	81
Health	1	2	1
TOTAL	43	7,922	5,659

Source: CLIMA CAPITAL PARTNERS based on the NDC Action Plan online tool, 2021

Complementing these financial needs, detailed programmatic descriptions guide support needed by sector. For example, in the transport and tourism sector, a significant program aims to evaluate the feasibility of electric mobility solutions within Jordan's Golden Triangle (Petra, Wadi Rum, Aqaba), supporting sustainable tourism through policy recommendations and investment planning. The expected impact includes emission reductions and enhanced tourist experiences, backed by an estimated USD 1,447,500 in combined technology support, capacity building, and transparency support.

Similarly, in the environmental transport sub-sector, an initiative to develop sustainable policies for recycling and safe disposal of electric vehicle batteries fosters circular economy practices. This program, with an estimated USD 965,000 budget, facilitates knowledge transfer on battery lifecycle management and strengthens institutional and private sector capacities.

4.5 Information on Financial Support Received between (2015–2025)

Between 2015 and 2023, Jordan successfully mobilized substantial international climate finance from diverse multilateral, bilateral, and regional partners to advance its climate objectives. These resources have been critical in bolstering Jordan's institutional readiness, technological capabilities, and on-the-ground implementation to meet its enhanced NDC targets.

Below **Table** summarizes key financial support received by various recipient entities, the channels through which funds were provided, types of financial instruments, amounts disbursed, status concerning adaptation or mitigation goals, and the types of technical and capacity-building support included (detailed information can be found in Annex IV CTF-FTC Support tables.

Table 22: Summary of Financial Support Received and Contributions to Technology Development and Capacity-Building

Recipient Entity	Channel	Financial Instrument	Amount Received (USD/Euro)	Status	Type of Support	Contribution to Technology Development & Transfer	Contribution to Capacity-Building Objectives	Additional Information
Jordan (National level)	International	Grant	1,233,000 USD	Both	Capacity Building, Support Transparency	No	Yes	GEF Trust Fund - UNDP
Jordan (National level)	International	Grant	1,137,215 USD	Both	Capacity Building	No	Yes	GEF Trust Fund - UNDP
Jordan (National level)	Regional	Grant	6,000,000 USD (Jordan)	Adaptation	Capacity Building	No	Yes	Adaptation Fund - UN-Habitat
Jordan (National level)	International	Grant	747,301 USD	Both	Capacity Building, Readiness	No	Yes	GCF - GGGI
Greater Amman Municipality	International	Loan and Grant	4,000,000 & 11,400,000 USD	Both	Capacity Building	Yes	Yes	EBRD
Greater Amman Municipality	International	Loan and Grant	7,900,000 USD & 4,800,000 Euro	Adaptation	Capacity Building	Yes	Yes	EBRD

This financial inflow has supported Jordan's efforts across key sectors, notably energy, water resource management, agriculture, transport, and urban resilience. For instance, initiatives funded focus on renewable energy deployment, water use efficiency, capacity-building for MRV systems, and climate-resilient agricultural practices, reflecting Jordan’s commitment to technology development, transfer, and institutional strengthening.

4.4 Technology Development and Transfer

Technology development remains integral to Jordan's climate strategy. The Technology Needs Assessment (TNA) in 2016 identified renewable energy, energy efficiency, and waste-to-energy for mitigation; and water harvesting, drought-resistant crops, and efficient irrigation for adaptation.

Key achievements include:

- Deployment of over 1,500 MW of renewable energy capacity
- Energy-efficient public buildings and street lighting via ESCO partnerships
- Biogas generation in landfill and wastewater treatment plants
- Introduction of a National Electric Mobility Policy
- Pilot projects on smart water metering and decentralized wastewater treatment funded by GIZ and USAID

Jordan continues cooperation with partners such as the EU, Japan, and Korea on emerging clean technologies including hydrogen and carbon capture.

4.5 Capacity-Building Support

Efforts focus on:

- Building GHG inventory and MRV capacity through UNDP-GEF projects
- Enhancing institutional readiness via GCF Readiness Programmes
- Supporting NDC implementation and transparency through GIZ and UNEP
- Mainstreaming climate education with UN CC: Learn
- Training farmers on climate-smart agriculture through FAO and IFAD
- Engaging in regional knowledge exchanges via the NDC Partnership and Mediterranean Climate Action Alliance

4.7 Gender, Inclusivity, and Private Sector Engagement

Jordan's 2021 updated NDC mainstreams gender and vulnerable group participation. The private sector's role expands via public-private partnerships, concessional financing, and green bonds supported by Central Bank guidelines and the National Green Growth Plan.

4.8 Challenges and Way Forward

Key challenges are limited access to sustainable climate finance, capacity gaps in project preparation, fragmented data systems, and weak climate finance budget integration.

Planned actions include operationalizing the national MRV system, establishing a climate finance registry, advancing the Long-Term Low Emission Development Strategy (LT-LEDS), strengthening institutional readiness, and building partnerships to mobilize concessional and blended finance.

4.9 References

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Chapter V: Information on Flexibility

Information on flexibility (MPGs, para. 6) (Indication of (1) reporting provisions to which self-determined flexibility is applied, (2) capacity constraints in relation to the application of flexibility and (3) self-determined estimated time frames for improvements in relation to those capacity constraints).

FLEXIBILITY PROVISIONS- GHG INVENTORIES

Para 48- (Reporting F-gases): Summary on the use of flexibility provision

Year	All
Sector	2. IPPU, 6. Other
Category	All
Gas	PFCs, NF_3
Description of the application of flexibility	MPGs, Para 48
Clarification of capacity constraint	Limited technical capacities to calculate Emission reduction and data unavailability
Timeframe for improvement	BTR3
Progress made in addressing areas of improvement	-

Para 57- (Annual time series): **Summary on the use of flexibility provision**

Year	1990-2012
Sector	All
Category	All
Gas	All
Description of the application of flexibility	MPGs, Para 57
Clarification of capacity constraint	Limited time and resources to calculate Emission reduction and data unavailability
Timeframe for improvement	BTR2 and BTR3

Progress made in addressing areas of improvement	-

Para 29 (Uncertainty assessment)

Summary on the use of flexibility provision

Year	ALL
Sector	ALL
Category	ALL
Gas	ALL
Description of the application of flexibility	MPGs, Para 29
Clarification of capacity constraint	Limited capacities in the area
Timeframe for improvement	BTR2
Progress made in addressing areas of improvement	NA

FLEXIBILITY PROVISIONS- NDC TRACKING

1. **Information on projections of greenhouse gas emissions and removals under a 'with additional measures' scenario (Table 8- was not reported):** Each Party shall report projections pursuant to paras. 93–101 of the MPGs; those developing country Parties that need flexibility in the light of their capacities are instead encouraged to report such projections (para. 92 of the MPGs). Those developing country Parties that need flexibility in the light of their capacities with respect paras. 93–101 of the MPGs can instead report using a less detailed methodology or coverage (para. 102 of the MPGs). Projections shall begin from the most recent year in the Party's national report and extend at least 15 years beyond the next year ending in zero or five; those developing country Parties that need flexibility in the light of their capacities with respect to this provision have the flexibility to instead extend their projections at least to the end point of their NDC under Article 4 of the Paris Agreement (para. 95 of the MPGs).

   Justification: Limited time resources to calculate Emission reduction and data unavailability for correctly estimating emissions reductions relevant to certain measures.

2. **Information on projections of greenhouse gas emissions and removals under a 'without measures' scenario (Table 9- was not reported):** Each Party shall report projections pursuant to paras. 93–101 of the MPGs; those developing country Parties that need flexibility in the light of their capacities are instead encouraged to report such projections (para. 92 of the MPGs). Those developing country Parties that need flexibility in the light of their capacities with respect paras. 93–101 of the MPGs can instead report using a less detailed methodology or coverage (para. 102 of the MPGs). Projections shall begin from the most recent year in the Party's national report and extend at least 15 years beyond the next year ending in zero or five; those developing country Parties that need flexibility in the light of their capacities with respect to this provision have the flexibility to instead extend their projections at least to the end point of their NDC under Article 4 of the Paris Agreement (para. 95 of the MPGs).

   Justification: Limited time resources to calculate Emission reduction and data unavailability for correctly estimating emissions reductions relevant to certain measures.

Chapter VI: Improvements in Reporting Over Time

Jordan acknowledges key areas for improvement in implementing Article 13 of the Paris Agreement, particularly in enhancing data systems, inter-institutional coordination, and technical capacities for climate-related reporting. While Jordan has successfully submitted three National Communications and three Biennial Update Reports (BURs), several challenges persist, especially in relation to tracking support received and needed, improving transparency, and institutionalizing climate monitoring frameworks.

Ongoing and Planned Improvements

Jordan has embarked on a progressive path to improve the national transparency framework by developing the building blocks required for transitioning to the Biennial Transparency Report (BTR). Current efforts include the development of a national Monitoring, Reporting, and Verification (MRV) system to centralize and digitize the collection, management, and verification of climate data across mitigation, adaptation, and means of implementation.

Jordan has also initiated steps to:

- Engage with national institutions to harmonize climate-related data systems, with support from development partners.
- Expand the climate finance tracking methodology, with clearer classification of financial instruments and funding channels aligned with the MPGs.
- Build technical capacity through training, peer learning, and South-South cooperation on GHG inventory, transparency tools, and reporting.

Jordan's reporting improvements are informed by lessons learned from past BUR submissions, feedback received through the International Consultation and Analysis (ICA) process, and alignment with newly adopted Modalities, Procedures and Guidelines (MPGs) for the enhanced transparency framework.

Challenges and Gaps

A. Data Collection

- Absence of a centralized system for real-time, cross-sectoral data collection and archiving.
- Data gaps in emissions from solvent use, and some industrial subsectors.
- Limited availability and traceability of domestic and international climate finance flows, especially from private and non-governmental actors.

- Lack of disaggregated data on the type of support (grant, concessional loan, equity, etc.) and purpose (mitigation, adaptation, capacity building, technology transfer).

B. Institutional Arrangements

- Fragmented responsibilities across ministries with limited coordination on climate finance and MRV processes.
- Insufficient human and financial resources to carry out sector-level mapping of support received/needed.
- Limited awareness among implementing entities of how to report climate finance using frameworks like the MPGs classifications.

Recommendations for Improvements

The following recommendations can be expected to enhance the quality, consistency, and comparability of future reports. Jordan is committed to improving its institutional readiness for enhanced transparency by:

- Finalizing and operationalizing its National MRV Framework across sectors.
- Establishing a climate finance registry to better track inflows, instruments, and their alignment with national priorities.
- Technical assistance and international cooperation to bridge capacity gaps in data management, MRV, and transparency reporting.

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Annexes

This section will be updated during 2025-when we have access to the UNFCCC ETF website

A. Annex I CRTs for the electronic reporting of the national inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

B. Annex II CTF for the electronic reporting of the information necessary to track progress in implementing and achieving the NDC

C. Annex III: CTF-FTC Support tables

D. Annex IV Information in relation to the Party's participation in cooperative approaches

Jordan's participation in cooperative approaches under Article 6 of the Paris Agreement is evolving, with growing interest in leveraging international climate finance and carbon markets to achieve its Nationally Determined Contributions (NDCs). Here's an overview of Jordan's position and involvement in cooperative approaches:

Jordan's interest in Carbon Markets and Bilateral Cooperation
Jordan has expressed interest in participating in Article 6.2 mechanisms, especially those involving carbon markets, to attract climate finance and investment into renewable energy, waste management, and water efficiency sectors.

Jordan's updated NDC (2021) explicitly mentions exploring market and non-market approaches, showing openness to: carbon pricing instruments, results-based finance, Non-market approaches under Article 6.8 that support capacity building, technology transfer, and adaptation.

Finalizing the Article 6 framework and national registry is still underway. Capacity gaps should be dealt with.

Opportunities for Jordan

- Attracting international finance for low-carbon infrastructure.
- Strengthening public-private partnerships for climate mitigation.
- Positioning Jordan as a regional leader in Article 6 implementation in MENA.