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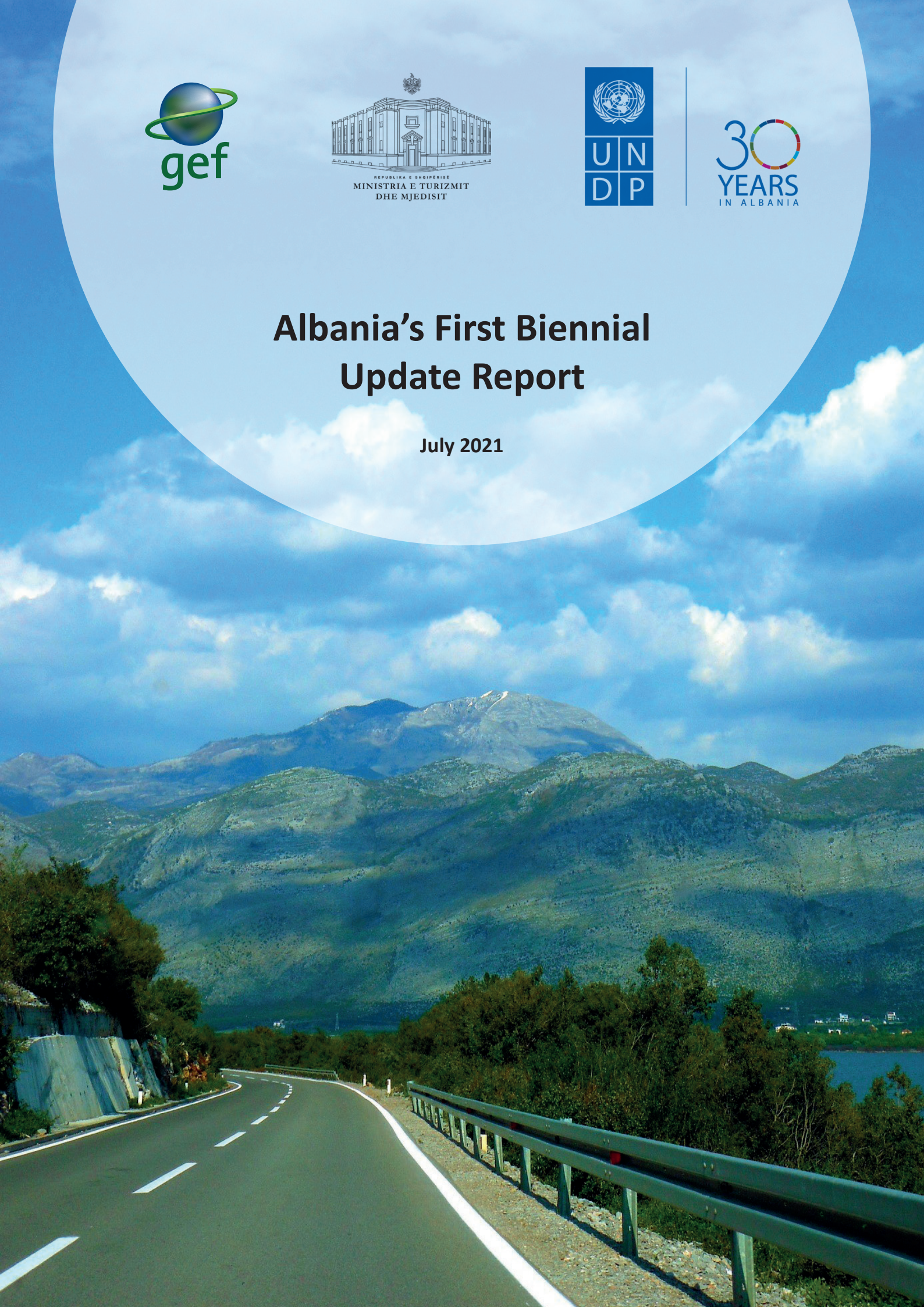
Albania's First Biennial Update Report

July 2021



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Climate change institutional and policy analysis	Elona Pojani (socio-economic scenarios), Narin Panariti (Financial resources, capacity building, technical &technology support received, other information), Emma Salisbury (Climate Change MRV), Edvin Zhllima (Gender issues)
Revised NDC	BAASTEL– CITEPA Consortium
Date	10 July 2021

This document has been developed within the Project “Republic of Albania: Enabling Activities for the Preparation of the Fourth National Communication and the First Biennial Update Report under the United Nations Framework Convention on Climate Change” implemented by the Ministry of Tourism and Environment and the United Nations Development Program (UNDP), with financial support of the Global Environment Facility (GEF)

Foreword

Since becoming a signatory party of the United Nations Framework Convention on Climate Change (UNFCCC), the Government of Albania has prepared three National Communications and the Nationally Determined Contribution and produced analysis and reports to inform our work alongside the national and international community. As we continue our work to address climate change, I am pleased to present the first Biennial Update Report.

Albania has taken action to support growth and revitalization in recent years, however there are still challenges we need to overcome, some of which have been made worse by the COVID-19 pandemic, and all of which will be impacted by the changes in our climate.

Around the world, changes in Earth's climate are affecting our health, our environment, and our future - Albania is no different. In Albania, we can all feel that our summers are longer and hotter, and winters milder and shorter. Air pollution affects our health and the oxygen we breathe. Droughts turn into sudden floods and wildfires rip through the forests. Our coast is warming 20% faster than the rest of the globe, and we are one of the countries hardest hit by coastal erosion in Europe. In our towns and cities air pollution is increasing and higher temperatures are risking the health of our population.

The mitigation, adaptation and sustainable development measures outlined in the Biennial Update Report demonstrate an ongoing commitment from the Government to embedding climate change action into key areas and sectors. Albania's mean GHG annual emissions amounted to 10.8 Mt CO_2e/y in the period 2009-2016. It is less than half the GHG emissions per habitant than the rest of Europe (EU-27), however, since the last report on Albania's NDC we have worked with international partners to increase the mitigation ambition, include coastal adaptation measures, and demonstrate transparently the accuracy and consistency of mitigation calculations.

Albania is progressing with climate change legislation aiming to establish a Monitoring, Reporting and Verification System to strengthen the data information collection processes and increase transparency on climate change. Albania also produced a Climate Change Gender Equality Plan (2021 – 2027) to strengthen capacities of institutions to integrate gender considerations in climate change policies and promote equitable participation and influence by women and men in climate change adaptation and mitigation decision-making processes. Albania participated in projects to mitigating environmental impacts of climate change such as improving water infrastructure and beach management which has resulted in Albania reaching EU standards in water quality.

In the upcoming years we will build on this work and move forward with the implementation of vital measures by ensuring climate finance readiness to reach the enhanced NDC target, improving public awareness, and building resilience and adaptation across sectors.

I am grateful for the support we have received from our partners, the United Nations Development Programme, and the Global Environment Facility in preparing this report, and am pleased to present it to the UNFCCC as part of Albania's contribution to tackling this international challenge.

Blendi KLOSI

Minister of Tourism and Environment

Acknowledgements

The development of the First Biennial Update Report of Albania to the United Nations Framework Convention on Climate Change has been a joint undertaking of the Ministry of Tourism and Environment (MoTE) and the United Nations Development Program (UNDP) in the frame of the support given by the Global Environment Facility (GEF) project "Republic of Albania: Enabling Activities for the Preparation of the Fourth National Communication and the First Biennial Update Report under the United Nations Framework Convention on Climate Change". Within this framework a core team of national and international experts has been mobilized representing a blend of experts from research institutions, private companies and independent ones working on project basis.

The report on First Biennial Update Report of Albania was successfully supported, led and coordinated by the Ministry of Tourism and Environment, while inputs and participation of national stakeholders from other line ministries, governmental institutions from different economic sectors, and specialized and/or interested NGOs did significantly contributed to its success. From the other hand the project has been supported and guided by the UNDP Country Office, the UNDP Istanbul Regional Hub, and the UNDP/UNEP Global Support Programme (GSP).

Three key experts have the primarily responsibility for developing the content of the BUR report: Mr. Besim Islami, Dr., Technical Coordinator of the GHG Inventory and Mitigation analysis, Ms. Eglantina Bruci, Prof. Dr., Technical Coordinator of the Vulnerability and Adaptation, and Ms. Mirela Kamberi, M.Sc., Team Leader/Project Coordinator of the UNDP Climate Change Programme (CCP). Besides their very professional inputs, UNDP CCP recognizes the direct contribution of the following blend of experts, mainly coming from the research institutions and academia, who worked under the guidance of the technical coordinators to feed the sectorial analysis as per their area of expertise:

- Greenhouse gas inventories and Mitigation analysis

Besim Islami – fuel combustion technologies; Mirela Kamberi – energy and climate; Abdulla Diku – agriculture, land use change and forestry, Gjergji Selfo – waste, Dritan Profka-industrial processes

- Vulnerability and Adaptation

Eglantina Bruci - climate, Miriam Ndini - water resources, Miranda Deda - disaster risk reduction, Abdulla Diku - agriculture, Sulejman Sulce - biodiversity and forests, Esmeralda Laci - tourism, population and settlements, Alban Ylli - health, Albana Zotaj - geographical information system, Oltion Marko - soils

- Climate Change Institutional and Policy Analysis

Elona Pojani – socio/economic scenarios, Narin Panariti - financial resources, capacity building, technical &technology support received, other information, Emma Salisbury - climate monitoring, reporting and verification, Edvin Zhllima - gender issues.

The First Biennial Update Report has also benefitted from:

(i) the National GHG Inventory Report for the years 2010 – 2016 (which includes as well a revision of the inventory results for the years 2005 and 2009 to adjust to the use of the 2006 IPCC Guidelines). The inventory covers the GHG emissions and removals estimates as divided into the following main sectors: (i) Energy; (ii) Industrial Processes and Product Use (IPPU); (iii) Agriculture, Forestry and Other Land Use (AFOLU) and (iv) Waste. The inventory covers the following Greenhouse Gases: CO_2, CH_4, N_2O, PFCs and HFCs and precursor and indirect emissions of CO, NO_X, NMVOC and SO_2.

(ii) the Revised NDC of Albania in response to Paris Agreement, supported by UNDP Climate Promise and developed by the Baastel – CITEPA Consortium with inputs from national consultants.

Special appreciation must be given to the support provided by the Ministry of Tourism and Environment of Albania specially to Minister H.E. Mr. Blendi Klosi and his cabinet.

Special thanks go to Mr. Rezart Fshazi, director of Policies and Strategies of Environmental Development and the UNFCCC focal point and to Ms. Eneida Rabdishta, Specialist of Climate Change, both sitting within the Ministry of Tourism and Environment, but also to a number of other colleagues within the MoTE with previous responsibilities on climate change during the last two years. Furthermore, many thanks go to the other Project Steering Committee members, Ms. Lauresha Grezhda (Ministry of Agriculture and Rural Development), Ms. Laureta Dibra (Ministry of Infrastructure and Energy), Mr. Gentian Opra (Ministry of Finance and Economy), Mr. Razlind Shytaj (Ministry of Defence), Ms. Albana Hasimi (IGEWE), Mr. Ndue Cuni (INSTAT), Mr. Ervin Arapashi (Vlora Region), and Ms. Lira Hakani (EDEN Center).

The UNDP CCP appreciates the time that several research institutions, line ministries and other interested organizations took to share ideas, discuss their own practical experiences and review the draft document, including a number of junior experts involved for the first time with data collection and assessment. The last 2 years were unique and difficult as the country was hit by the November 2019 earthquake and immediately after the Covid-19 pandemic was declared in March 2020. We had to adopt new strategies and new ways of working like virtual evaluations, consultations and training sessions substituting face-to-face ones, however working harder to not compromise the quality of the provided report.

Many credits go to the contribution of the UNDP Country Office especially to Ms. Limya Eltayeb, the UNDP Resident Representative and Ms. Elvita Kabashi, the Environmental Cluster Head.

UNDP CCP gratefully acknowledges the important contribution of Mr. Damiano Borgogno and his team of the UNDP – UNEP Global Support Programme.

Emma Salisbury served as principal writer and proof-reading provider of the English version of the Report. She contributed with her writing and designing skills to provide the entire document, logically linking the technical chapters together.

Despite the wide range of inputs into the process, the responsibility for this final output rests with the National Project Manager and any errors and omissions thereof is not to be attributed to the other participants in the process.

Mirela Kamberi, M.Sc.

Team Leader/Project Coordinator

Executive Summary

National Circumstances

The Republic of Albania is a Balkan country in south-east Europe. Albania has a Mediterranean climate, with mild and humid winters and hot and dry summers. Rainfall occurs mainly during the second half of the year and climatic conditions differ considerably between regions. Since the 1960s, the annual mean temperature in Albania has increased by 1°C, and there has been a six to eight-fold increase in the intensity, duration and number of heatwaves across the eastern Mediterranean. Albania is a highly biodiverse country. The mountainous topography, the different geological strata, types of soil and Mediterranean climate with some continental influence contribute to this diversity. In 2019, Albania had an estimated population of 2.88 million. Recent demographic developments show that Albania's population is shrinking and aging. In 2018, the average population density was 99.7 inhabitants per km^2.

As a result of three decades of remarkable economic growth, in 2019, its gross domestic product (GDP) was USD 15.3 billion, and its GDP per capita was USD 5,450. However, public debt was over 65% in 2019. This economic growth has been associated with structural economic changes, with a transition from an economy based on raw materials, agriculture and industry, into a more diverse economy where the service sector plays a leading role. Over the last three decades social indicators have improved in Albania. In 2019 Albania's Human Development Index value was 0.795 – which put the country in the high human development category. Unemployment reached a historically low 11.4 percent in Q3 of 2019. The socio-economic progress of Albania has been recently hampered by two shocks: the country was hit by a devastating earthquake in November 2019 and in the midst of the reconstruction efforts, the COVID-19 crisis took hold. The earthquake and the pandemic are expected to significantly increase poverty in 2020, with resulting poverty rates comparable to those in 2005.

National Greenhouse Gas Inventory

As a Non-Annex 1 country to the UNFCCC, Albania has been developing an inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs) emitted to or removed from the atmosphere since 1990 as part of its National Communications (NCs) on Climate Change and now as part of this report, Albania's First Biennial Update Report. For the first time, Albania published a National Inventory Report (NIR) alongside this report that provides detailed information regarding the GHG inventory in this report.

This report includes a national GHG inventory for the years 2010-2016 and a revision of the inventory results for the year 2009 to adjust to the use of the 2006 IPCC Guidelines. The inventory covers the GHG emissions and removals estimates as divided into the 2006 IPCC Guidelines: Energy, IPPU, AFOLU and Waste. To facilitate aggregate reporting of the GHG values, expressed as carbon dioxide equivalents (CO_2 eq.), as indicated in the Decision 17/CP.8, the global warming potentials (GWPs) values provided in the IPCC Second Assessment Report (temporal horizon 100 years) are used. The inventory covers the following GHGs: CO_2, CH_4, N_2O, PFCs and HFCs and precursor and indirect emissions of CO, NO_X, NMVOC and SO_2.

The GHG inventory was coordinated by the Ministry of Tourism and Environment as the UNFCCC focal point and the central authority in Albania in charge for climate change policy. The preparation of the GHG inventory was project based, supported by the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP). Six professionals were engaged to form the GHG inventory team (each of them responsible for one or more sectors including data collection). The inventory was prepared using the latest IPCC Inventory software version available at the time of the preparing the inventory (IPCC 2006 software - version 2.691).

The table and figure below show net emissions, including removals from AFOLU, for the years 2009 to 2016 disaggregated by sector. Energy and AFOLU are the most significant contributors of GHG emissions in Albania.

Table 1: Anthropogenic GHG emissions by sector in Albania (Gg CO_2 eq.)

Sector	2009	2010	2011	2012	2013	2014	2015	2016
Energy	4,340	4,347	4,398	4,252	5,026	4,746	4,813	4,781
IPPU	1,358	967	1,125	1,154	1,245	1,194	1,106	1,020
AFOLU	3,748	3,870	6,647	7,641	3,641	3,560	3,620	3,688
Waste	621	660	705	747	784	801	821	839
Other	75	80	82	83	86	104	129	134
Total	**10,141**	**9,924**	**12,957**	**13,876**	**10,782**	**10,405**	**10,489**	**10,461**

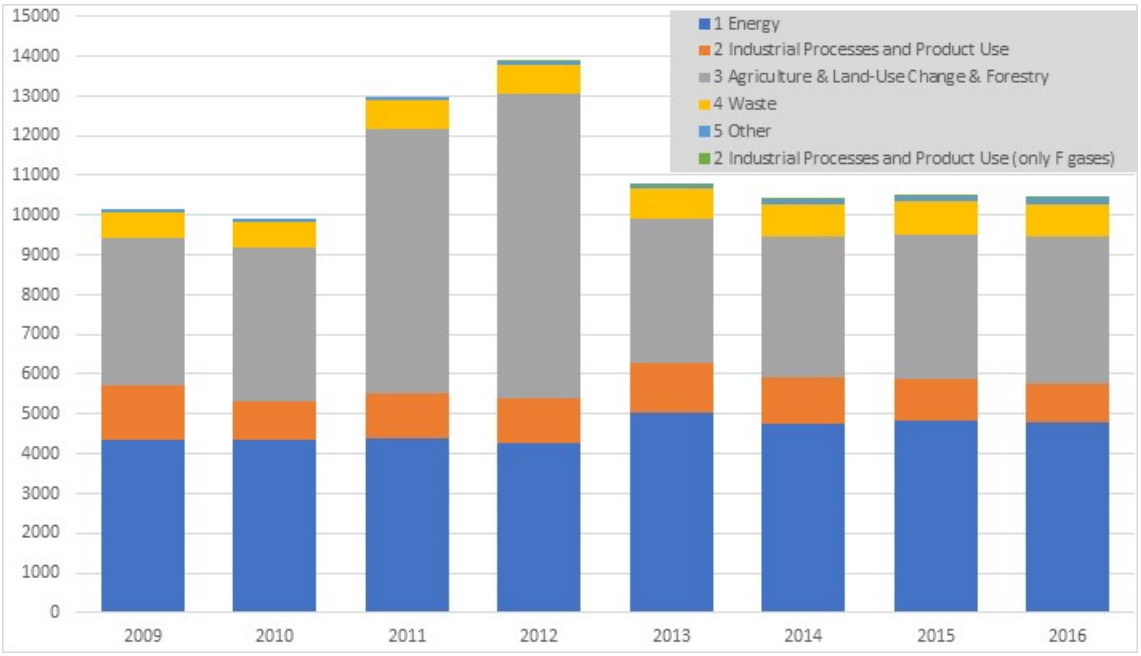


Figure 1: CO_2 eq. emissions and removals from all economic sectors (Gg)

The analysis of key categories that contribute the most to the absolute level of national emissions and removals (level assessment) and to the trend of emissions and removals (trend assessment), was conducted using Approach 1 in the 2006 IPCC Guidelines and identified 18 key categories for 2016. An uncertainty analysis using the Error Propagation method (Approach 1 in the 2006 IPCC Guidelines) was carried out to quantify the uncertainty of the compiled estimates and to help prioritise efforts to improve the accuracy of the inventory. The overall uncertainty of the 2016 estimates is 5.8% and the overall uncertainty of the 2009-2016 trend is 5.1%. QA/QC procedures to ensure the accuracy of GHG inventory outputs as well as improvements and recommendations for future inventories are outlined in the NIR.

Mitigation actions

On 22 April 2016 Albania signed the Paris Agreement, which was ratified on 21 September 2016 and entered into force on 4 November 2016. At the COP24 in Katowice 2018, the President of Albania signed the Solidarity and Just Transition, Silesia Declaration. With this signature, commitment was made for an effective and inclusive transition to low GHG emissions, climate resilient development and

to enhance the public support for achieving the long-term goals of the Paris Agreement. In 2019 Albania committed to develop its National Energy and Climate Plan for the period 2021-2030. In 2019 Albania became member to the NDC Partnership, showing its commitment to ambitious implementation of its NDC under the Paris Agreement and the 2030 Sustainable Development Goals.

In 2019 Albania endorsed the Strategic Document on Climate Change and its Action Plan on Mitigation. Six mitigation strategy priorities (SP) are identified:

- **SP.1 Ensure sustainable economy growth**
- **SP.2 Establish a monitoring, reporting and verification system of GHG**
- **SP.3 Strengthen the capacity of relevant institutions and inter-institution cooperation**
- **SP.4 Streamline climate changes across sectoral strategic planning**
- **SP.5 Reinforce capacity building and awareness raising**
- **SP.6 Align with the EU Climate Change framework**.

Albania has secured support from the NDC Partnership to update and enhance the NDC that it submitted in 2015. In particular, Albania aims to increase its mitigation ambition, expanding the sectors that are considered (adding transport and agriculture, forestry and land use, to energy and industrial processes) and include adaptation measures, especially related to coastal areas. The country's revised NDC will also show the consistency and accuracy of mitigation calculations in a transparent manner, and the fairness of its ambition, and present Albania's national circumstances. The mitigation assessment presented in this report reflects the work undertaken during the update of the First NDC. The NDC relies on the comparison between a business-as-usual scenario (BAU) and a scenario that considers mitigation measures, referred to as the NDC scenario. Projections rely on macro-economic assumptions such as GDP and population forecast but also on historical trends, strategies and plans as endorsed at national level. Population is expected to remain constant on the time series.

The BAU scenario relies on current trends and future economic development and considers the national circumstances. No major technology switch is considered. The main impacts concern the introduction of imported natural gas in the country around 2023, the increase of biofuels share in road transport as well as the consideration of energy efficiency based on technology improvement and fleet renewal. Considering all sectors (including FOLU), emissions in the BAU scenario are expected to increase from 10,139 kt CO_2e in 2016 to 15,148 kt CO_2e in 2030, which represents a growth of +49.4%. The NDC scenario considers national strategies and action plans as detailed in sectoral analysis.

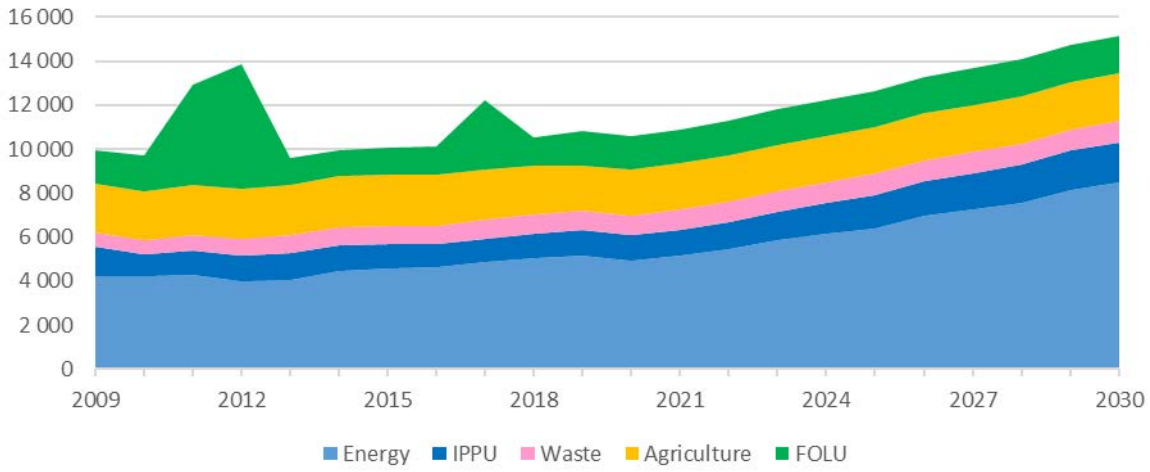


Figure 2: Historic and projected emissions for all sectors (BAU)

The Energy sector NDC scenario is based on Combined Strategy scenario, calibrated with figures for the period 2015-2019. The NDC scenario considers the introduction of natural gas in almost all sectors. It also considers the implementation of different National Energy Efficiency Actions Plans (NEEAP) to increase energy efficiencies in both supply and demand reaching 15% of the national final energy demand gain in 2030. It also considers the National Renewable Energy Action Plan (NREAP) with a share of 38% renewables in the final energy consumption in 2020 and 42% in 2030.

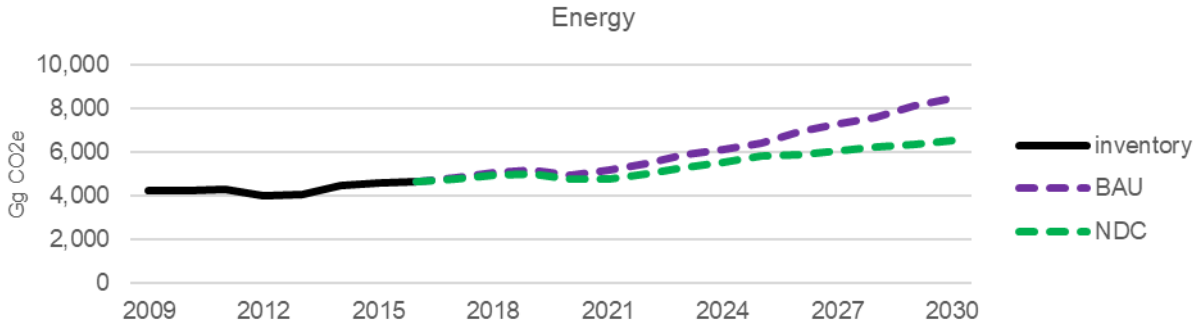


Figure 3: Projected BAU and NDC scenario emissions for energy sector

For the IPPU sector, no mitigation actions are designed or are in place. The impact of energy efficiency or fuel switch measures in the industry are considered in the Energy sector. BAU and NDC scenarios are therefore identical.

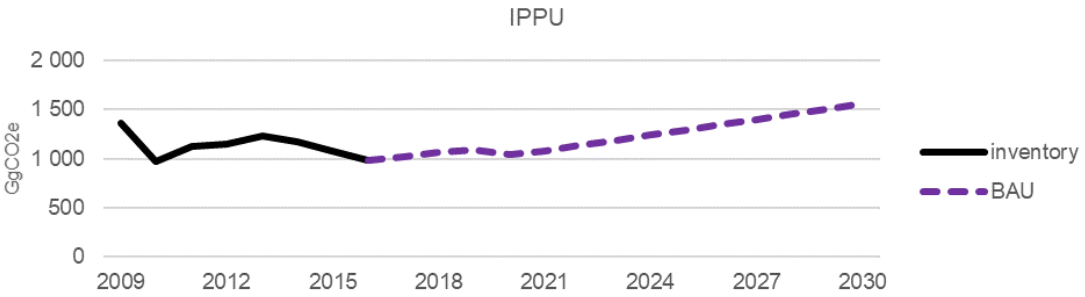


Figure 3a: Projected BAU IPPU-related emissions

In the Waste sector, the small difference observed between the two scenarios can be partly explained by the degradation kinetics of the waste sent to landfills. In fact, this kinetics induces a gap between the maximum of buried waste (960 kt in 2010) and the emission peak observed (728 kt CO_2e in 2024). In parallel, a strong increase of emissions associated with the development of waste incinerators in the country is considered.

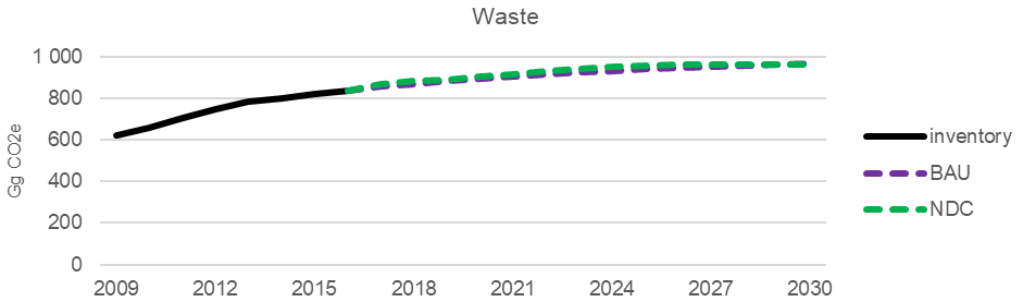


Figure 4: Projected BAU and NDC scenario emissions for waste sector

Additional mitigation measures considered in Agriculture allow an improvement of fertilisation, pasture, and animal feeding practices (see table below). However, these actions have little impact considering the importance of livestock population in the emissions. In line with the national strategy, and considering the national economic circumstances, the aim is an increase in production, no decrease of livestock population, and an increase in yields. This explains that emissions for the NDC scenario for the agriculture sector (with mitigation measures) decrease from 2,344 kt CO_2e in 2016 to 2,071 kt CO_2e in 2030, which represents a change of -11.6% (see figure below). The difference, in 2030, with the BAU scenario, is -68 kt CO_2e, which represents a limited mitigation impact of -3.2%.

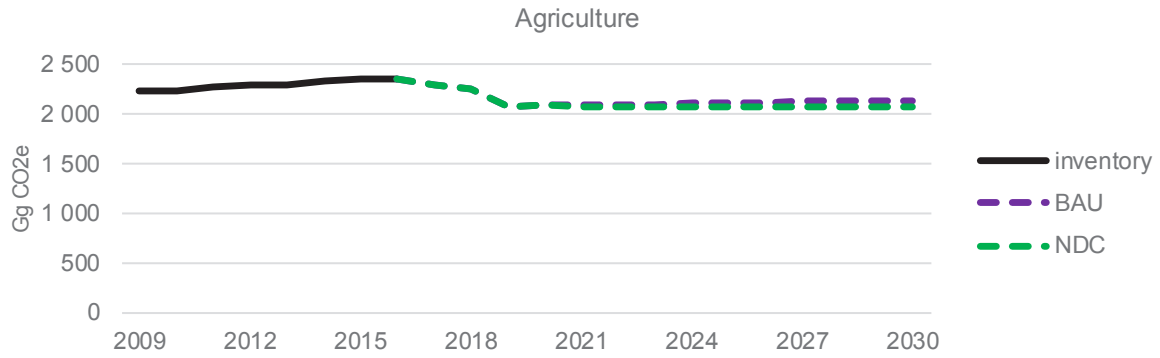


Figure 5: Projected BAU and NDC scenario emissions for agriculture sector

Emissions in the FOLU sector for the NDC scenario (with mitigation measures) decrease from 1,319 kt CO_2e in 2016 to 598 kt CO_2e in 2030, which represents an evolution of -54.7% (see figure below). The difference of 2030 with the BAU scenario is -1,174 kt $CO_2eq.$, which represents a mitigation impact of -66.2%. The big forest fires episodes caused the two peaks (2011-2012 and 2017) and such episodes could not be projected. However, it is considered, in line with the national policy (Draft Environmental Cross-cutting Strategy), that an effort is put to avoid such episodes through the improvement of the monitoring system to prevent wildfires. In addition to this action regarding the prevention of wildfires, other mitigation measures are considered in the NDC scenario: the reduction of the use of fuelwood (the assumption on fuelwood consumption being estimated in the Energy sector so that FOLU and Energy sectors are consistent); new afforestation areas; improved efficiency of fuelwood harvest; improved sustainable management of forests, cropland and grassland to enhance carbon sequestration and protect biodiversity.

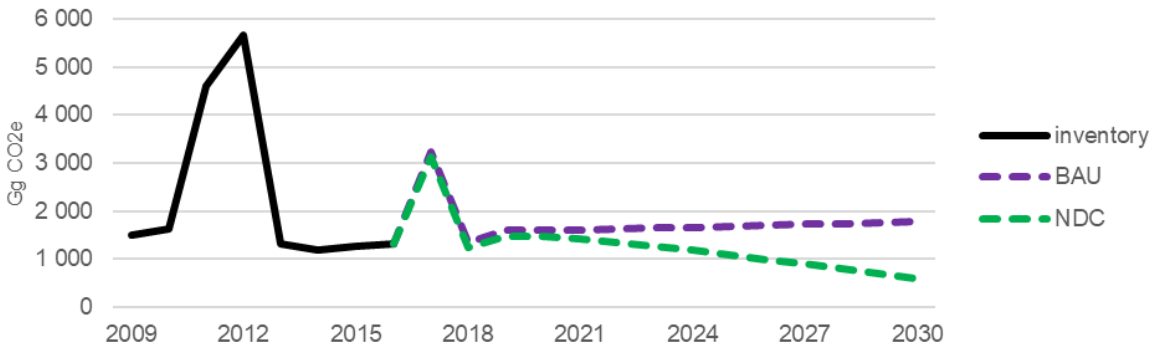


Figure 6: Projected BAU and NDC scenario FOLU-related emissions

Adaptation analysis

The adaptation assessment focusses on the Vjosa River basin (VRB), which is the second largest water system in Albania covering an area of 6784 km^2. It is one of the longest transboundary rivers in the Balkan area. Approximately one-third of its headwaters are located in northwest Greece, where it is known as the Aoös (Αώος) River. In Albania, the Vjosa catchment has a mean elevation of about 855 m, and it is shared among seven districts. Because the river has not been subjected to large damming or channelling schemes, it is considered one of the rare remaining natural flow regimes in Europe.

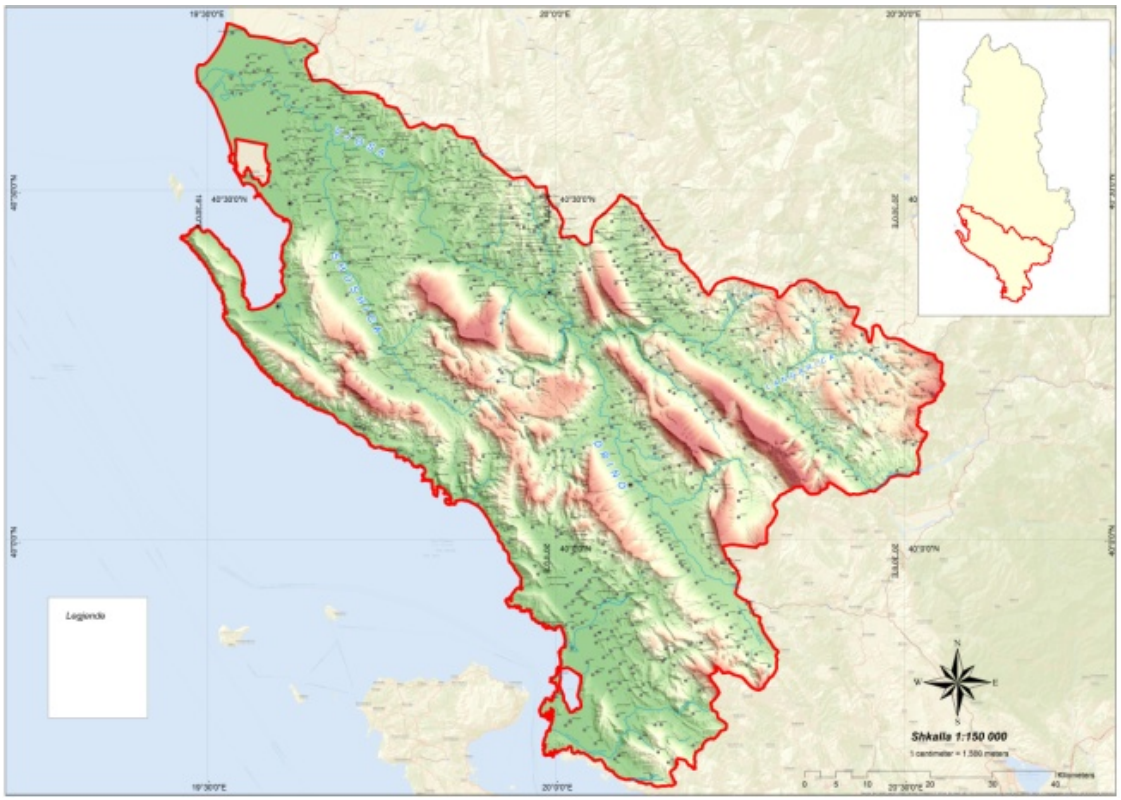


Figure 7: Map of the Vjosa River Basin

After 2000, the mean temperature trend shows a period of the positive anomaly from 2001 to present. This is a consequence of an increase in both maximum and minimum daily temperatures, especially in

summertime. The annual average temperature in 2010 has already reached the values projected for 2020. Since 2000, there has been a period of increasing precipitation. Analysis of seasonal precipitation patterns shows no consistent patterns in variation with periods above and below normal values.

The climate change projections are downscaled from the global 'Representative Concentration Pathways' (RCPs) for the climate science assessment ('Working Group I') of the Fifth Assessment Report (IPCC, 2014) and calibrated for the VRB area.

In terms of **temperature**, all scenarios for the VRB suggest that the area is likely to become warmer. Similarly, increasing trends in annual and seasonal temperatures, both minimum and maximum values, are expected. Temperature extremes are also expected to increase. The analysis of the precipitation projections shows a negative slight trend for all seasons and time horizons. The analysis indicates a higher risk for intensification of heavy precipitation that causes flooding as well as a likely increase in drought frequency. Sea level is projected to rise.

Water resource is one of the most vulnerable environmental factors in terms of climate change impact. Reduction in river flow depends primarily on changes in the precipitation total, on their distribution within the year and whether precipitation falls as snow or rain. These factors are all influenced by climate change. Temperature is particularly important in snow-dominated basins. The increase in temperature will influence the evaporation process in the basin which also affects river flows even at the sub-catchment scale. Potential evaporation is also highly likely to increase in all areas due to these higher temperatures. These increases will be larger in seasons in which rainfall decreases. For all the analyses conducted, the decrease in mean annual precipitation produces a decrease in mean annual runoff in the VRB. Expected changes in precipitation and temperatures will affect not only the hydrology of the watershed but demand for water as well. Industrial and domestic water demand show similar changes across all climatic scenarios. Only water demand from irrigation is exerting additional pressure on a changing climate.

Agriculture will be impacted by climate change. An increase in frequency and intensity of drought and flooding will cause severe physiological and direct stress to plants (and animals) as well as the change to the timing of water availability. These changes may mean it is no longer be suitable for current agricultural practices. Likely changes in the sea level will greatly impact agriculture in flat areas (mostly coastal areas which include Fieri, Vlora and Xara fields in Saranda) due to flooding, intrusion of salt water into agriculture lands, loss of land from coastal erosion, etc.

Soils will be impacted by climate change. Soil erosion is evaluated by using the Potential Erosion Method (PEM). This evaluates the potential amount of material eroded and deposited for the years 2035 and 2050. The analysis reveals that soil erosion is moderate in VRB area and the phenomenon will continue to be active in the coming years, undergoing a gradual increase of the quantity of eroded material.

Disaster risk management is a key requirement of adapting to climate change. The analysis shows an increasing number of disaster events in the past three decades when considering floods, flash floods, forest fires, landslide, storm, snowstorm, and heavy rains. The most affected municipalities are Fieri, Vlora, Gjirokastra, Permet and Mallakaster. The number of disasters is expected to increase. Flooding is one of the most important disasters in the VRB, especially in the downstream part.

Biodiversity and forest ecosystems will be impacted by climate change. Assuming a 1-2°C increase in temperature, meadow ecosystems are expected to replace forest ecosystems. The increase in temperature will result in different soil conditions making it unsafe to plant sustainable forests in the mountain meadow land belt up to 1900 m above sea level. As temperatures rise there will be a greater mix of forests. Rare vegetation will become dominant impoverishing forests with environmental and economic value. Wetlands of national importance in the Vjosa delta will change due to the increase of the sea level and the temperature of the aquatic environment. Installing hydropower plants will have a serious impact on wildlife. It might cause the permanent loss of habitat and special biotopes through inundation, fluctuating water levels, dispersal of exotic species and obstacles for fish migration. However, the impacts are very general, and it is hard to put any numbers on the losses. Among the fungal diseases that are infecting Platanus orientalis is canker stain (Cerotostitis Platenea) of plane trees. In the Vjosa valley this disease has appeared in the last ten years and is gaining momentum. Temperature changes of 1°C encourage the vectors and the disease itself to spread to other valleys.

Tourism and settlements will be impacted by climate change – both positive and negative. For the coastal area of the VRB the projected increase of temperature is expected to extend the period for sun and sea tourism. The projected temperature increase in the upper section of the basin is expected to have negative effects on winter tourism. In agritourism and rural tourism the heavy rains, especially in the intermediate seasons, will alter the holiday and the contact with nature will be increasingly altered due to the impossibility of having a direct relationship with it and limiting sharing with the farmer's work. A considerable increase for the need for water and energy is expected. The water demand will increase because of the increase of tourist numbers and of tourists' water demand. Projected changes in both minimum and maximum temperatures, the degree days for heating are expected to decrease and degree days for cooling to increase. There will be an increasing energy demand for cooling especially in the coastal part of VRB.

Health and sanitation will be impacted by climate change. Asthma is exacerbated by changes in pollen season and allergenicity and in exposures to air pollutants affected by changes in temperature, humidity, and wind. In spite of demographic changes, by 2031 in the VRB, there are expected to be 800-1200 additional cases of asthma, compared to 2019, very likely attributable to climate change. The population of Vlora Region is the most exposed to the condition. Cardiovascular disease increases sensitivity to heat stress. In VRB regions, 190,000 to 230,000 people are estimated to suffer from cardiovascular diseases (including hypertension) by 2031. Most of them will have some forms of exacerbations of the condition as a consequence of climate change, increasing the need for extra health care efforts and jeopardising the efficacy of existing programs of control. It is estimated that between 2030 and 2050, on average more than 70 additional deaths every year will be attributed to heat waves in VRB. Gjirokastra is expected to be the most affected region. Chronic pulmonary diseases increase sensitivity to changes in ambient air quality associated with climate change. It seems very likely that more than 30% of the expected pulmonary cases will suffer from additional consequences attributable to climate change and deterioration of air quality. Gjirokastra region is expected to be the most affected region. Many infectious agents increase their circulation and virulence in warmer temperatures. The age standardised rate of a number of infectious and parasitic diseases is projected to increase in VRB regions.

Albania continues its **efforts to address climate change adaptation** in national and sector strategies and plans, legislation, management plans, etc. In Albania, there are strategies in place related to climate change adaptation including the National Strategy for Development and Integration 2015-2020, Environmental Cross-cutting Strategy 2015-2020, Document of Strategic Policies for Protection of Biodiversity for the period 2016-2020, National strategy for Integrated Water Resources Management, National Climate Change Strategy and Plan, General National Plan 2030 and the Integrated Cross-sectoral Plan for the Coast. The adaptation actions proposed through legislation are summarised in the table below (Table 2).

Table 2: Summary of proposed action to address climate change adaptation

Strategy area	Proposed action	Strategy documents
Ensure the sustainable management of natural resources and undertake climate action.	Better management of forests and water, and the application of agricultural production methods in environmental protection and mitigation of climate changes.	NSDI-II
	A targeted increase in the number of certified organic farms by 2020.	NSDI-II
	An increase in the number of farmers benefitting from irrigation infrastructure to 300,000 by 2020.	NSDI-II
	Improving water efficiency, irrigation infrastructure, plant varieties, drainage system, fertilisation and soil moisture conservation in agriculture.	GNP
Enhance and strengthen the protection of nature.	A targeted 17% increase in the surface of Protected Areas of the territory through the enhancement and integrated management of protected areas.	NSDI-II
	The assurance of conservation status for 5% of threatened species and habitats.	NSDI-II
	The establishment of the ecological network "Natura 2000" of Special Areas of Conservation of importance to the EU.	NSDI-II, ECCS
	Increasing the number of protected areas and improving the management of the existing areas.	ECCS
Strengthen the management and preservation of forestry and pasture resources.	A targeted 40% reduction in illegal logging by 2020.	NSDI-II
	Achieving 100% coverage with breeding plans for all forest economies countrywide.	NSDI-II
	The rehabilitation of 25% of degraded areas.	NSDI-II
	Improved forest management plans and afforestation.	ECCS
	Prevention of illegal cutting through the control of the Forest Police.	ECCS
	Prevention of fires.	ECCS
	Reforestation of coastal and internal forests.	ECCS
Strengthen the management of water use, in order to reduce floods and phenomena of erosion and soil loss.	The rehabilitation and modernisation of existing infrastructure related to irrigation, drainage and flood protection	NSDI-II, GNP
	The development and implementation of mechanisms for the sustainable management of irrigation, drainage and flood protection systems (qualitatively improve the functionality of the drainage system).	NSDI-II
	The preparation and implementation of the river basin management plans.	NSDI-II
	The rehabilitation of damaged riverbeds.	NSDI-II
	Rehabilitation of buildings damaged by natural causes	NSIWRM
	Strengthening cooperation and fulfilling institutional obligations.	NSIWRM
	Mitigating the consequences by providing financial support to families whose homes have been damaged by natural or other disasters.	NSIWRM
	Developing a National Disaster Management Plan including: • Initial flood risk assessment for each watershed • Water scarcity risk analysis (also related to forest fires) for each watershed • Reducing the risk of waterborne diseases	NSIWRM

Strategy area	Proposed action	Strategy documents
	• Establishing early warning systems.	
	The inclusion of climate change issues in all strategic papers of water management.	ECCS
	Better management of water resources to reduce the effects of flooding and drought and consequent soil loss.	ECCS
	Water demand management through reuse, securing new water reserves, rainwater, desalination, etc.	GNP
	Monitoring coastline dynamics and sea level.	GNP
	Monitoring of water quality in wetlands and groundwater.	GNP
	Management of coastal erosion as well as adaptation measures to cope with expected sea level rise.	GNP
Develop sustainable tourism	Develop sustainable tourism in Albania, which will help preserve natural ecosystems.	NSDI-II

Constraints, gaps and needs

The **National Mitigation Plan** has been drafted based on a number of sectoral strategies, existing legal framework and draft laws/plans. The sources of the mitigation actions' financing are provided in the respective documents. The National Mitigation Plan (NMP) has summarized the measures affecting the GHG emissions and analysed the total costs and sources of funding as shown in the table below. The financial gap turns out to be largely in the measures to be implemented after 2022, the costs of which are based on existing documents such as the Biodiversity Strategy Policy Document, the National Energy Efficiency Action Plan, etc. the financial gap is projected to be partially funded by the state budget and the rest by donors.

Table 3: Financial resources for the implementation of the Mitigation Plan (in 000 ALL)

Sector	State Budget	EU	Other Donors	Financial Gap	Total
Energy	23,422,408	-	6,551,819	6,906,638	29,974,227
Transport	38,354,551	262,320	6,811,289	5,270,346	45,428,160
Agriculture	9,663,350	-	1,064,214	-	10,727,564
Forestry and other land use	1,471,226	-	-	4,480	1,471,226
Cross-sectoral	-	-	15,000	15,000	15,000
Total	**72,911,535**	**262,320**	**14,442,322**	**12,196,464**	**87,616,177**

The **National Adaptation Plan** identifies 15 priority actions, which were designed by the Climate Change inter-ministerial working group (IMWG) members through an extensive capacity development and participatory approach. These adaptation priority actions (PAs) are perceived in the form of a project fiches, so that the respective actors can later develop them further for funding. The total cost for the implementation of the NAP, is estimated to be approximately 11 billion Albanian Lek (ALL), or approximately 80 million Eur.

Table 4: NAP Budget requirements for Priority Actions 2017 – 2020 (in Million Lek)

List of measures	Total budget	Government	Donors	Others	Financial Gap
PA 1	10,800.00	10,800.00	-	-	-
PA 2	16,000.00	-	5,000.00	-	11,000.00
PA 3	150,000.00	4,920.00	49,200.00	-	95,880.00
PA 4	688,000.00	-	688,000.00	-	-
PA 5	93,750.00		50,000.00	43,750.00	-
PA 6	246,000.00		246,000.00	-	-
PA7	1,841,500.00	412,000.00	900,000.00	7,500.00	522,000.00
PA8	1,044,500.00	174,000.00	870,500.00	-	-
PA9	4,925,000.00	1,960,000.00	2,965,000.00	-	-
PA10	145,000.00	73,000.00	-	-	72,000.00
PA11	148,500.00	15,000.00	-	-	133,500.00
PA12	202,500.00	13,500.00	-	-	189,000.00
PA13	81,200.00	16,000.00	-	-	65,200.00
PA14	1,201,500.00	243,000.00	958,500.00	-	-
PA15	242,000.00	48,400.00	193,600.00	-	-
Total	**11,036,250.00**	**2,970,620.00**	**6,925,800.00**	**51,250.00**	**1,088,580.00**

Financial resources, capacity building, technical and technology support received

Efforts continue to strengthen the capacity of the staff responsible for climate change or related issues. Training courses and workshops have been provided to the relevant staff of NEA, MoTE, MoIE, MoARDWA, Technical Water Secretariat, etc. by different training providers in the frame of different projects, such as IBECA, ECRAN, TAIEX, RIPAP, PRO NEWS and SANE27 and donors such as the EU, Environment Agency of Austria, Environment Agency of Germany, Swedish Environment Protection Agency, Energy Community and REC.

Efforts continue to implement projects and support funds aimed at increasing mitigation action and Albania's resilience to climate change, including:

- EU Flood Protection Infrastructure Project
- Biomass energy for productive use for small and medium enterprises in the olive oil sector
- Building the resilience of Kune – Vaini Lagoon through ecosystem-based adaptation
- Climate-friendly Integrated Solid Waste Management and Circular Economy Project
- Support Establishment and Advancement of Pollutant Release and Transfer Registers
- Establishing Albania's Environmental Information Management and Monitoring System
- Green Economy Financing Facility
- Green for Growth Fund
- Wind parks
- Photovoltaic plants
- Photovoltaic energy supply as back up for three National Park centres
- Waste to Energy Plants.

Monitoring, reporting and verification

The Ministry of Tourism and Environment and the National Environment Agency (NEA) have key roles for monitoring, reporting and verification (MRV). Albania's national MRV system is being developed to engage with relevant stakeholders in a system that supports the rapid and cost-effective implementation of climate action; ensure a sustainable and continuously improving institutional memory with long-term teams of experts who can monitor, report and verify data; and produce transparent and informative national documents in a timely manner supporting Albania's contribution to the Paris Agreement's long-term goals.

Albania has developed a prototype MRV management portal to strengthen the data and information collection processes for MRV under GHG inventories, mitigation, adaptation and climate finance. This portal provides a secure platform for climate action information to be stored and managed.

Regarding **MRV for mitigation**, the Ministry of Tourism and Environment is the national focal point. National technical experts were contracted by the UNDP under the Climate Change programme to carry out the update of the GHG inventory and projection scenarios. They took part in training and have been involved in previous GHG inventories. The data collection process for the GHG inventory and projections has not yet been formalised in Albania. However, many of the key datasets including the Energy Balance are officially reported datasets by organisations such as INSTAT, which ensures the quality and completeness of the data. The underlying data, information and documentation related to the GHG inventory and projections is archived at UNDP. The Climate Change Law has been endorsed. It is envisaged that the corresponding Decision on MRV will be endorsed by the end of 2021. The results of the mitigation assessments carried out by Albania are published in international reports available to all interested stakeholders.

Regarding **MRV for adaptation**, the Ministry of Tourism and Environment is the national focal point. National technical experts were contracted by the UNDP under the Climate Change programme to carry out the update of the climate, impact, risk and adaptation analyses. The expertise developed in previous work was directly transferred to this work because of continuity of the national experts contracted to carry out the work. As such, there has been a clear group of experts to benefit from training opportunities continually updating their knowledge for many years. The model inputs, outputs and all other analyses and underlying data are stored by the national experts, UNDP and the Ministry of Tourism and Environment. This ensures that enough back-up of all documentation is in place. The outputs from this work were communicated to the general public through the production of publicly available articles and TV interviews. It is envisaged that a public facing website will be developed by the end of 2021 as part of the website for the Ministry of Tourism and Environment to provide visitors with information related to climate change.

Regarding **MRV for support and climate finance**, support is provided via financial support from public, private, international and national entities. It can also be provided via technology transfer and capacity building. Tracking these activities can support the effective implementation and reporting of climate finance. There is currently no central process for tracking these activities within Albania. The Ministry of Finance and Economy tracks the projects co-ordinated by aid agencies and receives monthly progress reports for all activities. These reports follow a consistent reporting template. Each line ministry individually tracks the projects for which they are managing and under some of these projects, such as those funded by the EC, progress reports are submitted which are a further source of information regarding climate support. The Climate Change Law instates the Ministry of Tourism and Environment as the authority that will track climate finance. The ministry will need to track all activities linked to climate change and track and analyse the support mechanisms through each.

Other information

The Paris Agreement refers to **gender-responsive approaches**, as well as to the goals of gender equality and empowerment of women. Government efforts for achieving Sustainable Development Goals in 2030 require progress towards gender equality as a stand-alone goal and a cross-cutting issue across a number of other goals. In Albania, policy steps to bring gender mainstreaming into climate change policies are not yet thoroughly addressed by national policies. As from gender considerations in laws related to climate change (Law no. 45/2019 "On civil protection" approved on 18/07/2019 and the Law on Climate change approved by DCM 499 date 17.7.2019), there are no separate gender sensitive objectives and actions and the language used especially in the narrative description of these strategies is almost gender blind. Considering the scarce efforts made regarding gender mainstreaming, an analysis has recently been undertaken on the state of gender equality in relation to the impacts of climate change.

A series of measures is necessary for promoting equitable participation and influence by women and men in adaptation decision-making processes. This will help allow equitable access by both women and men to financial resources and other benefits resulting from investments in adaptation. The main objectives are to:

1. Promote gender equality in decision making on climate change policies on central levels of policymaking and strengthen capacities of institutions to integrate gender considerations in climate change policies
2. Update the relevant national and local strategic documents in order to integrate best practices and information with gender and climate change issues taken into consideration
3. Develop and pilot gender-related climate change adaptation and mitigation projects with demonstration and awareness focus in agriculture as well as energy at local level with focus on Vjosa river
4. Engage stakeholders in the process of the monitoring of Action Plans in relation to National Strategy on Climate Change (NSCC), the National Action Plan on Mitigation (NAPM) and the National Adaptation Plan (NAP) (DCM 466, date 3.07.2019).

Considering these four objectives, a set of interrelated activities has been developed along with timelines, target indicators, stakeholders and budget. This forms the gender equality action plan.

Shared Socioeconomic Pathways (SSP) related to population and GDP for the VRB were developed through downscaling of respective global scenarios (as per IPCC Fifth Assessment Report) for 10, 25 and 50 years ahead. Water resources, agriculture and tourism indicators were evaluated for 25 and 50 years ahead for the VRB. This assessment identifies the potential outcomes and implications of the five different pathways.

Contents

Tables

Figures

Glossary

BAU	Business-as-usual
CH_4	Methane
CLRTAP	Convention on Long Range Transboundary Air Pollution
CO_2	Carbon dioxide
CO_2 eq.	Carbon dioxide equivalent
DCM	Decision of the Council of Ministers
EbA	Ecosystem based Adaptation
EE	Energy efficiency
EFFIS	European Forest Fire Information System
EU	European Union
EU ETS	EU Emissions Trading System
F-gases	Fluorinated gases
FAO	Food and Agriculture Organization of United Nations
FOLU	Forestry and other land use
GHG	Greenhouse gas
GDP	Gross domestic product
GEF	Global Environment Facility
HFCs	Hydroflurocarbons
IMWGCC	Inter-Ministerial Working Group on Climate Change
IPCC	Intergovernmental Panel on Climate Change
LEAP	Low Emissions Analysis Platform
LULUCF	Land use, land use change and forestry
MRV	Monitoring, Reporting and Verification
N_2O	Nitrous Oxide
NAMA	Nationally appropriate mitigation action
NAP	National Adaptation Plan
NC1	Initial National Communication
NC2	Second National Communication
NC3	Third National Communication
NDC	Nationally Determined Contribution
NIR	National Inventory Report
NMVOC	Non-methane volatile organic compounds
NO_X	Nitrogen oxides
NSDI-II	National Strategy for Development and Integration 2015-2020
PFCs	Perfluorocarbons
QA/QC	Quality Assurance and Quality Control
RCPs	Representative Concentration Pathways
RES	Renewable energy sources
SF_6	Sulphur hexafluoride
SO_X	Sulphur oxides
UNFCCC	United Nations Framework Convention on Climate Change

1 National Circumstances

The Republic of Albania (hereafter referred to as Albania) is a Balkan country in south east Europe. It is located to the north of Greece and to the south of Montenegro and Kosovo. To the west, it borders the Ionian (south) and the Adriatic (north) seas, in the Mediterranean Sea, for 450 km. Albania's land area totals 28,748 km^2. The country's average altitude is 700m above sea level, as 70% of the territory is mountainous.

Albania has a Mediterranean climate, which involves mild and humid winters and hot and dry summers, with some continental influence. Average annual temperatures vary from 17.6°C (in Saranda to the south) to 7°C (in Vermosh to the north). Lowland areas are characterized by an almost stable distribution of annual mean temperature of 14-16°C. Some regions concentrated primarily in the north, west and southwest regions of Albania are characterized by high amounts of precipitation. The annual average precipitation total is 1430 mm. However, the spatial and seasonal distribution of rainfall varies; 70% of the annual rainfall occurs during the cold half of the year. The most humid areas are the Albanian Alps in the north (Koder Shengjergj with 2935 mm and Boga with 2883 mm annual precipitation) and Kurveleshi in the south (Nivica with 2204mm annual precipitation). The highest level of precipitation is experienced in November and the lowest during July to August. Snowfall occurs in the Albanian Alps, in the central and southern areas. The average snowfall depth in mountainous areas is 60-120 cm, with the highest snowfall reaching 2-3 m depth in Vermosh, Boga, Theth, Valbona, Curraj and Lure. Snow is rare in the West Plains lowlands to the southwestern coast.

Since the 1960s, the annual mean temperature in Albania has increased by 1°C, and there has been a six to eight-fold increase in the intensity, duration and number of heatwaves across the eastern Mediterranean. Predictions for the climate in 2050 include further increases in temperature, rising sea levels, and more precipitation falling as intensive rain episodes instead of snow.[1]

Albania is a highly biodiverse country. The mountainous topography, the different geological strata, types of soil and Mediterranean climate with some continental influence contribute to this diversity. Albania's flora constitutes 29% of flora in Europe and 47% of flora in the Balkans, and its fauna includes a variety of mammals, birds, reptiles and sea, lake and river species. About 17% of Albanian territory had protected status in 2016. Water resources are an important source of hydropower, producing 90% of the country's energy and providing irrigation for agriculture. However, water resources have been polluted in populated areas. Albania's natural resources also include metals and oil.

In 2019, Albania had an estimated population of 2.88 million. Recent demographic developments show that Albania's population is shrinking and aging. This is due to a low birth rate and more importantly, negative net migration. Most studies project that the demographic decline will continue.

Albania is fairly densely populated. In 2018, the average population density was 99.7 inhabitants per km^2. The urban population has increased from one-third in the early 1990s to an estimate of almost two-thirds (62%) in 2020 and is expected to continue to rise. The largest city is Tirana, the country's capital, which had an estimated population of 421,000 in 2020, with a greater metropolitan population of 764,000. The second-largest metropolitan area in Albania is the ancient city of Durrës, only 30 km from Tirana, with an estimated population of 202,000 in 2020. Other major cities include Vlorë, Elbasan and Shkodër.

After 50 years of communist rule, Albania has transformed from one of the poorest countries in Europe in the early 1990s to an upper-middle-income country in 2020. As a result of three decades of

[1] Climate Change Risk in Albania; USAID 2016

remarkable economic growth, in 2019, its gross domestic product (GDP) was USD 15.3 billion, and its GDP per capita was USD 5,450. However, public debt was over 65% in 2019.

This economic growth has been associated with structural economic changes, with a transition from an economy based on raw materials, agriculture and industry, into a more diverse economy where the service sector plays a leading role. In 2019, the service sector (represented by the subsectors of trade, transport, commercial activities and telecommunication services) constituted about 50% of the GDP of the country. Industry and construction made up about 20% of the GDP and the agriculture sector contributed about 19% of the GDP.

The **service sector**, both public and private, is one of the most important and dynamic sectors of the Albanian economy, accounting for more than 60% of total value added. The main economic focus of this sector is commercial activity. According to the National Bank of Albania, the biggest part of economic growth over the years has been attributed to the development of this sector and it is evaluated through the index of corporate sales, covering trade companies, hotels and restaurants, transportation, telecommunication and other services. In 2010, the value added generated by the sector contributed 3.2% to the average annual growth of GDP.

The **industry sector** - including its sub-sectors: metallurgical, chemical, construction materials, mining, food/drinks/tobacco, textile/leather/shoes, wood/paper/printing/mechanic industry, has recorded very positive developments during the last decade, bringing the industrial sector to second in importance, after the service sector. The positive contribution of industrial production to economic growth is reflected in an increased number of employees in this sector.

The **transport sector** has been increasing rapidly since 2000. The number of vehicles on the road has increased as well while transport infrastructure has been improved. As a consequence, the total traffic load both for transport of goods and of passengers has increased further.

The **agricultural** sector plays a significant role in the Albanian economy, contributing to approximately 20% of the value added in the economy. Even though the last decade's emigration and urbanisation brought a structural shift away from agriculture and towards industry and service, agriculture remains one of the largest and most important sectors in Albania. Agriculture is the main source of employment and income – especially in the country's rural areas accounting for about half of total employment (INSTAT 2013). Nevertheless the development of the sector is still affected by several structural problems, such as poor technology, low land related investments and low total productivity compared to European Union (EU) averages.

The shift in the country's economic structure, from agriculture and the primary sector in general, to the less energy intensive service sector, as well as to the production of higher value products, is reflected in the evolution of Albania's energy intensity that was more than twice the EU average in the year 2000 but has been decreasing since then. To a lesser extent, the decrease of the energy intensity can be attributed to the improvement of energy efficiency and the application of relevant measures for thermal insulation of building stock, efficient lighting and other energy efficiency measures.

Over the last three decades social indicators have improved in Albania. In 2019 Albania's Human Development Index value, which considers life expectancy at birth, education and gross national income per capita, was 0.795 – which put the country in the high human development category – positioning it at 69 out of 189 countries and territories[2]. In 2012, the most recent year with official

[2] Between 1990 and 2019, Albania's life expectancy at birth increased by 6.7 years, mean years of schooling increased by 2.3 years and expected years of schooling increased by 3.1 years. Albania's GNI per capita increased by about 183.5 percent between 1990 and 2019.

poverty figures, 14.3% of Albanians lived below the national poverty line[3], while 1.1% lived below the international extreme poverty line and 39.1% lived below the upper middle income poverty line. Unemployment reached a historically low 11.4 percent in Q3 of 2019. The latest Gini index (an indicator representing income or wealth inequality with a value of zero representing perfect equality) is from 2017 and was 33.2.[4]

The socio-economic progress of Albania has been recently hampered by two shocks. The country was hit by a devastating earthquake in November 2019. The earthquake, measuring 6.3 on the Richter scale, the strongest in 30 years, caused 51 fatalities, injured at least 913 people and affected over 200,000 people (17,000 people were displaced). It caused extensive damage to physical assets in 11 municipalities, including the two most populous and developed municipalities (Tirana and Durres). Tourism assets and housing were hit the hardest. The earthquake led to losses equivalent to an estimated 7.5% of GDP.

In the midst of the reconstruction efforts, the COVID-19 crisis is putting more pressure on the Government's budget and response, and the country's socio-economic progress, as Albania was forced to put key economic sectors in lockdown. The tourism sector, a key driver of growth, was hit especially hard because of containment measures and travel restrictions. In the second quarter of 2020, employment declined by 3.6% year-on-year. The earthquake and the pandemic are expected to significantly increase poverty in 2021, with resulting poverty rates comparable to those in 2005.

Since the early 1990s, Albania has implemented important structural reforms to promote equitable economic growth and improve governance and public service delivery. In a transition from a centrally planned to a market-oriented economy, this has included macroeconomic and fiscal sustainability, financial sector stabilisation, energy reform, social assistance and disability reform, and territorial decentralisation.

The key national planning document currently in place is the National Strategy for Development and Integration 2015-2020 (NSDI-II), which was adopted by the Government of Albania in May 2016. This strategic document reflects the vision, priorities, objectives and means for social and economic development of the country up to 2020. Around 37 sectoral strategies[5] adopted by the Albanian Government (and in three cases, by the Parliament) complement the NSDI-II. The NSDI-II is organised around 13 cross-cutting foundations on good governance, democracy and rule of law, and four main sectoral pillars:

i) growth through macroeconomic and fiscal stability
ii) economic growth through enhanced competitiveness and innovation
iii) investing in social capital and social cohesion
iv) growth through sustainable use of natural resources and territorial development.

[3] The national poverty line is set at 60% of national median equalised disposable income (after social transfers). The percentage of Albanians living below the poverty line decreased from 25.4% in 2002 to 12.5 in 2008 and then increased to 14.3% in 2012. The international extreme poverty line is set up at US$1.90 per person per day (2011 PPP). The upper middle income country poverty line is set at 5.5 per person per day, 2011 PPP.

[4] https://data.worldbank.org/indicator/SI.POV.GINI?locations=AL

[5] Including for instance the energy strategy of 2018, the sustainable transport sector plan of 2015 or the national strategy for sustainable tourism development 2019-2023.

The overarching goal of NSDI-II is the accession to the EU. After the EU's decision in March 2014 to open accession talks with the country, Albania is advancing the EU integration agenda. As part of the process, the country is transposing and implementing parts of the EU legislation - most national plans or actions, including in the environmental domain, are now designed to consider policies and directives of the EU. Albania is also considering the EU's strategies and plans for the Western Balkans of which Albania is part[6], such as the EU Economic and Investment Plan for the Western Balkans[7], adopted in October 2020, and the EU Green Deal for the Western Balkans[8], adopted in November 2020, among others.

Besides the EU, Albania is an active participant in multilateral organisations and agreements. Albania is a signatory Party of the United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by the Albanian Parliament in 1994. In April 2016, Albania signed the Paris Agreement. In December 2017, the Albanian Parliament unanimously approved a resolution confirming the country's commitment to Agenda 2030 and achievement of the Sustainable Development Goals.

In line with global and regional commitments and national priorities, Albania has made progress on climate change mitigation and adaptation. In 2014, the Albanian government established the Inter-Ministerial Working Group on Climate Change (IMWGCC), which coordinates all institutions involved in climate change processes and facilitates the integration of climate change into relevant new and existing policies, programs, and activities. In July 2019 Albania approved a National Climate Change Strategy and corresponding national mitigation and adaptation plans. The country has implemented several mitigation and adaptation projects and studies.

There is currently a law "on climate change" which acts as the UNFCCC implementation law in Albania and covers requirements under the EU Emissions Trading System (ETS) Directive. This law requires all relevant ministries to mainstream climate change mitigation and adaptation issues into their legislation. The draft Decision of the Council of Ministers (DCM) "On monitoring and reporting GHG emissions and other information relevant to climate change at the national level" establishes a mechanism for monitoring and reporting on GHGs and other climate change information at the national level, as appropriate for a Non-Annex I party.

There are still areas of national environmental policy that are yet to be implemented effectively. Albania does not have an umbrella policy framework for environmental protection; the recent Environmental Impact Assessment Directive is not always fully enforced, and the national strategy for air quality is yet to be adopted. There is also a need to adopt a climate policy consistent with the EU 2030 framework.

Albania submitted its first Nationally Determined Contribution (NDC) in November 2015, with the commitment to reduce carbon dioxide (CO_2) emissions compared to the baseline scenario in the period of 2016 and 2030 by 11.5%, or 708 kt CO_2 emission reduction in 2030". Suggested mitigation measures include increased use of renewable energy, building insulation, more efficient industrial boilers and increasing biofuel use in transport. The scope was limited in terms of both gases and sectors. The NDC only covered CO_2 - it did not include other relevant gases such as methane (CH_4), nitrous oxide (N_2O),

[6] In addition to Albania, for the EU the Western Balkans region includes Kosovo, Serbia, Montenegro, North-Macedonia and Bosnia and Herzegovina

[7] This investment plan, which will mobilise up to €9 billion of funding for the region, aims to spur the long-term economic recovery of the region, support a green and digital transition, foster regional integration and convergence with the EU.

[8] This foresees actions around five pillars: (i) climate action, including decarbonisation, energy and mobility, (ii) circular economy, addressing in particular waste, recycling, sustainable production and efficient use of resources, (iii) biodiversity, aiming to protect and restore the natural wealth of the region, (iv) fighting air, water and soil pollution and (v) sustainable food systems and rural areas.

fluorinated gases (F-gases); and it only covered energy and industrial processes sectors – it did not include agriculture, forestry and other land use (AFOLU) and waste sectors. No references to adaptation were included.

Albania BUR1 GHG inventory

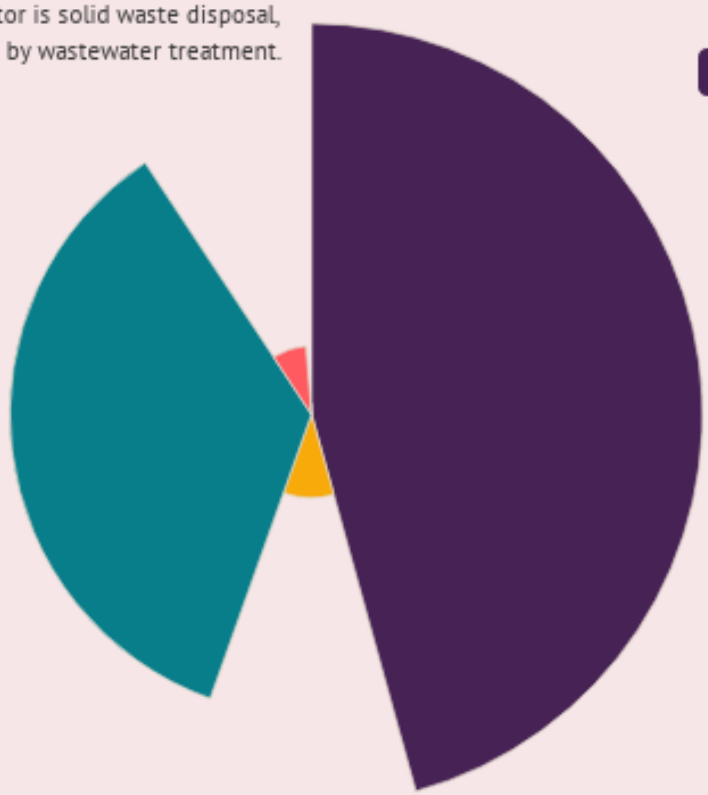
Waste 8.02%

Emissions from the waste sector have increased year on year. The highest contributor is solid waste disposal, followed by wastewater treatment.

Other 1.28%

AFOLU 35.25%

Forests are the main contributor to AFOLU emissions due to poor management, deforestation and forest fires.



Energy 45.70%

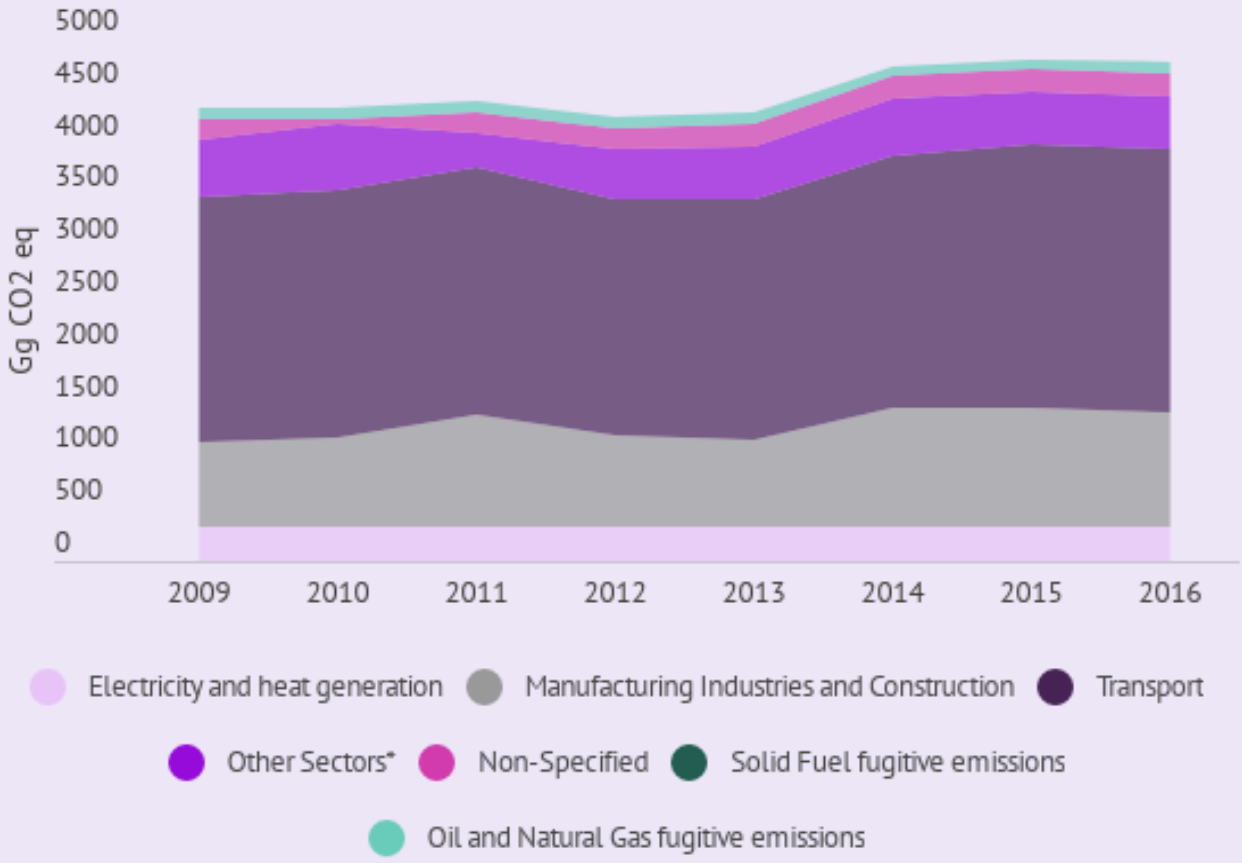
Transport is the most significant contributor to the energy sector, followed by manufacturing in industry and construction

IPPU 9.75%

The cement production and metal industries contribute the most to the IPPU sector. The latter is smaller and has decreased its emissions after a technology switch.

Anthropogenic GHG emissions in Albania in 2016 (Gg CO2 eq.)

Albania BUR1 GHG inventory: Energy

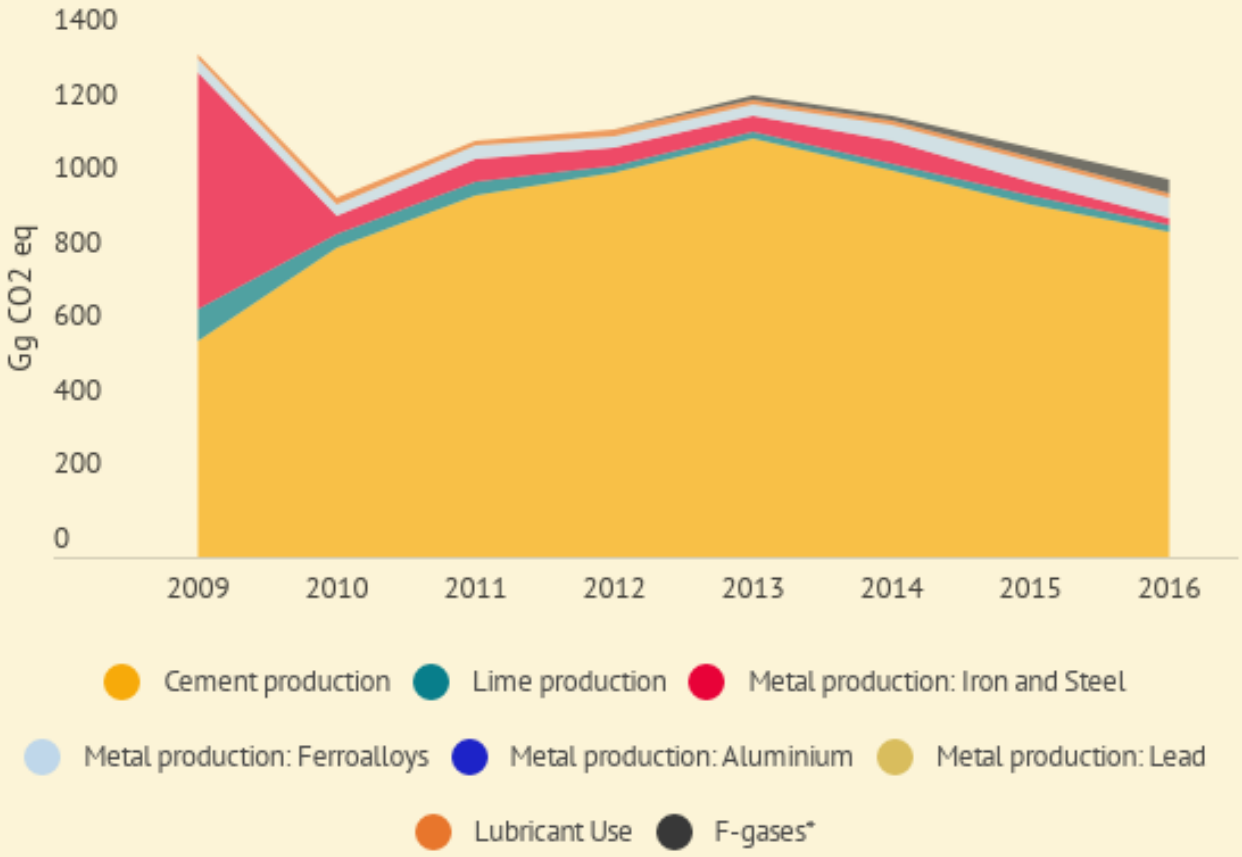


*Other sectors: Commercial/Institutional, Residential and Agriculture/Forestry/ Fishing

The greenhouse emissions from the energy sector account for the emissions released as a result of fuel combustion, as well as the fugitive emissions aka unintentional leaks.

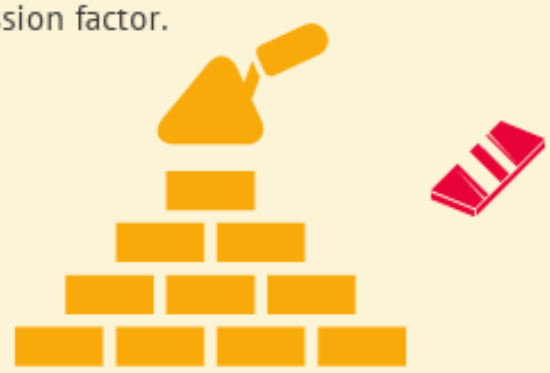
In 2016, the **transport** and **manufacturing industries and construction** made up 53% and 23% of all greenhouse gas emissions from the energy sector.

Albania BUR1 GHG inventory: IPPU



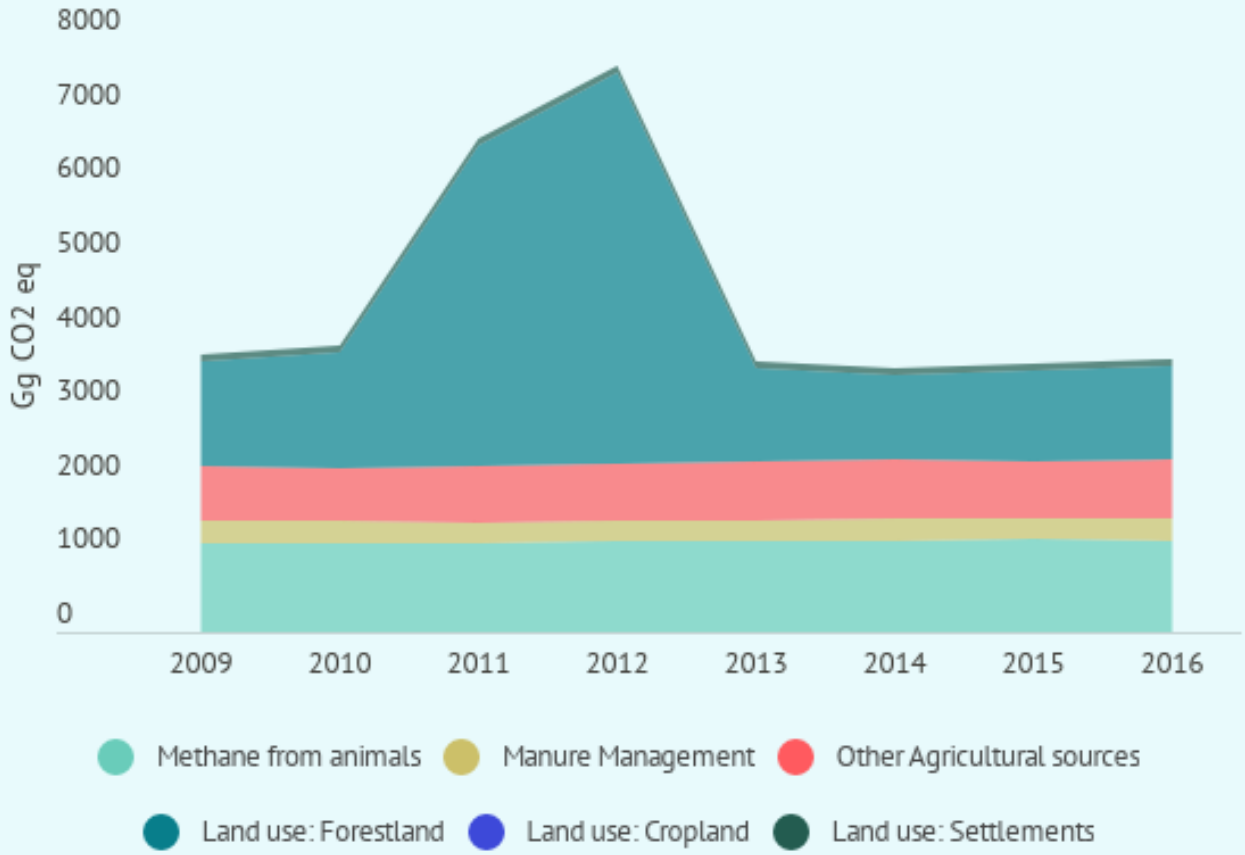
*F-gases: fluorinated gases that have a range of uses, including in refrigerants, electronics and insulation.

The greenhouse gas emissions from the Industrial Processes and Product Use (IPPU) sector come mainly from two main subsectors: the Mineral Industry (including cement production) and the Metal Industry. The latter has experienced a big drop in emissions due to a technology change in the Kurum Elbasan Steel company. Since 2010, it has been operating Electric Arc Furnace technology, which has a low emission factor.



In 2016, the **cement production** and **metal production** made up 86% and 8% of all greenhouse gas emissions from the IPPU sector.

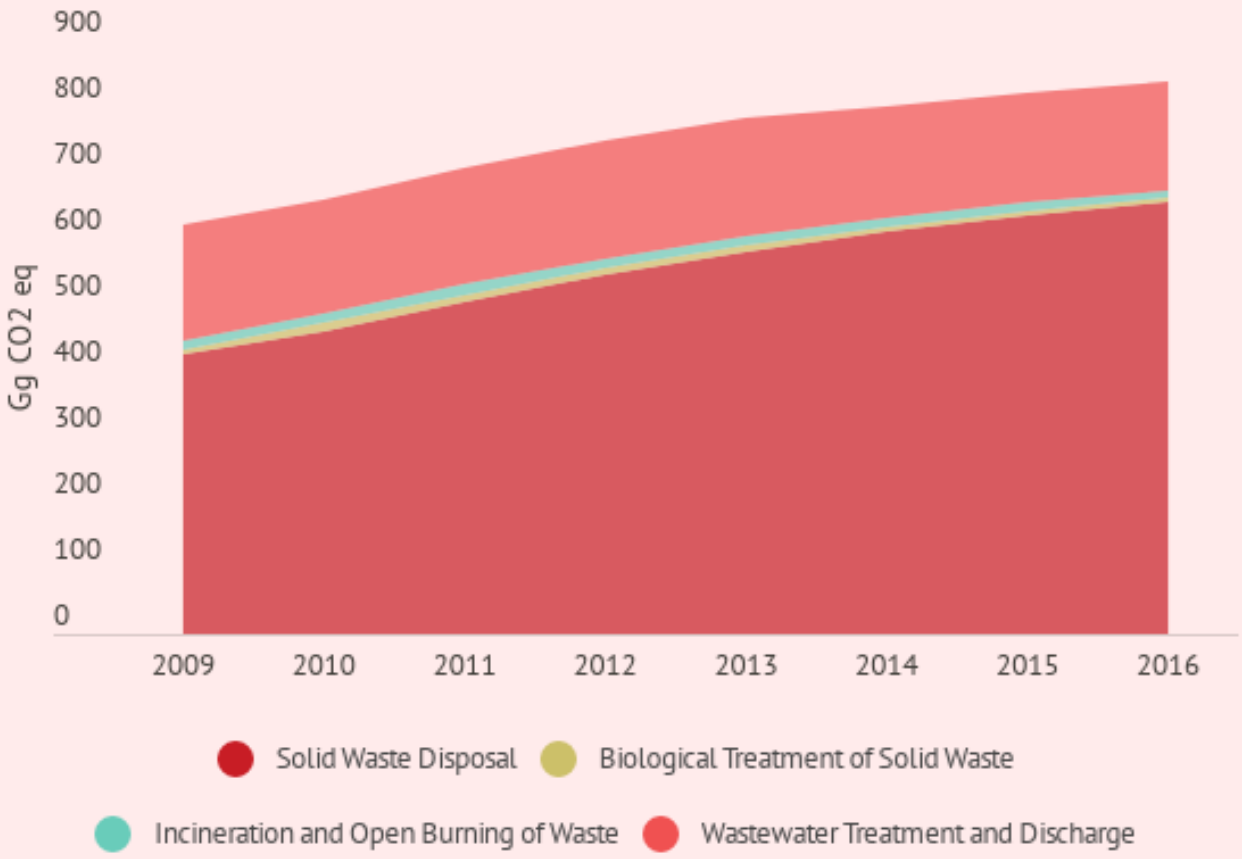
Albania BUR1 GHG inventory: AFOLU



The greenhouse gas emissions and removals from the Agriculture, Forestry and Other Land Use (AFOLU) sector represent a significant source of greenhouse gases in Albania. Although forests should serve as a sink of greenhouse gases, in Albania they represent one of the key sources of emissions as their management in the last three decades has been neglected.

Between 2009 and 2016, **forestland** made up 48% of all greenhouse gas emissions from the AFOLU sector. These emissions over recent years have been as a result of forest fires, deforestation and poor management.

Albania BUR1 GHG inventory: Waste



Emissions from the waste sector have increased year on year. Systems for the collection of urban solid waste are provided in most cities and towns in Albania, however, very little recycling is undertaken. There are no collection systems in rural areas and small towns. Most of the waste from these areas is disposed of by dumping in ditches, ravines, or at the side of roads where it is washed and blown onto other land and ultimately into water courses.

In 2016, **solid waste disposal** and **waste water treatment and discharge** made up 78% and 20% of all greenhouse gas emissions from the waste sector.

2 National GHG inventory

2.1 Introduction

Albania, as a non-Annex 1 country to the UNFCCC, has been developing an inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs) emitted to or removed from the atmosphere since 1990 as part of its National Communications (NCs) on Climate Change and now as part of this report, Albania's First Biennial Update Report.

For the first time, Albania published a **National Inventory Report** (NIR) alongside this report that provides detailed information regarding the GHG inventory in this report. This chapter provides a summary of the information presented in the NIR.

Estimates of GHG emissions and removals were presented in the three Albanian National Communications: the First National Communication (NC1) was submitted in 2002; the Second National Communication (NC2) in 2009; and the Third National Communication (NC3) in 2016.

More recent data on historical GHG emissions for the years 2012 and 2015 are also available in the study undertaken for the **Intended Nationally Determined Contribution** (INDC) submitted by Albania under the UNFCCC process in 2016[9]. However, these data are limited to the Energy and Industrial processes sectors and only account for CO_2 and no other GHGs.

Finally, this report includes national GHG inventory for the years 2010-2016, including a revision of the inventory results for the year 2009 to provide for adjustments resulting from the use of the 2006 IPCC Guidelines. The inventories include estimates of GHGs from Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land Use (AFOLU) and Waste, covering the following GHGs: (i) CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), and (ii) additional gases for which the GWPs are not available in the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report covered in the 2006 IPPC Guidelines[10]. Estimates of key sources have been provided as well. Aggregated GHG emissions and removals expressed in CO_2 equivalent are also presented.

Albania's NC1 was published in 2002[11] and was the first implemented GHG emission inventory by sources and sinks for Albania. According with the 1996 revised IPCC Guidelines, it considered the five main sectors (energy, industrial processes, AFOLU and waste). It included emissions/removals from three direct GHGs (CO_2, CH_4 and N_2O) and three indirect GHGs (carbon monoxide (CO), nitrogen oxides (NO_X), and non-methane volatile organic compounds (NMVOC)). The reference year was 1994, while time series for 1990-1994 were used only for the category of CO_2 emissions from fuel combustion.

Albania's NC2 was published in 2009[12] and covers the period 1990-2000. According with the 1996 revised IPCC Guidelines, it considered the five main sectors (energy, industrial processes, AFOLU and waste). It included emissions/removals from six direct GHGs (CO_2, CH_4, N_2O, HFCs, PFCs and sulphur hexafluoride (SF_6)) and four indirect GHGs (CO, NO_X, sulphur oxides (SO_X) and NMVOC).

Albania's NC3 was published in 2016[13] and covers the refined time series for the period 2000-2009 and provides a narrower and deeper analysis than the previous inventory (i.e., more detailed activity

[9] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Albania%20First/Albania%20First.pdf
[10] https://www.ipcc-nggip.iges.or.jp/public/2006gl/
[11] https://unfccc.int/sites/default/files/resource/albnc1.pdf
[12] https://unfccc.int/sites/default/files/resource/albnc2_0.pdf
[13] https://unfccc.int/sites/default/files/resource/Albania%20NC3_13%20October%202016_0.pdf

levels, data permitting) with the baseline year of 2005, the last year for which a complete data record was available.

2.2 Inventory overview

This report includes a national GHG inventory for the years 2010-2016 and a revision of the inventory results for the year 2009 to adjust to the use of the 2006 IPCC Guidelines. The inventory covers the GHG emissions and removals estimates as divided into the following main sectors as defined by the 2006 IPCC Guidelines: Energy, IPPU, AFOLU and Waste.

The Tier 1 method, i.e. the "Default method", is applied for all subsectors in the absence of country specific emission factors.

To facilitate aggregate reporting of the GHG values, expressed as carbon dioxide equivalents (CO_2 eq.), as indicated in the Decision 17/CP.8, the global warming potentials (GWPs) values provided in the IPCC Second Assessment Report (temporal horizon 100 years) are used. The inventory covers the following GHGs: CO_2, CH_4, N_2O, PFCs (perfluorocarbons) and HFCs and precursor and indirect emissions of CO, NO_X, NMVOC and SO_2.

2.3 Inventory preparation

The GHG inventory under this BUR1 was coordinated by the Ministry of Tourism and Environment as the UNFCCC focal point and the central authority in Albania in charge for climate change policy. The preparation of the GHG Inventory was project based, supported by the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP). Six professionals were engaged to form the GHG inventory team (each of them responsible for one or more sectors including data collection). The inventory was prepared using the latest IPCC Inventory software version available at the time of the preparing the inventory (IPCC 2006 software - version 2.691[14]).

2.4 Historical emission trends

The table and figure below show net emissions, including removals from AFOLU, for the years 2009 to 2016 disaggregated by sector. Further detailed breakdowns of emissions and removals are available in the NIR. Energy and AFOLU are the most significant contributors of GHG emissions in Albania.

Table 5: Anthropogenic GHG emissions by sector in Albania (Gg CO_2 eq.)

Sector	2009	2010	2011	2012	2013	2014	2015	2016
Energy	4,340	4,347	4,398	4,252	5,026	4,746	4,813	4,781
IPPU	1,358	967	1,125	1,154	1,245	1,194	1,106	1,020
AFOLU	3,748	3,870	6,647	7,641	3,641	3,560	3,620	3,688
Waste	621	660	705	747	784	801	821	839
Other	75	80	82	83	86	104	129	134
Total	**10,141**	**9,924**	**12,957**	**13,876**	**10,782**	**10,405**	**10,489**	**10,461**

[14] https://www.ipcc-nggip.iges.or.jp/software/

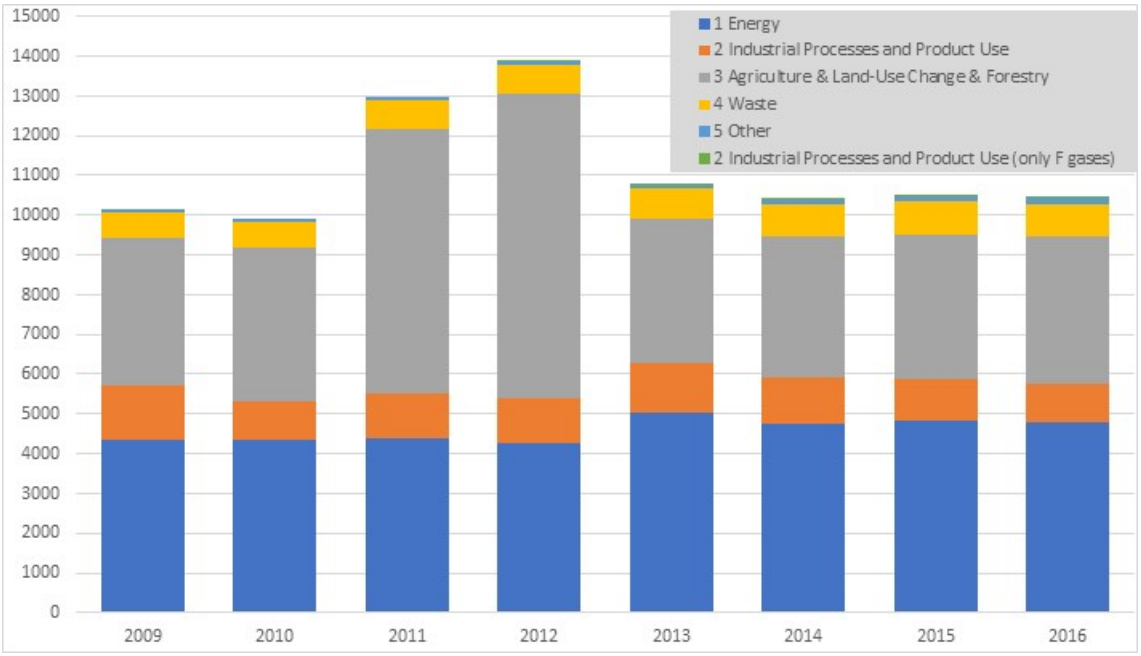


Figure 8: CO_2 eq. emissions and removals from all economic sectors (Gg)

The table and figure below show net emissions, including removals from AFOLU, for the years 2009 to 2016 disaggregated by gas. CO_2 is the most significant GHG in Albania.

Table 6: Anthropogenic GHG emissions by gas in Albania (Gg CO_2 eq.)

Sector	2009	2010	2011	2012	2013	2014	2015	2016
CO_2	7,028	6,773	9,731	10,589	6,678	6,919	7,022	6,939
CH_4	2,103	2,151	2,190	2,253	2,925	2,381	2,361	2,370
N_2O	1,010	1,000	1,037	1,034	1,172	1,089	1,081	1,118
HFCs	NE	NE	NE	0.1	8	16	25	35
Total	**10,141**	**9,924**	**12,957**	**13,876**	**10,782**	**10,405**	**10,489**	**10,461**

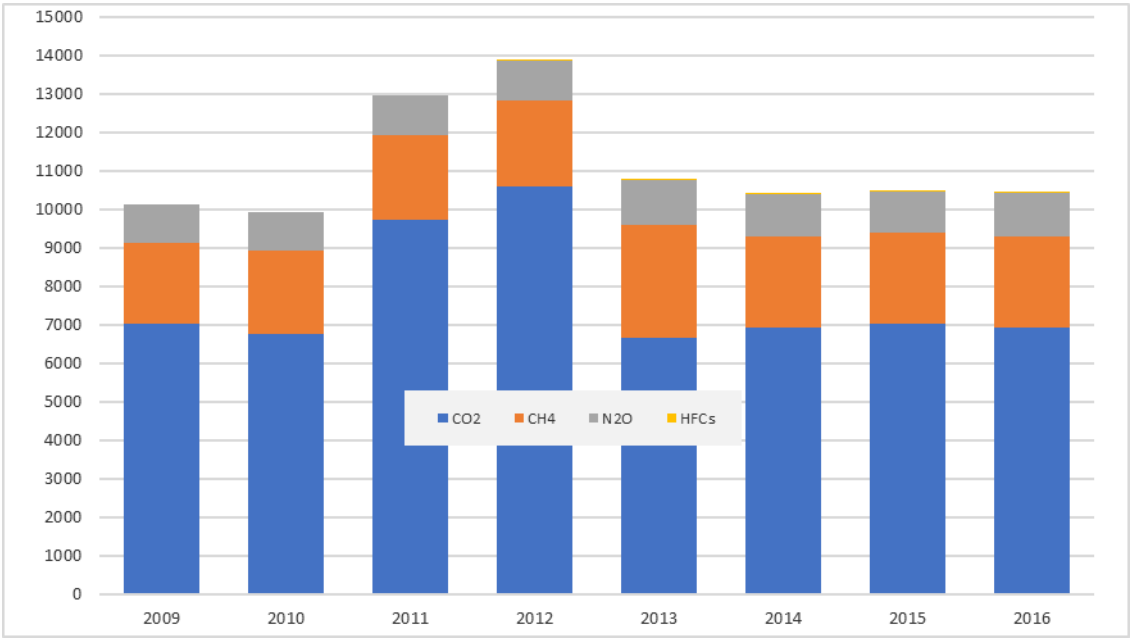


Figure 2.3: Total GHG emissions by gas (Gg CO_2 eq.)

2.4.1 Energy sector

The GHG emissions from the energy sector account for the emissions released as a result of fuel combustion activities, as well as the fugitive emissions from the extraction of solid fuels and transmission and distribution of liquid and gaseous fuels. The emissions are separated in the following categories: Energy Industries, Manufacturing Industries and Construction, Transport, Other sectors (Commercial/Institutional, Residential and Agriculture/Forestry/ Fishing) and Non-Specified. In addition, the fugitive emissions from extraction of lignite and from oil refining related activities have been calculated. Analysis shows that Transport is the most significant category across all years followed by Manufacturing Industry and Construction (related to fuel consumption).

2.4.2 IPPU sector

The GHG emissions from the IPPU sector come mainly from two main subsectors: Mineral Industry and Metal Industry. In 2016, CO_2 emissions from Mineral Industry were approximately 86% of total CO_2 eq. emissions from the industry sector. The other important subsector, the Metal Industry has experienced a big drop in emissions due to a technology change in the Kurum Elbasan Steel company. Since 2010, it has been operating Electric Arc Furnace technology, which has a low emission factor.

2.4.3 AFOLU sector

The GHG emissions and removals from the AFOLU sector represent a significant source of GHGs in Albania, and this is also a sector where mitigation of those emissions can be significantly implemented if sectoral policies are based on the principle of sustainable development. Within this sector, forests remain the main emitters of GHGs. Although forests should serve as a sink of GHGs, in Albania they represent one of the key sources of emissions with about 2968 Gg CO_2 per year (on average) during 2010-2016. This is because their management in the last three decades has been neglected. Other negative impacts have been from the uncontrolled deforestation, massive forest fires, lack of effective investment in forest improvement and afforestation, informality and lack of development reforms.

2.4.4 Waste sector

The GHG emissions from the Waste sector cover the following categories: Solid waste Disposal, Biological Treatment of Solid waste, Incineration and Open Burning of Waste and Wastewater Treatment and Discharge. Systems for the collection of urban solid waste are provided in most cities and towns. Very little recycling of waste is undertaken. There are no collection systems in rural areas and small towns. Most of the waste from these areas is disposed of by dumping in ditches, ravines, or at the side of roads where it is washed and blown onto other land and ultimately into water courses. Emissions from Waste sector have increased year on year. In 2016, the highest contribution is that of solid waste disposal followed by wastewater treatment.

2.5 Key category analysis

The analysis of key categories that contribute the most to the absolute level of national emissions and removals (level assessment) and to the trend of emissions and removals (trend assessment), is conducted using Approach 1 in the 2006 IPCC Guidelines. According to this approach, key categories are those that, when summed together in descending order of magnitude, add up to 95% of the total level/trend. In other words, a key source category is one that is prioritised within the national inventory system because its estimate has a significant influence on a country's total inventory of direct GHGs, in terms of the absolute emissions and the trend. The level assessment key categories for 2016 are as

follows starting with the most significant category (as shown by the percentage contribution to total emissions):

- Road Transportation, CO_2 (23.30%)
- Forest land Remaining Forest land, CO_2 (12.03%)
- Enteric Fermentation, CH_4 (11.80%)
- Manufacturing Industries and Construction - Liquid Fuels, CO_2 (10.15%)
- Cement production, CO_2 (7.40%)
- Solid Waste Disposal, CH_4 (6.23%)
- Direct N_2O Emissions from managed soils (5.26%)
- Other Sectors - Liquid Fuels, CO_2 (4.24%)
- Energy Industries - Liquid Fuels, CO_2 (2.99%)
- Non-Specified - Liquid Fuels, CO_2 (2.00%)
- Manure Management, CH_4 (1.96%)
- Indirect N_2O Emissions from managed soils (1.76%)
- Indirect N_2O emissions from the atmospheric deposition of nitrogen in NO_X and NH_3 (1.27%)
- Oil, CH_4 (0.96%)
- Wastewater Treatment and Discharge, CH_4 (0.92%)
- Land Converted to Settlements, CO_2 (0.89%)
- Manure Management, N_2O (0.81%)
- Cropland Remaining Cropland, CO_2 (0.69%)

The 2009-2016 trend assessment key categories are as follows starting with the most significant category (as shown by the percentage contribution to total trend):

- Iron and Steel Production, CO_2 (26%)
- Manufacturing Industries and Construction - Liquid Fuels, CO_2 (18%)
- Cement production, CO_2 (12%)
- Solid Waste Disposal, CH_4 (9%)
- Forest land Remaining Forest land, CO_2 (8%)
- Manufacturing Industries and Construction - Solid Fuels, CO_2 (7%)
- Road Transportation, CO_2 (5%)
- Lime production, CO_2 (3%)
- Other Sectors - Liquid Fuels, CO_2 (3%)
- Indirect N_2O emissions from the atmospheric deposition of nitrogen in NO_X and ammonia, N_2O (2%)
- Direct N_2O Emissions from managed soils, N_2O (1%)

2.6 Uncertainty analysis

An uncertainty analysis was carried out to quantify the uncertainty of the compiled estimates and to help prioritise efforts to improve the accuracy of the inventory. Uncertainty values for activity data and emission factors were collected and included in the IPCC Inventory software, which calculates uncertainty using the Error Propagation methods (Approach 1). The overall uncertainty of the 2016 estimates is 5.8% and the overall uncertainty of the 2009-2016 trend is 5.1%.

2.7 Quality assurance and quality control (QA/QC)

With regards to the QA/QC activities undertaken in the national GHG inventory process, the recommendations given in the NC3 (QA/QC plan) were taken into consideration together with relevant international best practices. The following QA/QC activities have been carried out:

- Compare with information submitted to international agencies
- Compare emissions calculations with use of default net calorific values/emission factors if not used
- Cross-check against Reference approach (Energy sector).

Two approaches have been used for the estimation of the emissions of CO_2, the most significant GHG. According to the first approach, the CO_2 emissions are estimated for each fuel type, based on the total national consumption, and then the values were summarised (top-down approach). According to the second approach, emissions for separate sectors and source categories are estimated and then summarised (bottom-up approach). The use of these two approaches in the Albania's inventory allows a judgement to be made on the fuel spectrum of the CO_2 emissions (top-down), and secondly on the sector distribution (bottom-up). In both approaches the default IPCC emission factors are used for each fuel type. Differences between two methods for energy sector are 2.91% for the year 2009 and 1.67% for the year 2016.

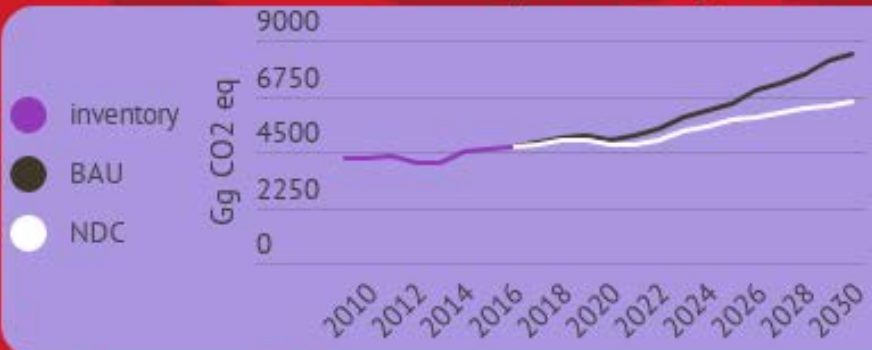
Training materials on GHG inventory preparation have been developed by the GHG inventory team. These materials are country specific and based on personal experience gathered by the team and lessons learnt during the GHG inventory preparation in Albania.

2.8 Improvements and recommendations for future inventories

Good practices, improvements and recommendations for future inventories are outlined in the NIR by sector, regarding activity data collection, level of disaggregation, consistency and quality of the activity data collection, as well as application of higher tiers/other methods for emission estimates where appropriate.

Albania BUR1 mitigation actions

Nationally Determined Contribution (NDCs) embody efforts by Albania to reduce greenhouse gas emmissions.



Energy

The NDC scenario represents mitigation measures that fall under three categories:

- Energy efficiency
- Renewable energy generation
- Penetration of natural gas

IPPU

There are no mitigation actions designed or in place.

Agriculture

The NDC scenario represents mitigation measures that affect both livestock and crop production.

FOLU

The NDC scenario represents mitigation measures that reduce firewood consumption, increase the amount of forested area and improve their management.

Waste

The NDC scenario represents mitigation measures that include:

- Reduction of waste going to landfill
- Increasing composting and Introducing methane capture installations
- Decreasing open burning
- Improvements in wastewater treatment

3 Mitigation actions

3.1 International context and commitments

At the 2013 UNFCCC Conference held in Warsaw, Poland, all countries that signed the UNFCCC were asked to develop and submit NDCs before the 2015 Conference in Paris, to present actions that they planned to undertake to address climate change. A Party's "contribution" to address climate change is "nationally determined" according to its national circumstances and priorities. NDCs submitted before the Paris Agreement of 2015 were considered Intended NDCs or INDCs. These automatically became Parties' first NDC unless the Parties chose to submit an updated NDC.

Albania submitted its first NDC in November 2015, with the commitment "to reduce CO_2 emissions compared to the baseline scenario in the period of 2016 and 2030 by 11.5%, or 708 kt CO_2 emission reduction in 2030". Regarding mitigation, the scope was limited in terms of both gases and sectors. The NDC only covered CO_2 and it only covered energy and industrial processes sectors. It did not include other relevant gases such as CH_4, N_2O, F-gases and it did not include AFOLU and waste sectors. No references to adaptation were included.

On 22 April 2016 Albania signed the Paris Agreement, which was ratified on 21 September 2016 and entered into force on 4 November 2016.

At the COP24 in Katowice 2018, the President of Albania signed the Solidarity and Just Transition, Silesia Declaration. With this signature, commitment was made for an effective and inclusive transition to low GHG emissions, climate resilient development and to enhance the public support for achieving the long term goals of the Paris Agreement; to recognise the development of climate resilient infrastructure as a source of decent job creation for both men and women, while improving resilience especially in vulnerable countries; and to recognise the challenges faced by sectors, cities and regions in transitioning from fossil fuel and high emitting industries. It encouraged this transition to low GHGs and climate resilient development to be in line with UN Sustainable Development Goals.

In 2019 Albania committed to develop its National Energy and Climate Plan for the period 2021-2030.

In 2019 Albania became member to the NDC Partnership, showing its commitment to ambitious implementation of its NDC under the Paris Agreement and the 2030 Sustainable Development Goals. Through this Partnership, Albania becomes eligible to access a global network of knowledge and resources needed for the implementation of its climate action, including technical assistance and capacity building; learning and knowledge sharing opportunities; enhanced financial support; increasing access to information and building a peer community around other countries implementing their NDCs.

3.2 National strategic climate change planning

In 2019 Albania endorsed the Strategic Document on Climate Change and its Action Plan on Mitigation[15]. The document was developed as a single document in accordance with decision 1/CP16 of the UNFCCC and decision 525/2013/EU for the mitigation part, also considering recommendations of several Progress Reports of the EC and trying to mainstream climate change into other sectors.

Six mitigation strategy priorities (SP) are identified:

[15] Approved by DCM No. 466, dated 3.7.2019

- **SP.1 Ensure a sustainable economy growth** consistent with GHG emission pathways defined in the NDC and move towards an economy-wide target to which all sectors contribute
- **SP.2 Establish a monitoring, reporting and verification system of GHG** in line with EU requirements
- **SP.3 Strengthen the capacity of relevant institutions and inter-institution cooperation** to address climate change issues
- **SP.4 Streamline climate changes across sectoral strategic planning**
- **SP.5 Reinforce capacity building and awareness raising** on climate change issues
- **SP.6 Align with the EU Climate Change framework** across sectors.

The plan includes:

- Direct measures: those with a direct impact on climate change mitigation
- Indirect measures: those having a positive impact on climate change mitigation
- Enabling measures: those that are functional to the achievement of the necessary conditions that allow for the application of direct/indirect measures leading to mitigation of climate change.

In the Mitigation Plan, 222 measures are identified, mainly focused to a short-term period (up to 2020), and some targeted to the medium (2030) and long (2050) terms. A major part of the measures derives from the existing strategies and plans, few of them are newly proposed by the document of the National Climate Change Strategy and Plan (NCCS&P) for addressing gaps or synergies.

Most of the measures are in the energy sector (77) and in the transport sector (71), followed by FOLU (53) and Agriculture (17) with four measures that are cross sectorial. Particular attention is given to the measuring, monitoring and reporting system in Albania. Robust, standard and transparent estimation, reporting and accounting of GHG emissions and removals is crucial to track progress towards the achievement of targets, assess the performance of policies and measures and, at an international level, assess the success of aggregated efforts to mitigate climate change.

Taking into consideration the proposed approach, the following strategies, plans and laws have been considered and analysed.

Cross cutting:

- INDC under UNFCCC (2015-2030)
- Draft Environmental Cross-cutting Strategy (ECCS) (2015-2020)
- National Strategy on Development Integration (NSDI-II) (2015-2020)
- Law on Climate Change[16] (from the entry into force to its revision)
- National Territorial Plan (NTP) (2015-2030)[17]

Energy sector:

- Strategy of Energy for the period 2016-2030 (approved by the Albanian Council of Ministers)
- Nationally appropriate mitigation action (NAMA) – Replacing fossil fuels with non-hazardous waste in the Albanian cement industry (2015-2020)
- NAMA – Financing mechanism for energy efficiency in buildings (2015-2020)
- 1st National Action Plan for Energy Efficiency, 2009-2020
- National Action Plan for Natural Gas Penetration to the Albanian Economy, 2018-2030
- National Action Plan for Renewable Energy Sources 2018-2020

[16] Law on Climate ChangeNo.15/2020

[17]DCM No. 881, date 14.12.2016, For the approval of the general national plan of the territory.

- Law 124/2015 on Energy Efficiency (from the entry into force to its revision)
- Law 7/2017 "On the promotion of the use of renewable energy sources"
- Law 116/2016 “On energy performance of buildings”
- DCM No. 709, dated 1.12.2017 on the 2nd&3rd National Energy Efficiency Plan 2017-2020.

Transport sector:

- Transport Sector Strategy and Action Plan (TSSAP) (2016-2020)
- Sustainable Transport Plan (STP) – Background document (2016-2020).

AFOLU:

- Inter-sectoral strategy for Agriculture and rural development in Albania (ISARD) (2014-2020)
- Rural Development Programme 2014-2020 under the Instrument for Pre-Accession Assistance (IPARD) (2014-2020)
- Strategic Policy Document for the Protection of Biodiversity (SPDBP) (2016-2020)
- Draft Law on the Administration of the National Forest and Pasture Fund in Albania (from the entry into force to its revision).

3.3 Revision of Albania’s First NDC[18]

Albania has secured support from the NDC Partnership[19] to update and enhance the NDC that it submitted in 2015. In 2020 Albania secured support from the UNDP Climate Promise to revise the first NDC. In particular, Albania aims to increase its mitigation ambition, expanding the sectors that are considered (adding transport and agriculture, forestry and land use, to energy and industrial processes); and include adaptation measures, especially related to coastal areas since a high percentage of the Albanian population is concentrated on the coastal zone. The focus is on settlements, population and tourism in coastal areas. The country’s revised NDC will also show the consistency and accuracy of mitigation calculations in a transparent manner, and the fairness of its ambition, and present Albania’s national circumstances. More specifically, the NDC will be enhanced in the following ways:

- To cover gases other than CO_2 (i.e. CH_4, N_2O, F-gases), that were not included in the first NDC, but are covered in the NC3, even though they have large uncertainties.
- To cover all emission sectors: Energy; Industrial processes AFOLU and Waste. The first NDC only covered Energy and Industrial processes.
- To consider the latest methodological improvements of the local team in charge of the national inventory, the NC3, and the ongoing First Biennial Update Report.
- To consider potential ways for enhancing the country’s climate ambition, in accordance with the Paris agreement framework and the need of a collective raise of climate pledge to reach the aim to limit global warming to +2°C or even +1.5°C.
- To include climate change adaptation measures and an aim at mainstreaming climate change adaptation into relevant development and sectoral strategies (this will represent an enhancement in terms of increased geographic and sectoral coverage ((including new sectors). As mentioned, the initial NDC did not include an adaptation component.

[18] The revision of Albania’s First NDC is supported by the UNDP Climate Promise.

[19] The NDC Partnership is a coalition of countries and institutions committed to supporting countries in implementing and increasing the ambition of their NDCs. Albania joined the NDC Partnership on August 27, 2019.

- To reflect Albania's specificities: the use of renewable sources for electricity production (95% hydro power, meaning low emissions for energy but a high vulnerability to climate change), the demand in fuel wood, the need to set up a register for waste generated by industrial and non-household activities, the lack of collection and treatment system for the waste water, the lack of cadastre for a national precise monitoring of land use changes, the concentration of population, infrastructure and tourism activities along the coast.

The mitigation assessment presented in this report reflects the work undertaken during the update of the First NDC.

3.4 BAU projections

The NDC relies on the comparison between a business-as-usual scenario (BAU) and a scenario that considers mitigation measures, referred to as the NDC scenario. Projections rely on macro-economic assumptions such as GDP and population forecast but also on historical trends, strategies and plans as endorsed at national level. Population is expected to remain constant on the time series. The GDP forecast considered in the assumptions is presented in the figure below.

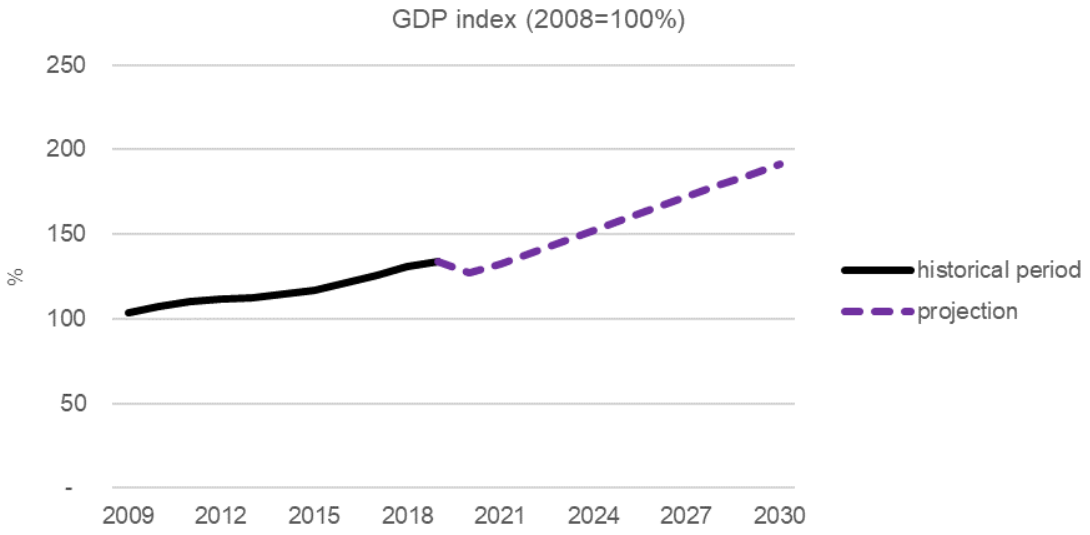


Figure 9: Historical data and GDP forecast[20]

The BAU scenario relies on current trends and future economic development and considers the national circumstances. No major technology switch is considered. The main impacts concern the introduction of imported natural gas in the country around 2023, the increase of biofuels share in road transport to reach 10% in 2030 as well as the consideration of energy efficiency based on technology improvement and fleet renewal (see figure below). The NDC scenario considers national strategies and action plans as detailed in sectoral analysis.

[20] Study on carbon pricing design for the energy community (ENC, 2020)

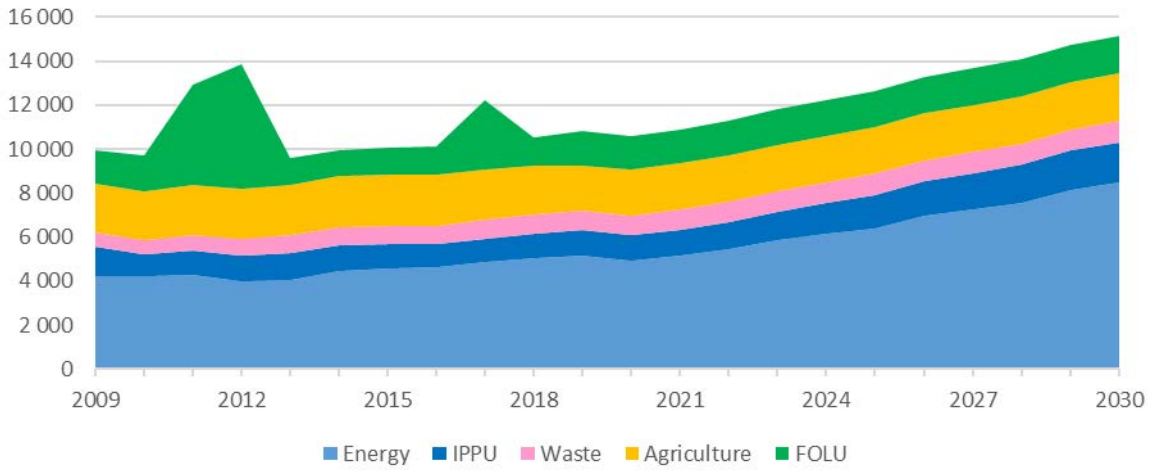


Figure 10: Historic and projected emissions for all sectors (BAU)

Considering all sectors (including FOLU), emissions in the BAU scenario are expected to increase from 10,139 kt CO_2e in 2016 to 15,148 kt CO_2e in 2030, which represents a growth of +49.4%.

3.5 Energy sector

In the **Energy sector BAU scenario**, consumption is expected to increase rapidly according to economic development based on current technologies. GHG emissions for the BAU scenario are expected to increase from 4,664 kt CO_2e in 2016 to 8,466 kt CO_2e in 2030, which represents an increase of +81.5%, as shown in the figure below.

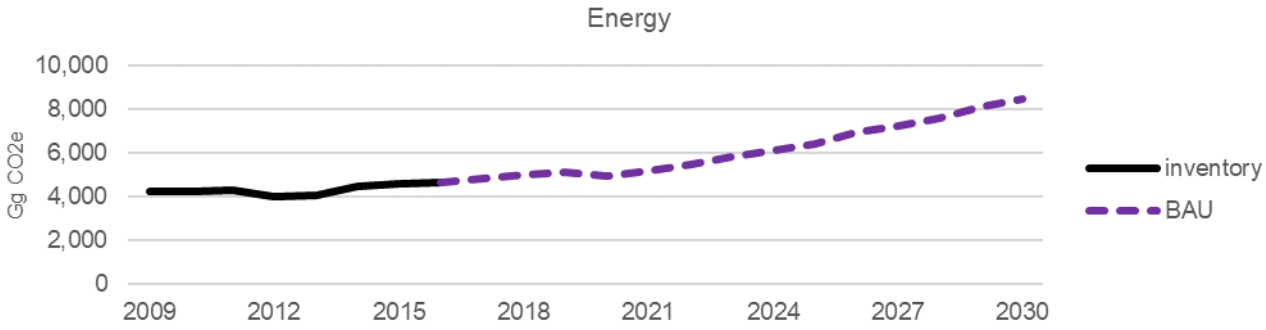


Figure 11: Projected BAU energy-related emissions

The BAU scenario is based on the most likely evolution of the Albanian energy sector according to the baseline scenario of the National Strategy of Energy approved by the Albanian Government through the Council of Ministers Decision number 480 on July 31, 2018 and with no further policy interventions. It was developed according to the National Energy Strategy considering the new set of macro-economic drivers such as GDP and population. The Low Emissions Analysis Platform (LEAP)[21] energy model was used for energy demand forecasts for the BAU and other scenarios, using 2015 as the base year and assessing annual energy demand until 2030.

LEAP is a widely used model-building tool for analysing energy systems in the medium to long term. LEAP is a user-friendly accounting framework that can be used to analyse the integrated energy and environment results of baseline and alternative scenarios of the energy system as it grows over time. An Albania-LEAP model has been in use since 1997. A basic characteristic of LEAP models is that the

[21] https://leap.sei.org/default.asp

calculation of energy demand is based on a “bottom-up” approach with many decentralised data, such as end-use energy intensities, the efficiency and penetration rates of different equipment and the demand for energy services at the residential, commercial, agriculture, industry and transport sector levels. Given these sectoral demands, the LEAP software calculates the demand for primary energy sources, electricity and all other energy commodities. LEAP also calculates a variety of emissions that are generated from the fuels used.

The main drivers of energy consumption in the **residential sector** are population and the number of households. Data on the number of persons per household in developed European countries and countries in transition show that household size decreases as the standard of living grows. The decrease occurs due to the aging of the population and the increase in the number of one-member and two-member households. In Albania, the number of persons per household is expected to decrease from 2.92 in 2014 to 2.41 in 2030.

To reflect the various climatic zones in Albania, households were categorised into three zones with respect to their heating and cooling demands. Breakdown between zones is done based on the concept of Heating Degree Days according to the Albanian Energy Building Code (approved by the Albanian Council of Ministers in January 2003). Zone 1 covers most of the urban centres in the coastal area of Albania with heating degree days lower than 1300°C, Zone 2 includes cities with heating degree days between 1300°C and 2300°C, and Zone 3 is mountainous areas with heating degree days higher than 2300°C.

The basic measure of heating standard in the model is heated area. The heated area of the average household was determined based on statistical data and calibrating with the data from the energy balance. The share of heated area in total living area (load factor) is 31% and is the result of the purchasing ability of the population, the availability of firewood, the price of electricity, and life priorities arising from tradition and cultural heritage. Therefore, with standard growth, the further increase of the share of heated area in a total area of housing units is 70% by 2030.

In order to calculate the energy demand, the **Service Sector** was divided in two parts: Public Service and Private, or Commercial Service. The Public Service Sector is based on the traditional approach to heat demand, mainly using old technology, installations, and organisation, although in some recent cases new schemes have been introduced. Commercial Service Sector approach is based on rapid introduction of modern technology, but improvements are needed regarding efficient energy utilisation. Analysis of the energy demand is based on the general tendency of the previous period. A number of driving factors were taken into consideration as determining factors for the future energy demands. The public service buildings have as a special driving factor the total volume, divided into the heated stock and unheated stock. In order to increase service quality, improve the working conditions and the comfort for the public administration, it was forecasted that until the end of the period 2014-2030, the existing ratio would change in favour of the heated stock in 2030. The GDP growth from the service sector will be accompanied with energy demand increase due to high comfort requirements, the qualitative improvement of services and changes of the ratio between the urban and rural populations in favour of the former.

The structure of the **industry sector** in Albania shows that three main industrial sectors are consuming the highest share of energy: food, metal and building materials. Each of these industries is represented by its final energy consumption of electricity and other fuels. The growth in GDP is the most influential determinant of energy demand in industry. In addition to overall GDP growth, the value-added structure of the GDP drives the energy consumption for the industry and agriculture sectors. In the early development of a society, agriculture contributes a significant share of GDP. As the society develops, the share of the agriculture sector typically declines while the share of industry grows. In developed economies the dominant GDP share belongs to services, followed by industry and then

agriculture. For this analysis, given that few structural changes away from agriculture are anticipated in the near future, the expected contribution from agriculture is expected to remain constant at 22.7%, while the contribution from the overall industry sector will be increased from 14.9% in 2014 to 25% in 2030.

The **Transport Sector** is the largest energy consuming sector in Albania and plays an important role in the consumption of energy resources. After 1990, there was a significant increase in transport activity, especially for road transport, which led to a significant increase of transport fuel consumption, mainly diesel and gasoline. In order to calculate the future transport energy demand, the sector was divided in two sub sectors: transport of freight and passengers. For the transport sector, two main indicators forecast the demand for passenger and freight transport: passenger-km and ton-km. It is forecast that ton-km will increase by 85% in 2030 compared to 2014, while passenger-km will increase by 37%. Most of the transport is undertaken by road vehicles. Albania's transport sector has been increasing rapidly since 2000. The number of vehicles in circulation has increased and infrastructure is being improved, which leads to an ever-increasing total traffic load. The transport sector consumes significant quantities of energy (mostly in the form of diesel and gasoline).

Establishment of the **NDC scenario for the Energy Sector** was based mainly on Albania's Energy Sector Strategy, which is harmonised in terms of goals, details and timeline, with a number of other strategic and legal documents that are in force adopted or drafted in the same time frame as this document. Building on and complementing these documents has led to synergies in the prioritisation of policies and programs and in the development of strategic recommendations. The following long-term strategic objectives were identified to implement the Guiding Principles and the current commitments that have been undertaken by the Albanian government:

- Improving the reliability and security of energy supply
- Developing domestic primary energy sources in a sustainable and competitive manner
- Improving the cost-effectiveness of energy supply systems
- Achieving renewable energy sources (RES) and energy efficiency (EE) targets established in the second National Energy Efficiency Action Plans and the National Renewable Energy Action Plan
- Developing least cost and sustainable policy for residential heating and cooling
- Integrating the Albanian power and natural gas markets with regional Energy Community and European markets
- Achieving the NDC targets for GHG emission reductions.

To understand the costs and benefits of these possible policies, the following four other scenarios were developed and analysed using the Albania-LEAP model.

- **Energy efficiency**: This scenario assumes that Albania meets its Energy Community Treaty commitments by implementing the second National Energy Efficiency Action Plan and enforces the Law on Energy Efficiency (together with improvement of the Law to transpose EE requirements) and the Law on Energy Performance in Buildings. EE target for 2030 is defined to be 15% of the national final energy demand.
- **Renewable energy sources:** This scenario assumes that Albania meets its Energy Community Treaty commitments of reaching a 38% renewable energy target in 2020 by implementing the Albanian National Renewable Energy Action Plan. RES target for 2030 is defined to be 42.5% of the national final energy demand.
- **Natural gas promotion**: This scenario assumes maximum possible penetration of natural gas in line with the Gas Master Plan. The natural gas penetration rate target for 2030 has been defined to be 8-10%. Natural gas in Albania will be used to guaranteeing the security of

electricity supply since the Albanian power sector is based almost 100% on domestic hydro resources and electricity imports.

- **Combined:** This scenario combines the EE, RES and Natural Gas Promotion scenarios. Under this scenario all above mentioned targets have been aggregated and guarantee a proper development scenario for the energy sector until 2030.

The Energy sector NDC scenario is based on Combined Strategy scenario, calibrated with real figures for the period 2015-2019. The NDC scenario considers the introduction of natural gas in almost all sectors (including energy industry, manufacturing industry, transport, commercial, residential and agriculture). It also considers the implementation of different National Energy Efficiency Actions Plans (NEEAP) to increase energy efficiencies in both supply and demand reaching a 15% of the national final energy demand gain in 2030. It also considers the National Renewable Energy Action Plan (NREAP) with objectives of a share of 38% renewables in the final energy consumption in 2020 (already almost reached in 2019) and 42% in 2030.

Emissions for the NDC scenario (with mitigation measures) increased from 4,664 kt CO_2e in 2016 to 6,544 kt CO_2e in 2030, which represents a growth of +40.3% (see figure below). The difference in 2030 with the BAU scenario is -1,921 kt CO_2e, representing a mitigation impact of -22.7%.

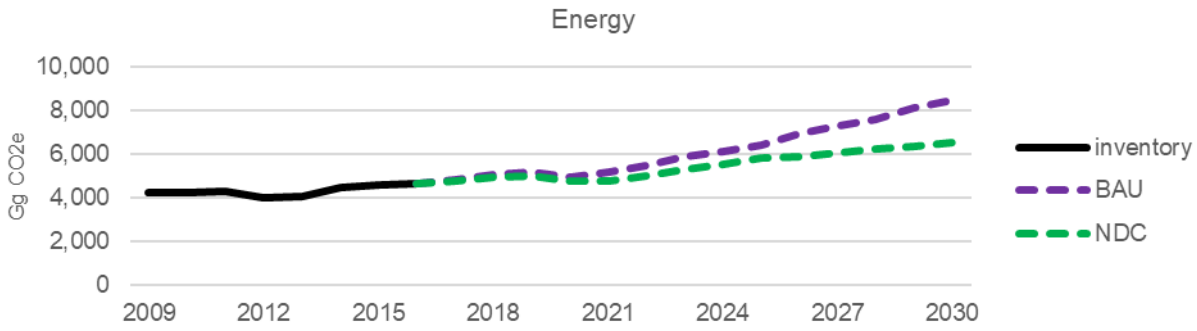


Figure 19: Projected BAU and NDC scenario emissions for energy sector

The following table presents a summary of the mitigation actions considered in the NDC scenario for this sector. An aggregated list of measures presented below is based on the list of measures presented under the Energy Strategy and all other strategic documents mentioned above.

Table 7: Summary of the main mitigation actions for the energy sector

N°	Sector	Name	Subsector	Policy context	Description
E1	Energy	Energy efficiency	Transport	National Energy Efficiency Action Plan (NEEAP), NSE, Action Plan of Transport sector, National Energy Strategy 2018-2030	Efficient transport system: Increasing the share of public transport for passengers and freight (roads, railways and waterways). Up to 2030, 30% of the road transport journeys longer than 300 km shall be shifted to other transport modes, such as rail. Up to 2050 the goal to be achieved is 50%. Energy labelling of new vehicles.
E1	Energy	Energy efficiency	Buildings - Residential & Tertiary	National Energy Efficiencies Actions Plans (NEEAP), National Energy	Improving the energy performance in buildings considering the local and climatic conditions of the country, interior comfort of buildings and cost-effective measures. Renovation of public building stock each

N°	Sector	Name	Subsector	Policy context	Description
				Strategy 2018-2030	year by 2% of the heated /cooled area for buildings that are under administration of, or used by a public authority, or provide a public service, with a view to meeting minimum energy performance requirements.
E1	Energy	Energy efficiency	Power sector (electricity generation, transmission and distribution)	National Energy Efficiency Action Plan (NEEAP), National Energy Strategy 2018-2030	New construction of power plants. Reduction of transmission and distribution losses by promotion of distributed generation.
E1	Energy	Energy efficiency	Industry	National Energy Efficiency Action Plan (NEEAP), National Energy Strategy 2018-2030	Reduction of emissions from industries, based on energy efficiency
E2	Energy	Renewable Energy	Power sector	National Renewable Energy Action Plan (NREAP), National RES Action Plan 2019-2020	Transition process towards diversification away from hydropower and promotion of alternative sources of renewable energy: By 2030, 42% of renewable energy in gross final energy consumption.
E2	Energy	Renewable Energy	Transport	National Energy Strategy 2018-2030	Renewable energy sources in transport: Goal for the share of the biofuels vs. total fuel consumption in transport sector 10% in 2020, 10% in 2025 and 10% in 2030 as compared to 3.55% in 2015. The share of electrical vehicles is increasing in the passenger cars fleet (up to 10% of passenger.km in 2030). Bicycle as passenger travel mode is increasing (up to 5% of passenger.km in 2030).
E3	Energy	Penetration of natural gas	Power supply	Gas master plan 2018	Increasing the penetration of natural gas. Development of the gas market and services in Albania based on natural gas supplied through the Trans Adriatic Pipeline (TAP Project), as well as potential gas sources discovered and concretized in the country, or even through natural gas pipelines such as the Ionian-Adriatic Pipeline (IAP Project) and the Albania - Kosovo Pipeline (ALKOGAP Project). Albania intends to develop an underground natural gas storage site in Dumre, near Elbasan (UGS Dumrea Project). The construction of the pipeline will link the TAP project near the Fier Compressor Station area to the Vlora TPP and the entire Vlora region. This will

N°	Sector	Name	Subsector	Policy context	Description
					make possible to restore the Vlora TPP by using natural gas as fuel.

3.6 IPPU sector

Almost 90% of GHG emissions from industrial processes originate from cement production. Emissions from energy consumption in the manufacturing industry are considered under the Energy sector presented above.

Emissions for the **BAU scenario in the IPPU sector** are expected to increase from 1,020 kt CO_2e in 2016 to 1,854 kt CO_2e in 2030, which represents a growth of +81.9% (see figure below). The BAU scenario is based on the GDP trend for all sub-sectors of the manufacturing industry, except for F-gases. For F-gases, emissions are based on a model considering imports, bank, equipment market, refrigerant market share, equipment production, average characteristics of equipment. Albania has ratified the Kigali Amendment to the Montreal Protocol on Ozone Depleting Substances , in 2019. The impact is considered in the BAU. In 2030 HFCs are expected to represent about 16% of IPPU emissions.

For the IPPU sector, no mitigation actions are designed or are in place. The impact of energy efficiency or fuel switch measures in the industry are considered in the Energy sector. BAU and NDC scenarios are therefore identical.

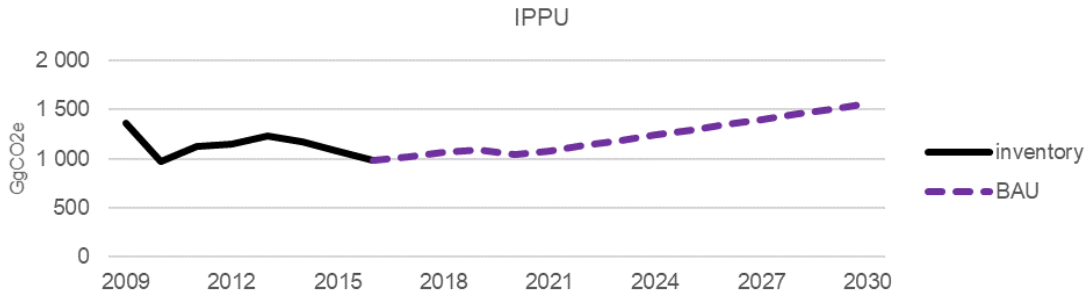


Figure 12: Projected BAU IPPU-related emissions

3.7 Waste sector

In Albania, urban solid waste collection systems are in place in most cities, but little recycling of waste is undertaken. There are no collection systems in rural areas and small towns. Most of the waste from these areas is disposed of by dumping in ditches, ravines, or at the side of roads where it is washed and blown onto other land and ultimately into water courses.

GHG emissions of the waste sector are mainly due to landfills. In 2016, CH_4 emissions from landfills represented almost 80% of total waste emissions. Due to the lengthy waste degradation process there is a delay between the time of maximum disposal of waste and the peak of emissions observed. There are some landfills already functioning in 2010 (Tirana and Shkoder Region), while others remained at the project level (new landfills of Korce, Pogradec, Sarande, Vlore, and Durres).

The second sub-sector in terms of emissions is wastewater treatment, causing N_2O emissions. There are only two wastewater treatment facilities in the country: the Kavaja and Pogradec wastewater treatment plants. These two facilities are relatively small to make a difference and almost all used water is discharged untreated to water bodies.

Albania started the construction of three incinerators of urban waste in Elbasan, Tirana and Fier. The first one entered in operation in 2017 to perform tests and all others should be operational in 2023. There is no segregated waste collection system in place yet, although it is required by law since several years ago. However there are established waste recycling industries mainly for plastics and metals.

In the Waste sector, emissions for the BAU scenario increased from 838 kt CO_2e in 2016 to 966 kt CO_2e in 2030, which represents a growth of +15,3% (see figure below).

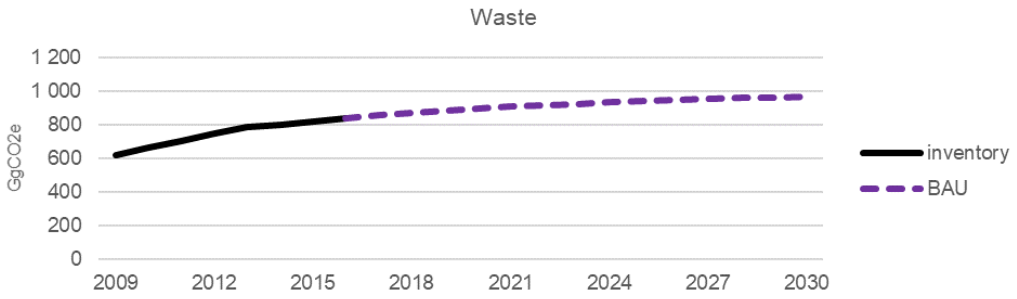


Figure 13: Projected BAU waste-related emissions

The **BAU scenario for the waste sector** assumes a stable level of waste produced per year and per capita, a stable ratio of waste going to landfill, no methane capture installation, an amount of composted, incinerated and open burnt waste per inhabitant equal to the mean value of the three recent years and evolving with population growth. The wastewater treatment forecast is based on industrial production trends.

In the **Waste sector, emissions for the NDC scenario** increased from 838 kt CO_2e in 2016 to 959 kt CO_2e in 2030, which represents an evolution of +14.5% (see figure below). The difference of 2030 with the BAU scenario is -7 kt CO_2e, which represents a mitigation impact of -0.7%.

The small difference observed between the two scenarios can be partly explained by the degradation kinetics of the waste sent to landfills. In fact, this kinetics induces a gap between the maximum of buried waste (960 kt in 2010) and the emission peak observed (728 kt CO_2e in 2024).

In parallel, a strong increase of emissions associated with the development of waste incinerators in the country is considered.

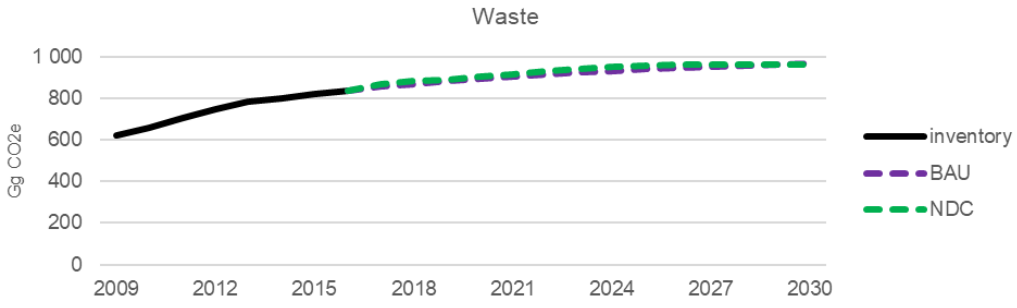


Figure 14: Projected BAU and NDC scenario emissions for waste sector

The following table presents a summary of the mitigation actions considered in the NDC scenario for this sector.

Table 8: Summary of the mitigation actions for the waste sector

N°	Sector	Name	Subsector	Policy context	Description
W1	Waste	Reduction in the amount of waste going to landfill	Landfilling	National Waste Management Plan Governmental Decree No.418, dated 27.05.2020NC3 and communications with national inventory teams.	In 2030 the amount of municipal waste going in landfills will be reduced to 35% of the total amount (by weight) of biodegradable municipal waste produced in year 2010.
W2	Waste	Setting up of methane capture installations	Landfilling	TNC	Beginning of CH_4 capture in 2025 and linear evolution until the capture of 10% of 1.34 million tonnes of CH_4 in 2030.
W3	Waste	Increase in the amount of composted waste	Composting	Albanian Waste National Strategy - Table A5.1 - Waste projection	Increase in the amount of composted waste by 85% between 2009 and 2020, then +3% each year until 2030.
W4	Waste	Stagnation of the total amount of clinical waste incinerated	Incineration	NC3 and communications with national inventory teams. Albanian Waste National Strategy - Table A5.1 - Waste projection	Stagnation of the total amount of clinical waste incinerated.
W5	Waste	Increase of MSW incineration	Incineration	TNC and communications with national inventory teams. Albanian Waste National Strategy - Table A5.1 - Waste projection	Start of MSW incineration in 2017 (only for testing) and gradual increase between 2021 and 2030. 2017: start 2017 - 2018: +100% 2018 - 2019: +50% 2019 - 2020: +33% 2020 - 2021: +25% 2021 - 2030: +27%
W6	Waste	Decrease in the amount of waste burned in open fires.	Open burning	Albanian Waste National Strategy - Table A5.1 - Waste projection	
W7	Waste	Wastewater treatment in rural areas	Wastewater treatment	NC3 and communications with national inventory teams	No evolution regarding wastewater treatment methods in rural areas. Increase of the rate of connection of the urban population to shallow anaerobic lagoons.
W8	Waste	Wastewater treatment in industry	Wastewater treatment	NC3 and communications with national inventory teams	Increase of the total industry product evolution until 2030 estimated from national data and the GDP growth rate.

N°	Sector	Name	Subsector	Policy context	Description
W9	Waste	Increase of protein consumption	Wastewater treatment	Food and Agriculture Organization of the United Nations (FAO) - Statistics Division (ESS)	Increase of the annual protein consumption per capita estimated from FAOSTAT data.

3.8 Agriculture sector

Agriculture emissions are mostly driven by the livestock population. The main sources of emissions are CH_4 emissions from enteric fermentation and from manure management. Historical data about livestock populations is available for the period 2009 to 2016 from the national inventory; and for the period 2017 to 2019 from the Food and Agriculture Organization of United Nations (FAO). The decreasing emissions between 2016 and 2020 reflect these data sources.

The **BAU emission trend for agriculture** predicted between 2019 and 2030 is based on an interpolation between 2030 values used in Albania's NC3 and the FAO values from 2019. The assumption from the NC3 is an increase in most of the livestock populations (except for sheep, goats, horses, mule and asses) in line with the objective of promoting the Albanian agricultural production. It assumed no change in animal feed regimes and associated productivity, and a constant distribution of animals per manure management systems.

For the calculation of nitrogen from crop residues, the analysis considers stable land areas by types of crops, except for wheat, which is decreasing, and assumes an increase in the average yield of these crops. The mineral fertilisation projection is based on the evolution of area of total cropland (in line with FOLU sector), assuming that the average nitrogen rate is constant for the BAU scenario. Assumptions of stability have been made regarding other nitrogen inputs. The area of histosols is assumed stable. For crop residue burning, data from the European Forest Fire Information System (EFFIS) are considered for the period 2009-2018. Average rate of burning for wheat during this period (2009-2018) equals 1.3% and is maintained for the whole period (2019-2030). For pasture burning, the average area burnt during 2009-2018 (5,154 ha) has been used for projected years.

In the Agriculture sector, emissions for the BAU scenario decrease from 2,344 kt CO_2e in 2016 to 2,140 kt CO_2e in 2030, which represents a change of -8.7% (see figure below). However, the decreases from 2016 to 2019 are based on FAO datasets, and the projection for BAU considers a small increase from 2020 to 2030, in line with livestock population projected for the NC3.

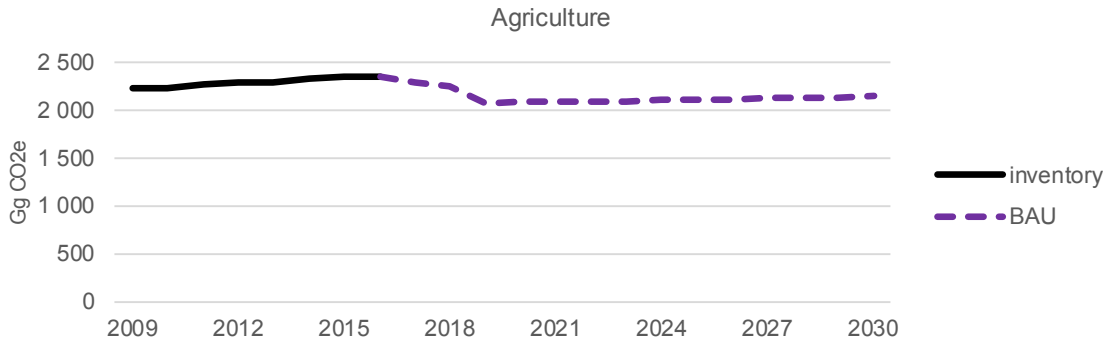


Figure 15: Projected BAU agriculture-related emissions

Additional mitigation measures considered in Agriculture allow an improvement of fertilisation, pasture, and animal feeding practices (see table below). However, these actions have little impact considering the importance of livestock population in the emissions. In line with the national strategy, and considering the national economic circumstances, the aim is an increase in production, no decrease of livestock population, and an increase in yields.

This explains that emissions for the **NDC scenario for the agriculture sector** (with mitigation measures) decrease from 2,344 kt CO_2e in 2016 to 2,071 kt CO_2e in 2030, which represents a change of -11.6% (see figure below). The difference, in 2030, with the BAU scenario, is -68 kt CO_2e, which represents a limited mitigation impact of -3.2%.

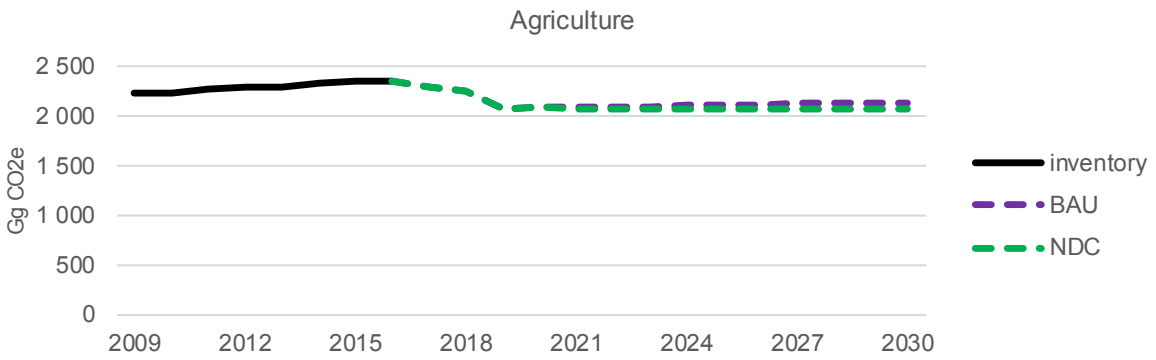


Figure 16: Projected BAU and NDC scenario emissions for agriculture sector

The following table presents a summary of the mitigation actions considered in the NDC scenario for this sector.

Table 9: Summary of the mitigation actions for the agriculture sector

N°	Sector	Name	Subsector	Policy context	Description
A1	Agriculture	Promoting Albanian agricultural production and competitiveness	Livestock and crop production	CAP / EU's Rural Development Policy; NSDI-II; NTP	Increase in production, no decrease of livestock population, increase in yields.
A2	Agriculture	Improving nitrogen fertilisation by applying the right rate	Crop production	CAP / EU's Rural Development Policy; ECCS; NSDI-II; NTP; ISARD; IPARD; TNC.	The impact of the actions A2 and A3 is a reduction of the average rate of mineral fertiliser spread on crops. We assume that this average rate will decrease by 10% between 2019 and 2030.
A3	Agriculture	Improving nitrogen fertilisation by applying the right source	Crop production	CAP / EU's Rural Development Policy; ECCS; NSDI-II; NTP; ISARD; IPARD; TNC.	Improving nitrogen fertilisation by applying the right source of nitrogen, promoting organic amendments and crops residues instead of mineral fertilisers. The impact of the actions A2 and A3 is a reduction of the average rate of mineral fertiliser spread on crops. We assume that this average rate will decrease by 10% between 2019 and 2030. Furthermore, we consider that

N°	Sector	Name	Subsector	Policy context	Description
					other mineral fertilisers than urea could be used, thus we consider a reduction of 50% of the urea spread between 2019 and 2030.
A4	Agriculture	Increasing the time spent in pasture	Livestock	TNC	This action applies only to cattle. In 2016, dairy cows spent 18% of their time in pasture. We consider that in 2030, they will spend 25% of their time grazing. In 2016, other cattle spend 20% of their time in pasture. We consider that in 2030, they will spend 25% of their time grazing. This action increases carbon sequestration in pasture.
A5	Agriculture	Optimising animal feeding in order to reduce N_2O and CH_4 emissions	Livestock	NSDI-II; ISARD; IPARD	Improved feeding techniques for animal in housing (where feeding can be controlled). This action applies only to cattle livestock in housing in 2030, at different application rates. The improved feeding techniques lead to: - A decrease in nitrogen excretion rate (N inputs from feeding fitting better to animal needs). We assume a 10% reduction for improved feeding. - A decrease in enteric CH_4 (add of fat in feeding): according to the GACMO tool, this can lead to a reduction of 4% of CH_4 emissions for 1% of fat added.

3.9 FOLU sector

In the FOLU sector, emissions (mainly carbon losses from the harvest of fuelwood, wood, and forest fires) are bigger than absorptions (the growth of forest biomass). Therefore, this sector does not represent a net sink. During the historical period, fuelwood harvested quantities did not vary much (around 1 million m^3/y), and forest growth remained stable. On the other hand, there is a large magnitude of variation for forest fires, with one peak in 2011-2012 and another in 2017. While the main driver of the sector and for the projections remains the forest, agricultural land also presents mitigation potential that has been considered.

The **BAU scenario for the FOLU sector** considers the continuation of the situation and trends of the recent decade covered by the inventory, in particular in terms of trends for land-use change areas, wood and fuelwood harvests (stable, as in the 2009-2016 period). For wildfires, EFFIS data is used for 2017-2018, and it explains the second peak in 2017. Forest fires episodes, which happen at irregular times, cannot be projected: only a background level was projected, based on the whole period without considering exceptional episodes. it is assumed an increasing probability of fires for this background level, with a linear increase.

In the FOLU sector, emissions for the BAU scenario increase from 1,319 kt CO_2e in 2016 to 1,772 kt CO_2e in 2030, which represents an evolution of +34.3% (see figure below).

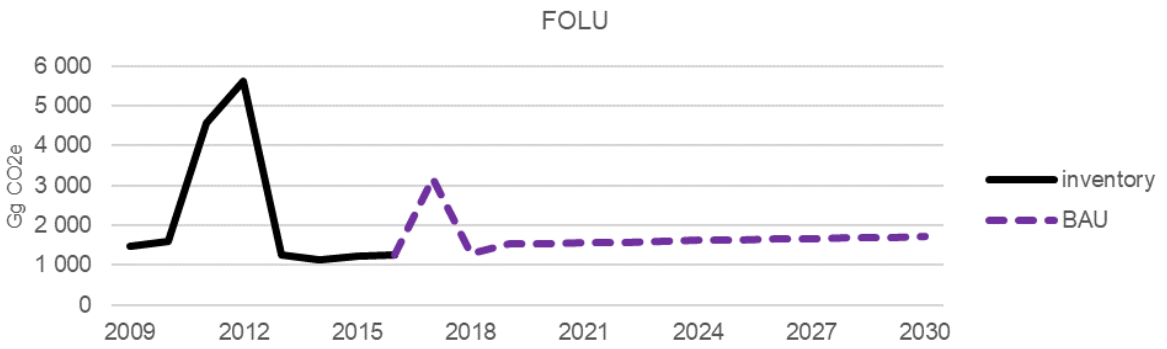


Figure 17: Projected BAU FOLU-related emissions

Emissions in the **FOLU sector for the NDC scenario** (with mitigation measures) decrease from 1,319 kt CO_2e in 2016 to 598 kt CO_2e in 2030, which represents an evolution of -54.7% (see figure below). The difference of 2030 with the BAU scenario is -1,174 kt $CO_2eq.$, which represents a mitigation impact of -66.2%. The big forest fires episodes caused the two peaks (2011-2012 and 2017) and such episodes could not be projected. However, it is considered, in line with the national policy (Draft Environmental Cross-cutting Strategy), that an effort is put to avoid such episodes through the improvement of the monitoring system to prevent wildfires. In addition to this action regarding the prevention of wildfires, other mitigation measures are considered in the NDC scenario: the reduction of the use of fuelwood (the assumption on fuelwood consumption being estimated in the Energy sector so that FOLU and Energy sectors are consistent); new afforestation areas; improved efficiency of fuelwood harvest; improved sustainable management of forests, cropland and grassland to enhance carbon sequestration and protect biodiversity.

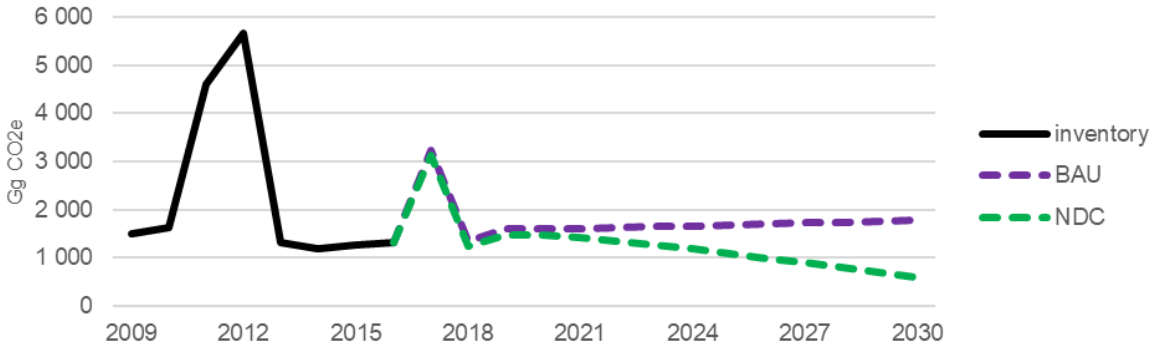


Figure 18: Projected BAU and NDC scenario FOLU-related emissions

The following table presents a summary of the mitigation actions considered in the NDC scenario for this sector.

Table 10: Summary of the mitigation actions for the FOLU sector

N°	Sector	Name	Subsector	Policy context	Description
F1	FOLU	Energy: changes in fuel mix, reduction of use of fuelwood. Moratorium on fuelwood	Forest land - fuelwood	ECCS, NSDI-II, SPDBP	The evolution of fuelwood harvest is directly consistent with projections applied in the Energy sector regarding the evolution of fuel mix. The fuelwood consumption increases by 14% between 2016 and 2030 in the BAU scenario, while it decreases by 4% in the NDC scenario.

N°	Sector	Name	Subsector	Policy context	Description
					In 2030, the application of this measure allows a reduction of the annual emission estimated at -314 kt CO_2e compared to the BAU scenario.
F2	FOLU	New afforestation areas	Forest land	ECCS, NTP, ISARD, TNC	Based on national circumstances, and considering the current trends, the potential for afforestation areas is estimated at 300 ha per year. In 2030, the application of this measure allows a reduction of the annual emission estimated at -7 kt CO_2e compared to the BAU scenario.
F3	FOLU	Improved management and monitoring to prevent wildfires	Forest land - disturbances & biomass burning	ECCS	While it is not possible to predict future episodes of wildfires, the improvement of monitoring and management of forest fires will help reduce this risk. While the BAU scenario considers a mean risk of forest fires at 10 000 ha/year (less than bigger episodes but slightly higher than the other years to represent an increasing risk), the NDC considers a progressive reduction of 5% of this risk. In 2030, the application of this measure allows a reduction of the annual emission estimated at -251 kt CO_2e compared to the BAU scenario.
F4	FOLU	Improving efficiency of fuelwood harvest	Forest land - fuelwood dumping - disturbances	NSDI-II, NEEAP, TNC	Improving the efficiency on use of fuelwood results in a decrease in wood dumping. In 2030, the application of this measure allows a reduction of the annual emission estimated at -145 kt CO_2e compared to the BAU scenario.
F5	FOLU	Improved sustainable forest management	Forest land - growth	ECCS; NSDI-II; NTP; IPARD; LANFPF; SPDBP; PDFS	Improved forestry management, applied progressively on 5000 ha per year, allows a higher growth rate for the tree biomass in these areas. In 2030, the application of this measure allows a reduction of the annual emission estimated at -18 kt CO_2e compared to the BAU scenario.
F6	FOLU	Improved sustainable grassland management to enhance carbon sequestration and protect biodiversity	Grassland	ECCS; LANFPF; NCCS	In the NDC scenario, grassland soil is improved by additional inputs from agricultural management (livestock management, more inputs, as seen in Agriculture sector). In 2030, the application of this measure allows a reduction of the annual emission estimated at -202 kt CO_2e compared to the BAU scenario.

N°	Sector	Name	Subsector	Policy context	Description
F7	FOLU	Improved sustainable cropland management	Cropland	ECCS; NSDI-II: NCCS	Development of agroforestry is projected to be progressively increasing to 100 ha in 2030. Improvement of agricultural soil practices helps storing carbon in soils in areas that increase progressively to 20% of cultivated cropland in 2030. In 2030, the application of this measure allows a reduction of the annual emission estimated at -167 kt CO_2e compared to the BAU scenario.

Albania BUR1 adaptation

Agriculture
Crop yield will be affected by increased drought, flooding and changes in timing of water availability, as well as sea level rise in flat coastal areas.

Tourism
Winter tourism is expected to decline while summer tourism increases, also increasing water and energy demand.

Water resources
Industrial and domestic water use and irrigation are all affected by changes in precipitation and temperature.

Climate risks in Albania (the Vjosa river basin):

Temperatures are expected to increase, along with the risk of **intense precipitation,** leading to flooding. **Sea levels are also expected to rise.**

Health
Changes in pollen seasons and air quality will exacerbate asthma and pulmonary diseases. Increased heat will increase vulnerability to cardiovascular diseases and infectious and parasitic conditions.

Disaster risk management
The number of floods, flash floods, forest fires, storms, snowstorms, landslides and heavy rains have increased over the past three decades.

Biodiversity
Sensitive forest and wetland areas will be greatly affected by climatic changes. This includes fungal diseases affecting plane trees. New hydropower plants will also impact wildlife.

4 Adaptation actions

This chapter describes the efforts made to address climate change adaptation since the NC3 of Albania to UNFCCC. The report consists of two parts:

- Vulnerability assessment and adaptation analysis
- The efforts made after the NC3 to cope with climate change impacts through addressing adaptation, in parallel with mitigation, in strategies, strategic documents and action plans.

This chapter focusses on the Vjosa River basin (VRB), which is the second largest water system in Albania. The previous National Communications focussed on different geographical regions:

- NC1 considered the entire Albanian territory
- NC2 considered the Drini River basin (largest water system in Albania)
- NC3 considered the coastal area (because of its importance for economic development).

4.1 Vulnerability and adaptation analysis

The following vulnerability and adaptation analysis considers the sectors/systems for the VRB: water resources, agriculture, soils, health and sanitation, disaster risk reduction, biodiversity and forests, tourism and settlements.

The VRB is the second largest water system in Albania[22] covering an area of 6784 km^2. The Vjosa River is one of the longest transboundary rivers in the Balkan area. Approximately one-third of its headwaters are located in northwest Greece, where it is known as the Aoös (Αώος) River (see figure below).

In Greece, the Aoös catchment is shared among three prefectures: Ioannina, Kastoria and Grevena. The river's source is situated at 2600 meters above sea level (m.a.s.l.), below the Mavrovouni Mountain in the Pindus mountain range in Greece. The Aoös River flows over a distance of 85 km before crossing Albanian border. In Albania, it continues as the Vjosa River, and flows over a distance of 190 km before discharging into the Adriatic Sea north of Vlora city, where it intermittently shapes and nourishes the Narta lagoon.

In Albania, the Vjosa catchment has a mean elevation of about 855 m, and it is shared among seven districts: Erseke, Permet, Gjirokaster, Tepelene, Mallakastra, Fieri, and Vlora (Vlora and Gjirokastra Counties/qark). The main water bodies are Vjosa, Drino and Shushica Rivers, Butrinti lake and Narta and Orikumlagoons. Because the river has not been subjected to large damming or channelling schemes, it is considered one of the rare remaining natural flow regimes in Europe.

[22]Ministria e Bujqësisë, Zhvillimit Rural dheAdministrimittëUjëravePërgatitjadheZbatimi i njëStrategjie MIBU. StrategjiaKombëtarepërMenaxhimin e IntegruartëBurimeveUjore 16 qershor 2017

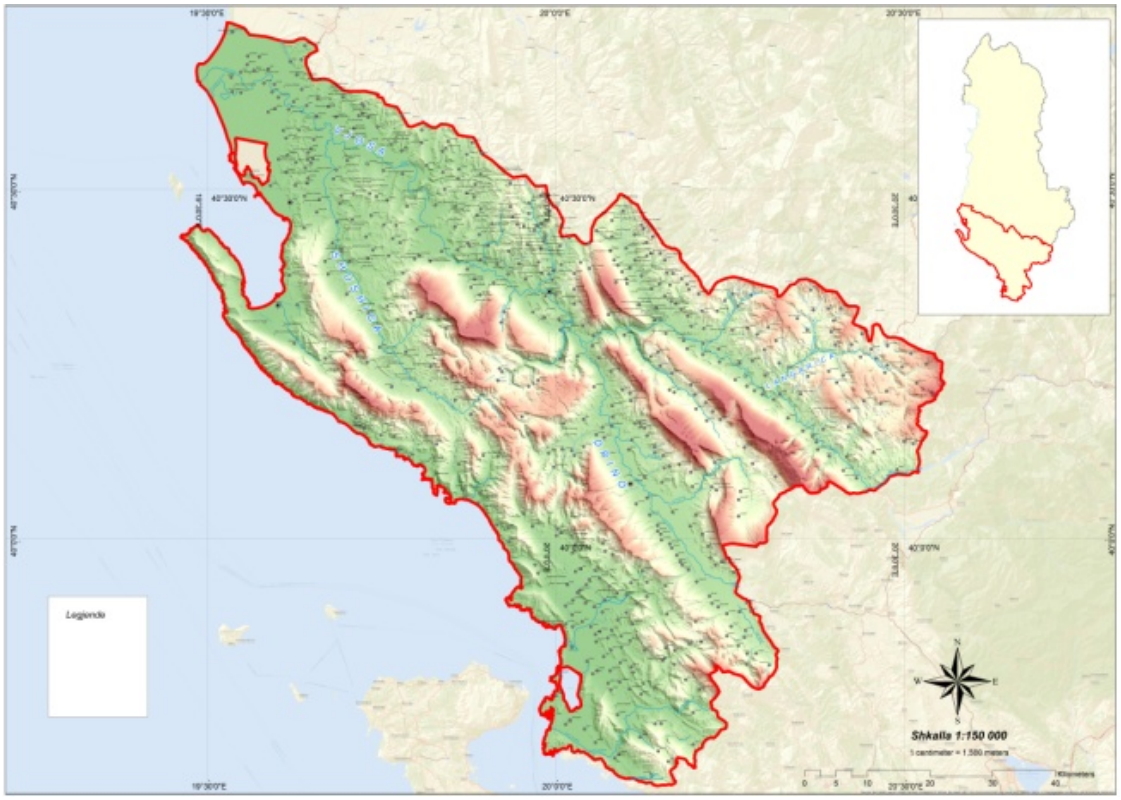


Figure 19: Map of the Vjosa River Basin

4.1.1 Climate trends

The **mean temperature trend** for the period 1930 to 2006 against the 1961-90 average for the Vjosa catchment area shows the period 1931 to 1970 had a positive anomaly followed by a negative anomaly between 1971 and 2000 (see figure below). After 2000 there has been a period of the positive anomaly from 2001 to present. This is a consequence of an increase in both maximum and minimum daily temperatures, especially in summertime. The annual average temperature in 2010 has already reached the values projected for 2020.[23]

[23]Albania's NC3 to UNFCCC.

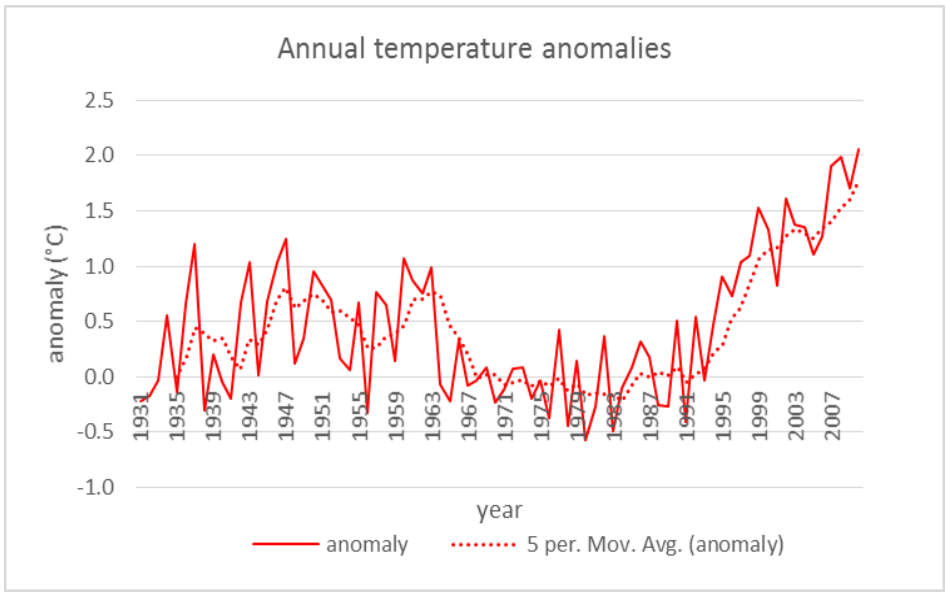


Figure 20: Anomalies of average temperature, Vjosa River downstream

Analysis of anomalies of the **annual precipitation trend** for the period 1931-2008 for the Vjosa downstream area (see figure below) shows that the variation around the normal value (1961-1990) can be divided into different sub periods: with a highly wet period during 1935-1945, followed by a wet period between 1951-1980 up to 40% above the normal value, a dry period between 1981-2000 up to 45.3% below the normal value, and since 2000 a period of increasing precipitation. Analysis of seasonal precipitation patterns shows no consistent patterns in variation with periods above and below normal values[24].

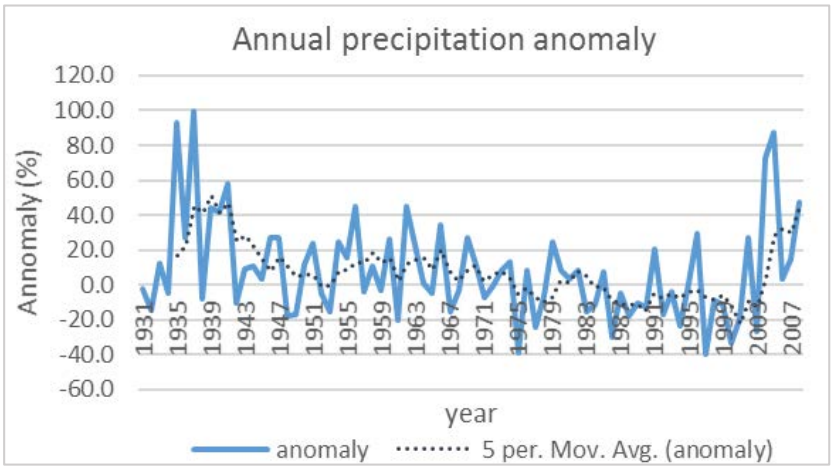


Figure 21: Anomalies of precipitation, Vjosa River downstream

4.1.2 Climate projections

The **climate change projections** are downscaled from the global 'Representative Concentration Pathways' (RCPs) for the climate science assessment ('Working Group I') of the Fifth Assessment Report (IPCC, 2014) and calibrated for the VRB area[25].

[24] Albania's NC3 to UNFCCC.
[25] The same methodology is used in the NC3 of Albania to UNFCCC and Vjosa Project

All scenarios for the VRB suggest that the area is likely to become warmer. Similarly, increasing trends in annual and seasonal temperatures, both minimum and maximum values, are expected. Given the mitigation approach (warming at global scale is limited up to 2°C), RCP2.6 projects the lowest increase. The projections of average maximum temperatures reach up to 1.1°C above the normal period (1986-2005) by 2050 and remain unchanged thereafter. RCP8.5 (4°C global warming) reveals the worst projections with increases in annual maximum temperatures of up to 2.0°C and 4.7°C by 2050 and 2100, respectively (see figure below).

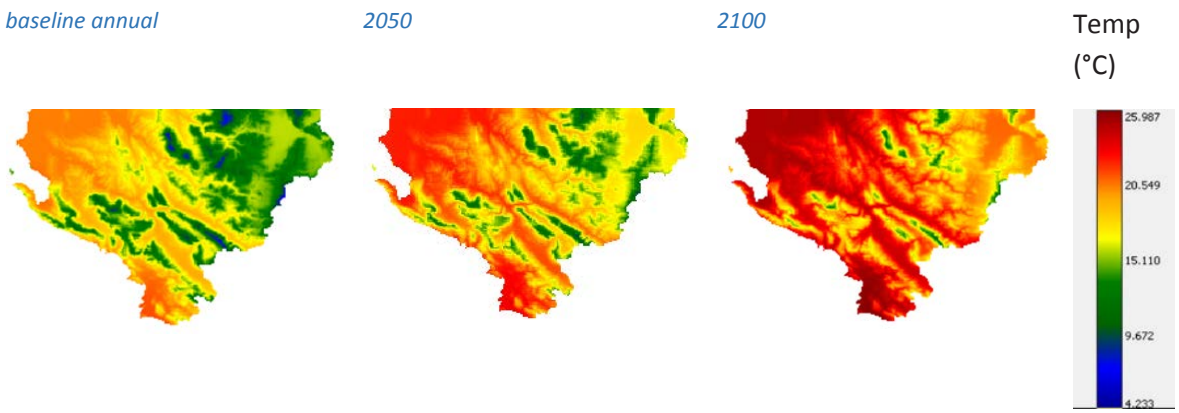


Figure 22: Annual distribution of Tmax, RCP8.5 different time horizons

The climate change scenarios project lower **maximum temperature** increases in winter and spring compared to summer and fall. In summer, projections of the mean temperature changes are likely to reach up to 1.5°C (1.0-1.9°C) by 2050 for RCP2.6, and from 2.6°C (1.9-3.4°C) to 6.4°C (4.4-8.3°C) for RCP8.5, by 2050 and 2100, respectively.

The **average minimum temperatures** and their variation limits are likely to increase. The expected changes in winter are of 1.0°C by 2100 for RCP2.6, and from 1.5°C and 3.4°C by 2050 and 2100 respectively for RCP8.5.

The **temperature extremes** are also expected to increase according to all RCPs scenarios. In Permet, the absolute maximum temperature is expected to change from 42.5°C (current record) to 44.2°C (RCP2.6), 44.7°C (RCP4.5) or 45.5°C (RCP8.5) by 2050.

On the other hand, the return periods of **maximum absolute temperatures** are expected to drastically decrease over the VRB area. Temperatures of 40°C that are currently reached once in 50 years, might occur more frequently, once in every 3 years (RCP2.6) or 2 years (RCP8.5) in Tepelenë area.

The analysis of the **precipitation** projections according to different RCPs shows that all scenarios project a negative slight trend for all seasons and time horizons. The scenario RCP8.5 projects the highest percentage decreases in precipitation. The annual and summer values are likely to reach up to -7.7% (-45.7% to +29.8%) and -16.0% (-48% to +14.5%) respectively by 2050. The mitigation scenario, RCP2.6 projects the lowest percentage decreases in precipitation compare to other RCPs, likely to reach a value of -8.2% (-25.1% to +7.7%) in summer and -2.4% (-13.5% to +8.4%) over the year by 2050. RCP 4.5 and RCP8.5 project a slight positive trend of winter precipitation for all time horizons -). These positive trends may arise because of higher winter temperatures leading to more rainfall than snow. The reduced snowfall will lead to subsequent decreases of river flows during spring.

The RCP projections show that **high-percentile precipitation** (90% - - change/increase faster than average precipitation changes. This indicates a higher risk for intensification of heavy precipitation that causes flooding. On the other hand, the high reduction at the 10% percentile level of changes indicates a likely increase in drought frequency.

The **return periods of maximum precipitation** levels are expected to decrease over the VRB area. More frequent heavy rains with longer duration can cause flooding and economic damages as a consequence. For example, a maximum precipitation of 150mm/d that historically occurred once in 50 years in Permet may now be expected to occur more frequently, every 40 years (RCP2.6), 36 years (RCP4.5) or 34 years (RCP8.5). In parallel with a decrease of return periods, the amount of total precipitation falling during intense multi-day's events is expected to increase from 134 (1 day) to 186 mm (2 day) and 218 mm (3 day) events.

Sea level as in the case of SRES scenarios is projected to rise. As per the worst scenario, RCP8.5 the sea level is expected to rise by 27 cm (20.4 to 34.7 cm) and 80 cm (57.5 to 105.4cm) by 2050 and 2100 respectively. These simulations do not consider tectonic movements.

4.1.3 Water resources

Water resource is one of the most vulnerable environmental factors in terms of climate change impact. Reduction in river flow depends primarily on changes in the precipitation total, on their distribution within the year and whether precipitation falls as snow or rain. These factors are all influenced by climate change. Temperature is particularly important in snow-dominated basins. The increase in temperature, as annual average and especially during the summer, will influence the evaporation process in the basin which also affects river flows even at the catchment scale. Potential evaporation is also highly likely to increase in all areas due to these higher temperatures. These increases will be larger in seasons in which rainfall decreases. For all the approaches used, the decrease in mean annual precipitation produces a decrease in mean annual runoff in the VRB (see figure below). Only projections according to RCP2.6 show a very slight increasing trend.

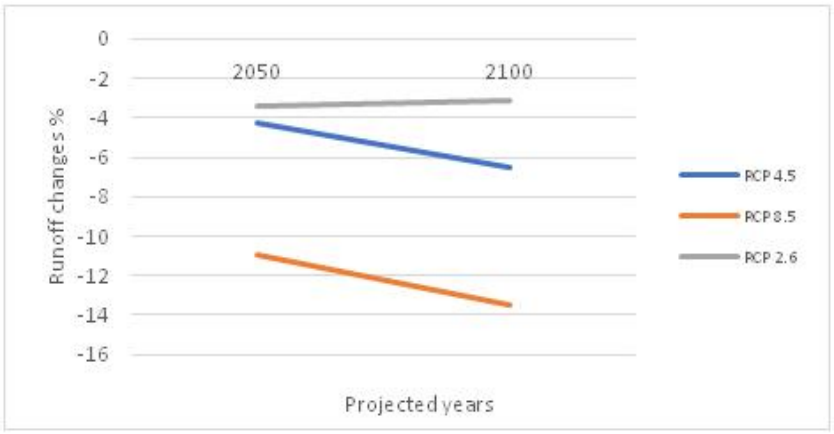


Figure 23: Runoff projections for RCP4.5 and RCP8.5 RCP2.6, VRB

Expected changes in precipitation and temperatures will affect not only the hydrology of the watershed but demand for water as well. Industrial and domestic water demand show similar changes across all climatic scenarios. Only water demand from irrigation is exerting additional pressure on a changing system. The figure below shows how overall system demands grow over time from the first year of the Reference Scenario (2016) to the last year of the model (2050). The various scenarios show growing demand.

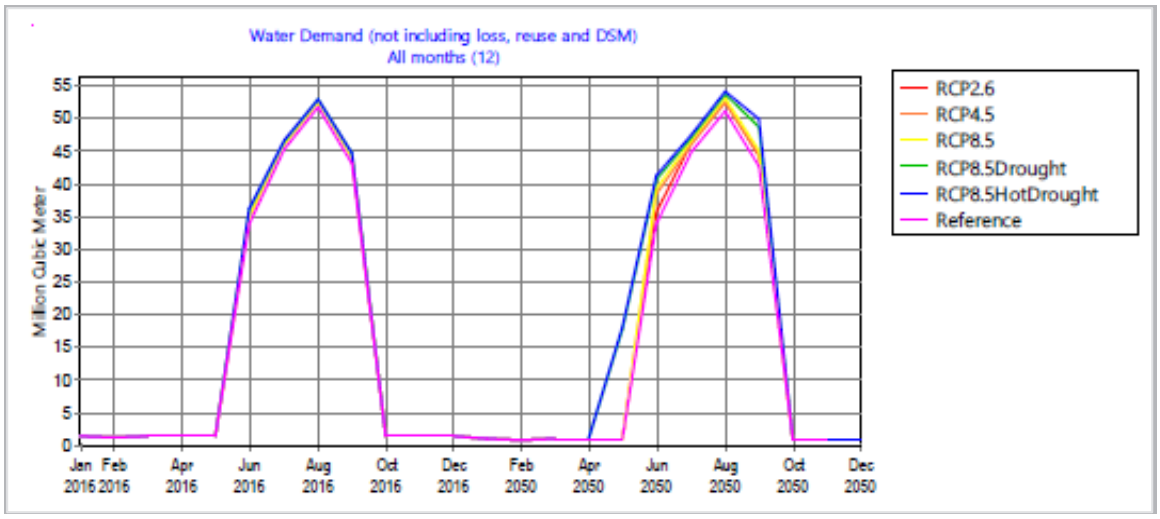


Figure 24: Vjosa watershed demand for all demand sites. Source: Report II- Hydro-ecological Assessment

4.1.4 Agriculture

Some key results related to the impacts of climate change on crop yields are:

- An increase in frequency and intensity of drought due to the reduction of water resources causing severe physiological stress to plants and animals
- An increase in frequency of flooding due to the increase of frequency and intensity of heavy rains with an excess of water for a period of time causing physiological and direct physical stress to plants and animals
- The timing of water availability when severe lack or excess of water does not occur but its availability through the year changes so as to no longer be suitable for current agricultural practices, crops or animals
- Likely changes in the sea level will greatly impact agriculture in flat areas (mostly coastal areas which include Fieri, Vlora and Xara fields in Saranda) due to flooding, intrusion of salt water into agriculture lands, loss of land from coastal erosion, etc.

Some of the outputs of the impact analysis according to RCP4.5 projections performed in the frame of NC4 are illustrated in the figures below.

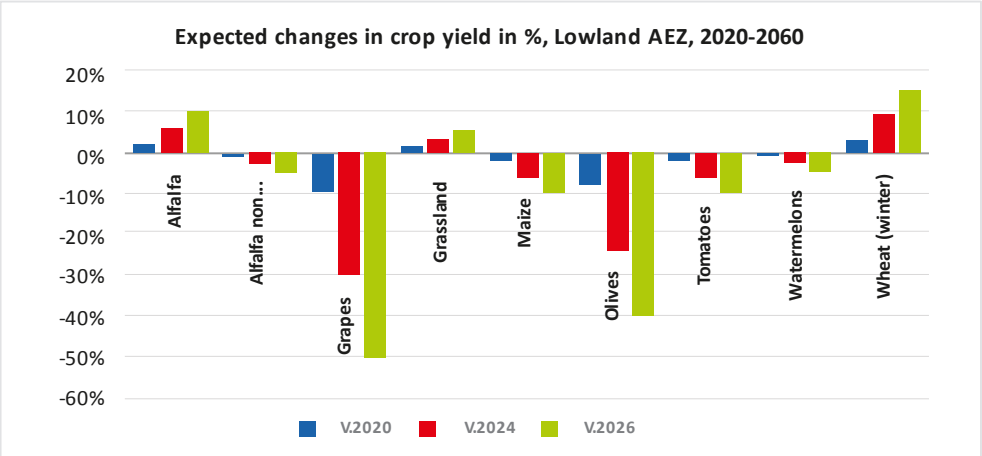


Figure 25: Expected changes in crop yield, VRB downstream

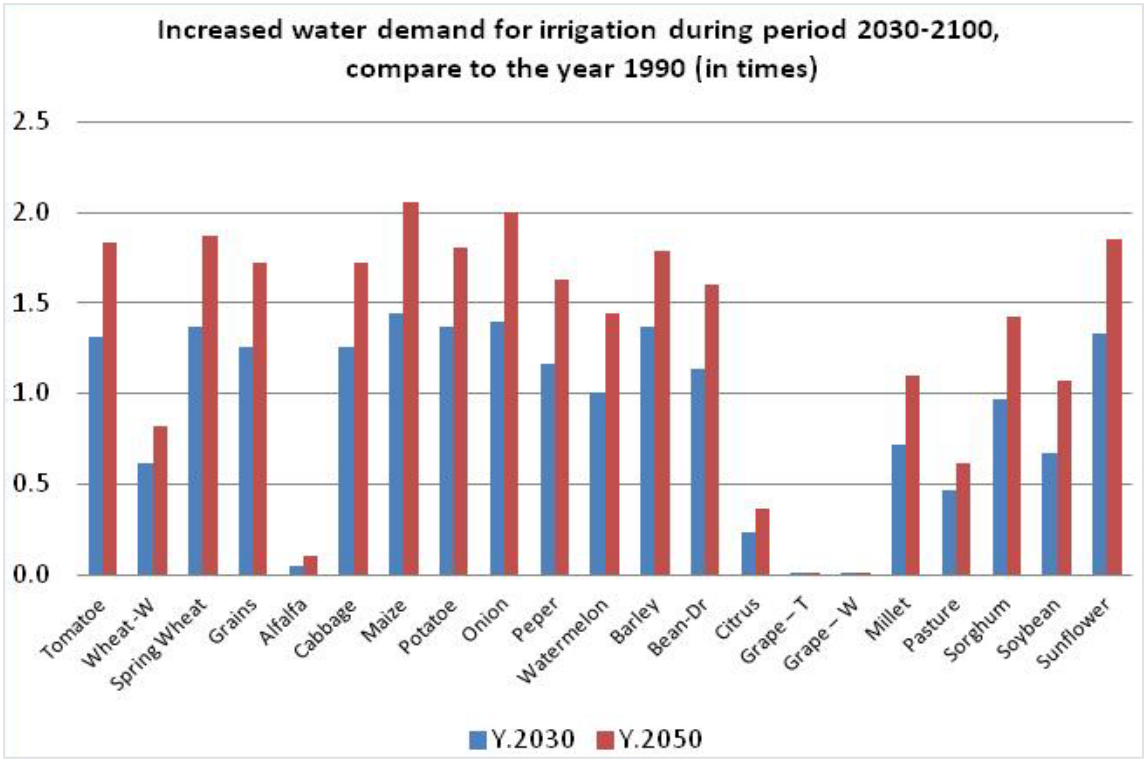


Figure 26: Projection of water demand for irrigation using CROPWAT software

4.1.5 Soils

The impact of climate change in soil erosion is evaluated by using the Potential Erosion Method (PEM). This evaluates the potential amount of material eroded and deposited for the years 2035 and 2050, considering climate change scenarios RCP8.5 and RCP4.5. The analysis reveals that:

- The potential quantity of eroded material for the current period is 3,976,382 m^3/year, and the mean quantity of eroded material per hectare is therefore 6.14 m^3/ha/year. This value shows that the soil erosion phenomenon is moderate in VRB area.
- The phenomenon of soil erosion in VRB will continue to be active in the coming years, for both climate change scenarios RCP8.5 and RCP4.5, undergoing a gradual increase of the quantity of eroded material.

4.1.6 Disaster risk management (DRM)

The statistical analysis of DesInventar_Albania data shows an increasing number of disaster events in the past three decades when considering floods, flash floods, forest fires, landslide, storm, snowstorm, and heavy rains. The most affected municipalities are Fieri with 45% of total events, Vlora with 19%, Gjirokastra with 19%, Permet with 7%, Mallakaster with 5%. Figure 27 shows the distribution of flood disasters for three more affected municipalities for the period 1990-2018.

More than 98% of all events, including forest fires, are caused by meteorological conditions, and the most problematic months in terms of flood disasters are October to March, during which is also the maximum precipitation in the area associated also to the same behaviour of the discharge of the river.

Considering the outputs of climate change scenarios (CCS), the number of disasters is expected to increase. Flooding is one of the most important disasters in the VRB, especially in the downstream part. The map below shows the Potential Significant Flood Risk area downstream of the VRB.

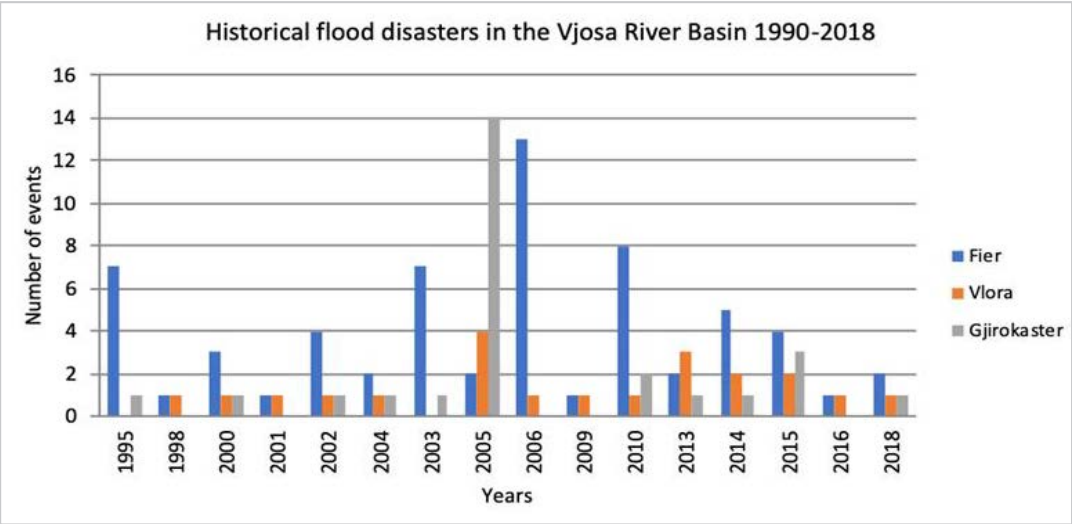


Figure 27: The distribution of flood historical disasters in the Vjosa river basin 1990-2018, in prefecture level. Accumulative numbers for each year

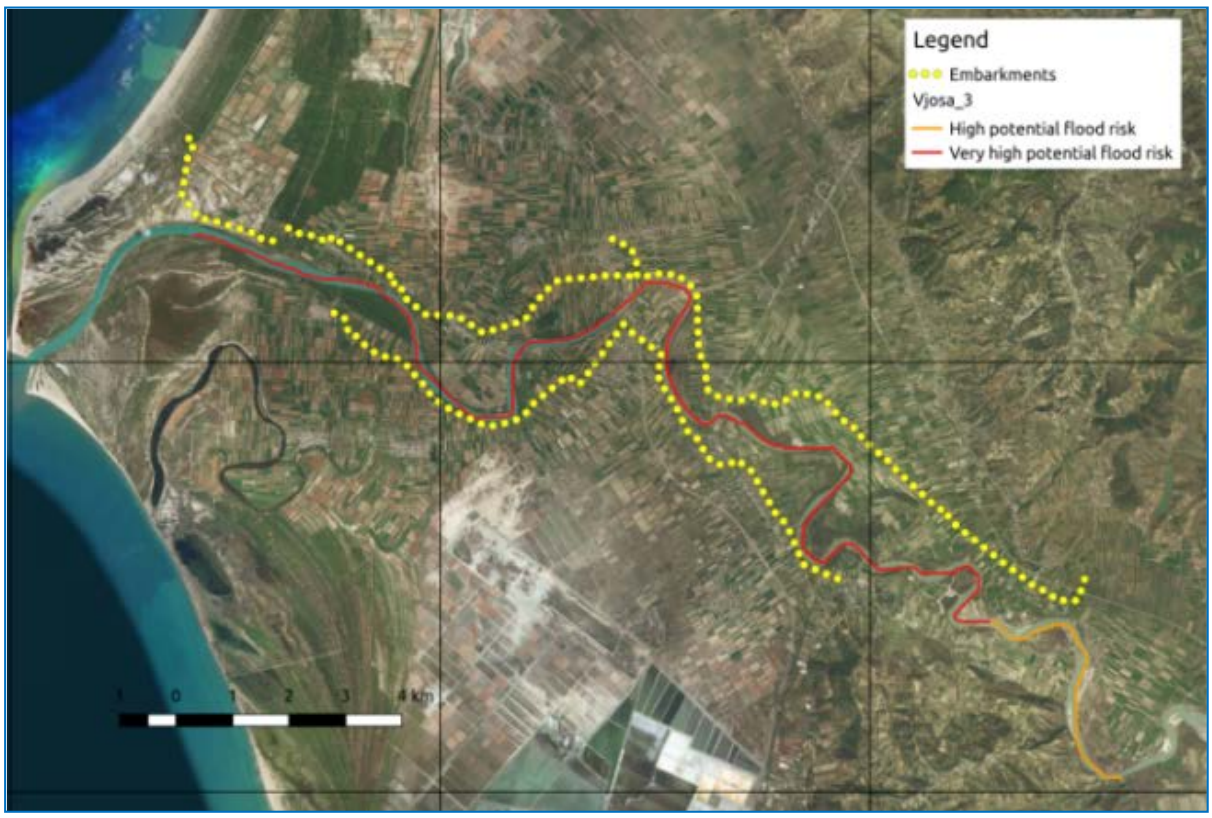


Figure 28: The Identification of Area with Potential Significant Flood Risk for the downstream of VRB Source: PRO NEWS Project

4.1.7 Biodiversity and forests

The climate change impact on biodiversity and forest ecosystems identifies the key vulnerabilities due to climate changes in the VRB with a focus on protected areas. It especially identifies the impact of hydro power plants and small hydro power on biodiversity and forestry in conditions of climate change, as described below.

Assuming a 1-2°C increase in temperature, meadow ecosystems are expected to replace forest ecosystems. The increase in temperature will result in different soil conditions making it unsafe to plant sustainable forests in the mountain meadow land belt up to 1900 m above sea level in the mountains of Murgana, Kardhiq, Cajup , Cike, Shelegur, Dhemblan, Zhulat and Nemercke. This replacement is expected to occur from highland forests represented mainly by fir, black pine followed by beech.

As temperatures rise there will be a greater mix of forests. Typical Mediterranean forests (querqus sps., arbutus sps and carpinus orientalis) and forests with high temperature resistance exposed on the southern and southwestern slopes of the VRB range will be mixed with oak forests. Rare vegetation will become dominant impoverishing forests with environmental and economic value. Xerophytic forest vegetation will be affected by the imbalance of water reserves and will actively penetrate forest ecosystems leading to lower forest production (biomass) and more intensive degradation of terrestrial ecosystems.

Wetlands of national importance in the Vjosa delta and Karavasta lagoon will be greatly affected. The habitats will change due to the increase of the sea level and the temperature of the aquatic environment.

Installing hydropower plants will have a serious impact on wildlife. It might cause the permanent loss of habitat and special biotopes through inundation, fluctuating water levels, dispersal of exotic species and obstacles for fish migration. However, the impacts are very general, and it is hard to put any numbers on the losses.

Among the fungal diseases that are infecting Platanus orientalis is canker stain (Cerotostitis Platenea) of plane trees. In the Vjosa valley this disease has appeared in the last ten years and is gaining momentum. The gorge of Kelcyra in Drino and the stream of Suka (Katundishte) were the first areas completely dried by this fungal disease. Temperature changes of 1°C encourage the vectors and the disease itself to spread to the valleys of Drino, Kelcyra, Shushice, Sukes, Langarica, the upper part of the Vjosa and the river Izvor.

4.1.8 Tourism and settlements

Climate change is already perceived as having an impact on the tourism sector – both positive as well as negative. For the coastal area of the VRB the projected increase of temperature is expected to extend the period for sun and sea tourism. Up to 2030, the October-May period will remain unsuitable for sun and sea tourism, while the other period of the year will still offer full comfort levels:

- Good conditions (temperature condition index (TCI) value 60-70): between mid-March and mid-October up to between early March and early November
- Very good conditions (TCI value 70-80): between the end of March and beginning of October up to between mid-March and mid-October (for RCP8.5 this period is even longer)
- Excellent conditions (TCI value 80-90): between mid-April and the end of September up to between early April and the beginning of October (RCP8.5).

Data regarding 2050 defines April as an acceptable month, June as ideal, while May, July, August, September and October as excellent months for tourist activity. The number of visitors is expected to increase.

The projected temperature increase in the upper section of the basin (the hilly and mountainous regions but also in the Llogara National Park, the mountain of Gramoz) is expected to have negative effects for winter tourism and the environment in general.

In agritourism and rural tourism the heavy rains, especially in the intermediate seasons, will alter the holiday and the contact with nature will be increasingly altered due to the impossibility of having a direct relationship with it and limiting sharing with the farmer's work.

A considerable increase for the need for water and energy is expected. The water demand will increase because of the increase of tourist numbers and of tourists' water demand.

As a result of projected sea level rise and an increase of frequency and intensity of heavy rains the following areas in VRB are endangered:

- Potentially flooded inhabited areas: Seman-Vlore: Tepelene, Memaliaj, Selenice, Mallkaster, Fier (only here almost 60ha in risk of flooding), Vlora
- Roads at risk of flooding: about 25 km between Fier and Vlora

The figure below shows settlement areas endangered by floods from river and sea level rise as per different rivers within the VRB (Vjosa, Drinos, Shushica, Bistrica Rivers).

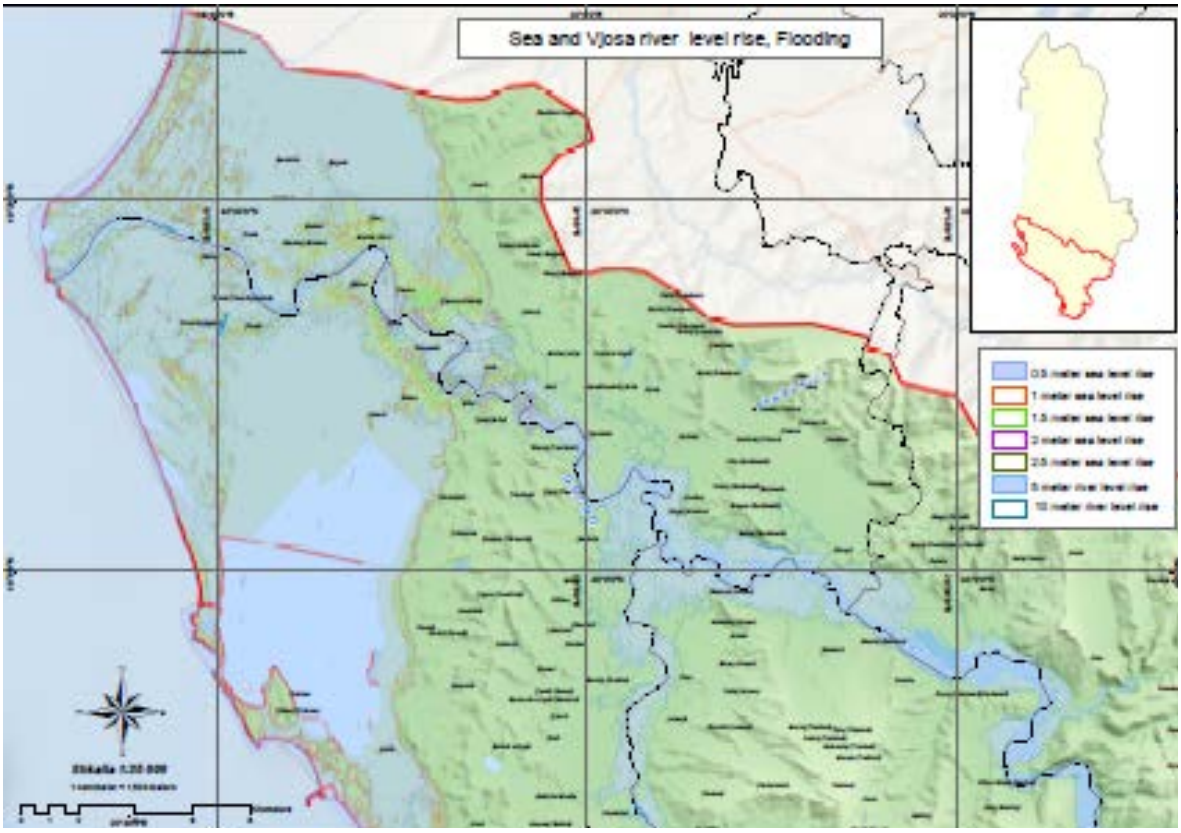


Figure 29: Settlements endagered by floods from river

Following the projected changes in both minimum and maximum temperatures, the degree days for heating are expected to decrease and degree days for cooling to increase (see the figure below). It indicates the increasing energy demand for cooling especially in the coastal part of VRB, Konispol.

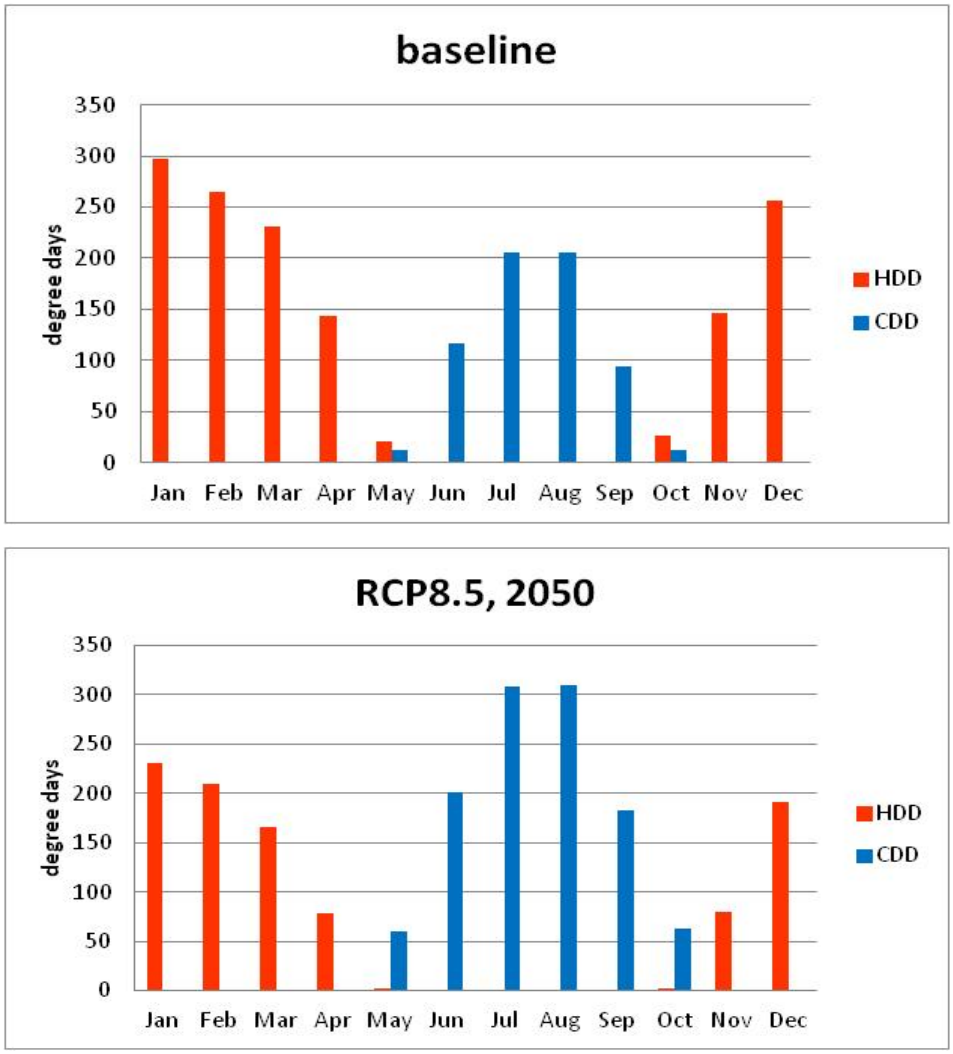


Figure 30: Changes in heating and cooling degree days, different RCPs, Konispol (average monthly values)

4.1.9 Health and Sanitation sectors

The analysis performed consisted, among others, in the evaluation of:

1. Health impacts of extreme events (for example floods and droughts)
2. Diseases and deaths of specific diseases related to extreme temperatures (using data on death certificates, hospital admissions, emergency visits related to cardiovascular problems, and other chronic conditions).
3. Heat stress which can make living and working conditions unbearable and increase the risk of cardiovascular, respiratory and renal diseases. The risk is expected to be particularly high in the presence of air pollution.
4. Vector borne diseases and zoonoses**.** Climate change lengthens the transmission season and expands the geographical range of many diseases.
5. Water related illness (gastrointestinal conditions, outbreaks, parasitic like leptospiroses). Many infectious diseases, including water-borne ones, are highly sensitive to climate condition.
6. Potable, surface water and recreational water pollution (bacterial monitoring).
7. Food safety and food security (data on food safety pathogens and toxins. Data on food security). Food security, particularly in relation to floods and drought.

8. Health conditions data about most vulnerable populations and those disproportionally affected by extreme weather and climate events (older people, outdoor workers, people with disabilities and chronic conditions, living alone, women, children, those with low access to health services, etc).
9. Analyses of healthcare vulnerabilities and reforms and general data about adaptation efforts and policies.

Some results of the analysis in the health sector are presented in the table below.

Table 11: Expected climate change impacts on health issues

Health issue	Trends	Possible influences of climate change	Estimation of additional attributable burden of disease in relation to climate change scenarios
Asthma	The prevalence of asthma increased (on average 5% every year) and is projected to continue to increase in Albania and VRB in the coming decades. The situation is expected to be worse in Vlora. There are no systematic incidence data, but the relative low baseline prevalence indicates a risk of future increases year on year.	Asthma is exacerbated by changes in pollen season and allergenicity and in exposures to air pollutants affected by changes in temperature, humidity, and wind.	In spite of demographic changes, by 2031 in the VRB, there are expected to be 800-1200 additional cases of asthma, compared to 2019, very likely attributable to climate change. The population of Vlora Region is the most exposed to the condition. Women tend to be more vulnerable.
Cardiovascular diseases	Cardiovascular disease was by far the main cause of death in Albania in the last decade. In the coming decade, approximately one third of the Albanian population is projected to have some form of cardiovascular condition, including high blood pressure.	Cardiovascular disease increases sensitivity to heat stress.	In VRB regions, 190,000 to 230,000 people are estimated to suffer from cardiovascular diseases (including hypertension) by 2031. This group constitutes the largest population category vulnerable to excess heat. Most of them will have some forms of exacerbations of the condition as a consequence of climate change, increasing the need for extra health care efforts and jeopardising the efficacy of existing programs of control. It is estimated that between 2030 and 2050, on average more than 70 additional deaths every year will be attributed to heat waves in VRB. Gjirokastra is expected to be the most affected region.
Chronic pulmonary diseases	In 2018, approximately 2.1% of adults had been registered with chronic pulmonary diseases by a family doctor. Deaths from chronic lung diseases have not increased during the last decades, but they remain the third leading	Chronic pulmonary diseases increase sensitivity to changes in ambient air quality	While it is difficult to project additional pulmonary diseases attributable to climate change, it seems very likely that more than 30% of the expected pulmonary cases will suffer from additional consequences attributable to climate change and deterioration of air quality.

	cause of death and are expected to become some of the most costly illnesses in coming decades.	associated with climate change.	By 2031, climate change in VRB will be the underlying factor for additional health consequences in almost 2000 people with chronic pulmonary diseases. Gjirokastra region is expected to be the most affected region.
Infectious and parasitic conditions	The infectious and parasitic diseases in Albania have declined in terms of mortality, mostly because of a decline in fertility rate and decreasing cohort of children. ADHS 2018 data about acute respiratory infections and diarrhoea confirm this trend. Nevertheless, these diseases are associated to climate and are showing signs of re-emergence.	Many infectious agents (salmonellas, noroviruses, rotaviruses etc.) increase their circulation and virulence in warmer temperatures. Additionally the vectors responsible for their transmission, are influenced by weather and climate change, as is the case for leptospirosis and zoonosis.	With climate change the age standardised rate of a number of infectious and parasitic diseases is projected to increase in VRB regions. Gastroenteritis is associated with almost 170 new cases per 100,000 inhabitants per year for summer temperatures 1 degree Celsius higher. This is translated to 250/100,000 excess rate for summer temperatures expected to increase 1.5 C°. In Vjosa regions it may be estimated that, in the period 2030 to 2050, climate change will be responsible for around 1500 to 2500 new cases of gastroenteritis every year, in the higher temperature scenario. In addition, a smaller number of other infectious or parasitic diseases will occur. Fieri is expected to be the most affected region.

4.2 Efforts to address climate change adaptation

In the period since the NC3, Albania has continued its efforts to address climate change adaptation in national and sector strategies and plans, legislation, management plans, etc. In Albania, there are several strategies in place related to climate change adaptation. These are considered below splitting the strategies between legislation and project. The adaptation actions proposed through legislation are summarised in **Table 12**.

4.2.1 Legislation related to climate change adaptation

The National Strategy for Development and Integration 2015-2020 (NSDI-II)[26]

The National Strategy for Development and Integration 2015-2020 (NSDI-II) encompasses the key priorities of the Government of Albania, of which, EU integration is the overarching goal. The four main sectoral pillars of the strategy are listed below:

i) growth through macroeconomic and fiscal stability
ii) economic growth through enhanced competitiveness and innovation
iii) investing in social capital and social cohesion
iv) growth through sustainable use of natural resources and territorial development.

[26] Approved by DCM no. 348, date 11.5.2016

Actions that affect climate change adaptation fall under the 4th pillar; the key strategies are split into the following aims:

- Ensure the sustainable management of natural resources and undertake climate action.
- Enhance and strengthen the protection of nature.
- Strengthen the management and preservation of forestry and pasture resources.
- Strengthen the management of water use, in order to reduce floods and phenomena of erosion and soil loss.
- Develop sustainable tourism in Albania, which will help preserve natural ecosystems.

Environmental Cross-cutting Strategy 2015-2020 (ECCS)

The vision of the Draft Environmental Cross-cutting Strategy 2015-2020 (ECCS) is based on a principle of integrated development where the protection and the improvement of the environment contribute to economic growth and social welfare.

The strategy provides a list of actions and measures for the following main themes: climate change, air quality, chemical products, waters, waste management, nature protection, forestry and pastures, aimed at the protection of environment, with some actions focused in particular to climate change adaptation and mitigation, for the medium term (2015-2017) and longer term (2017-2020).

In relation to climate change, priorities include the development of a national strategy and a national action plan on climate change, the establishment of a national inventory system on GHG emissions, and the strengthening of cooperation with institutions for the implementation of climate change policies in their sector strategies.

Some actions from the strategy are listed below:

- **Water resources**: the inclusion of climate change issues in all strategic papers of water management, better management of water resources to reduce the effects of flooding and drought and consequent soil loss.
- **Protected areas**: increasing the surface and improving management of the existing ones, identification and establishment of "Natura 2000" network of Special Areas of Conservation of importance to the EU, in order to ensure a favourable conservation status and increasing the carbon sequestration potential of natural ecosystem.
- **Forests and pastures**: forest improvement with sustainable and multifunctional management plans and afforestation, prevention of illegal cutting through the control of Forest Police, prevention of fires, reforestation of coastal and internal forests to avoid soil erosion with consequent carbon loss, preventing further degradation and protection of biodiversity, ensuring the maximum potential to fulfil the ecological functions and increase carbon sequestration.

The Document of Strategic Policies for Protection of Biodiversity for the period 2016-2020

The Document of Strategic Policies for Protection of Biodiversity for the period 2016-2020[27] recognises the fact that climate change can cause the extinction of endangered species, as well as have a major impact on our environment. Changes in vegetation patterns, loss of biological resources, sudden

[27] Approved by DCM no.31, date 20.1.2016

increase in alien species, and changes in fish resources are some of the biggest challenges the globe is facing. In addition, climate change increases the impact of invasive alien species. So, it is important to:

- Conduct studies on the selection and management of climate change indicators
- Assess the forest health and vitality
- Select and monitor forest insects, indicative of climate change
- Undertake long-term monitoring of changes in forest ecosystems
- Predict future changes, in the distribution and diversity of species, sensitive to climate change
- Improve systematic management of climate change sensitive species
- Develop of new species varieties, suitable for climate change.

The National strategy for Integrated Water Resources Management (NSIWRM)[28]

The National strategy for Integrated Water Resources Management (NSIWRM) integrates the objectives of existing Albanian policies considering the risks expected from climate change. The strategy is based on four strategic pillars: water for people, food, industry, and the environment.

The strategy focuses on risks, such as droughts and floods, on water. Objectives are set out around effective management of natural disasters; provision of flood protection and preparing for drought and water constraints. The actions proposed to fulfil these objectives are:

- Rehabilitation of buildings damaged by natural causes
- Strengthening cooperation and fulfilling institutional obligations
- Mitigating the consequences by providing financial support to families whose homes have been damaged by natural or other disasters
- Developing a National Disaster Management Plan including:
  - Initial flood risk assessment for each watershed
  - Water scarcity risk analysis (also related to forest fires) for each watershed
  - Reducing the risk of waterborne diseases
  - Establishing early warning systems.

National Climate Change Strategy and Plan (NCCS&P)

The National Climate Change Strategy and Plan (NCCS&P) was developed to support the enforcing of the EU Environmental and Climate Acquis, aiming at reinforcing Albania's inter-sectoral coordination for climate action, environmental protection and sustainable development, in order to respond to the need of alignment to EU requirements[29].

An Adaptation Plan with 15 priority actions was developed through an extensive capacity development and participatory approach undertaken jointly with the Climate Change inter-ministerial working group (IMWG) members. These priority actions, listed below, were perceived in the form of project plans, including costs for implementation.

[28] Mott MacDonald | Përgatitja dhe Zbatimi i një Strategjie MIBU, Strategjia Kombëtare për Menaxhimin e Integruar të Burimeve Ujore, available at http://ambu.gov.al/public/STRATEGJIA%20KOMB%C3%8BTARE%20P%C3%8BR%20MENAXHIMIN%20E%20INTEGRUAR%20T%C3%8B%20BURIMEVE%20UJORE.pdf

[29] Approved by DCM No. 466, dated 3.7.2019

Overarching Actions / implementation framework

1. Steering of the adaptation process in Albania
2. Overarching mainstreaming initiative
3. Climate finance readiness
4. Implementation monitoring system
5. Public information and involvement initiative
6. Initiative for capacity building on climate change adaptation

Sector-wise and cross-sector strategic actions

7. Climate Resilient Irrigation, Drainage and Flood protection
8. Integrated Water Resources Management
9. Adaptation in agriculture sector
10. Promote implementation of Adaptation Strategy for Health Sector
11. Integrated Cross-Sectorial Plan for the Coast (ICPC)*
12. Initiative for municipal adaptation
13. Adaptation in tourism
14. Upgrading civil defence preparedness and disaster risk reduction*
15. Building the resilience of Kune Vain Lagoon System through the Ecosystem based Adaptation (EbA)*.

Note: * actions already under implementation

The General National Plan, Albania 2030 (GNP)[30]

The General National Plan, Albania 2030 (GNP) represents an integrated sustainable approach to urban development, with other strategic sectors of the country as tourism, agriculture, energy, transport, housing, and other aspects. Some of the main objectives of the plan are to manage the risk of flooding and coastline erosion, and to encourage the reuse of existing resources.

The GNP includes many measures that positively affect climate change adaptation:

- **Water sector**: rehabilitation, expansion and creation of infrastructure for water supply including climate change scenarios in this sector. Water demand management through reuse, securing new water reserves, rainwater, desalination, etc.
- **Agriculture sector**: improving water efficiency, irrigation infrastructure, plant varieties, drainage system, fertilisation and soil moisture conservation considering the impacts of temperature increase due to climate change.
- **Coast**: monitoring coastline dynamics and sea level; monitoring of water quality in wetlands and groundwater; management of coastal erosion as well as adaptation measures to cope with expected sea level rise.

Integrated Cross-sectoral Plan for the Coast

The Integrated Cross-sectoral Plan for the Coast, Albania 2030, aims to identify the natural and added values of coastal belt and create a management and development strategy, with special focus on ecosystems resilience. The plan also aims to create a macro- and local scale management framework for reduction of the impacts and risks related to climate change, through adaptation and mitigation

[30] Approved by DCM No. 881, dated 14.12.2016

actions. Among others, the plan highlights the need for the central and local governments to cope with and mitigate the risks of climate change through initiatives such as:

- afforestation
- planting trees in endangered areas
- construction of dams for preventing floods using ecological materials
- limiting urban sprawl
- use of the renewable energy.

Table 12: Summary of proposed action to address climate change adaptation

Strategy area	Proposed action	Strategy documents
Ensure the sustainable management of natural resources and undertake climate action.	Better management of forests and water, and the application of agricultural production methods in environmental protection and mitigation of climate changes.	NSDI-II
	A targeted increase in the number of certified organic farms by 2020.	NSDI-II
	An increase in the number of farmers benefitting from irrigation infrastructure to 300,000 by 2020.	NSDI-II
	Improving water efficiency, irrigation infrastructure, plant varieties, drainage system, fertilisation and soil moisture conservation in agriculture.	GNP
Enhance and strengthen the protection of nature.	A targeted 17% increase in the surface of Protected Areas of the territory through the enhancement and integrated management of protected areas.	NSDI-II
	The assurance of conservation status for 5% of threatened species and habitats.	NSDI-II
	The establishment of the ecological network "Natura 2000" of Special Areas of Conservation of importance to the EU.	NSDI-II, ECCS
	Increasing the number of protected areas and improving the management of the existing areas.	ECCS
Strengthen the management and preservation of forestry and pasture resources.	A targeted 40% reduction in illegal logging by 2020.	NSDI-II
	Achieving 100% coverage with breeding plans for all forest economies countrywide.	NSDI-II
	The rehabilitation of 25% of degraded areas.	NSDI-II
	Improved forest management plans and afforestation.	ECCS
	Prevention of illegal cutting through the control of the Forest Police.	ECCS
	Prevention of fires.	ECCS
	Reforestation of coastal and internal forests.	ECCS
Strengthen the management of water use, in order to reduce floods and phenomena of erosion and soil loss.	The rehabilitation and modernisation of existing infrastructure related to irrigation, drainage and flood protection	NSDI-II, GNP
	The development and implementation of mechanisms for the sustainable management of irrigation,	NSDI-II

Strategy area	Proposed action	Strategy documents
	drainage and flood protection systems (qualitatively improve the functionality of the drainage system).	
	The preparation and implementation of the river basin management plans.	NSDI-II
	The rehabilitation of damaged riverbeds.	NSDI-II
	Rehabilitation of buildings damaged by natural causes	NSIWRM
	Strengthening cooperation and fulfilling institutional obligations.	NSIWRM
	Mitigating the consequences by providing financial support to families whose homes have been damaged by natural or other disasters.	NSIWRM
	Developing a National Disaster Management Plan including: • Initial flood risk assessment for each watershed • Water scarcity risk analysis (also related to forest fires) for each watershed • Reducing the risk of waterborne diseases • Establishing early warning systems.	NSIWRM
	The inclusion of climate change issues in all strategic papers of water management.	ECCS
	Better management of water resources to reduce the effects of flooding and drought and consequent soil loss.	ECCS
	Water demand management through reuse, securing new water reserves, rainwater, desalination, etc.	GNP
	Monitoring coastline dynamics and sea level.	GNP
	Monitoring of water quality in wetlands and groundwater.	GNP
	Management of coastal erosion as well as adaptation measures to cope with expected sea level rise.	GNP
Develop sustainable tourism	Develop sustainable tourism in Albania, which will help preserve natural ecosystems.	NSDI-II

4.2.2 Projects with a climate change adaptation component

EU Flood Protection Infrastructure Project (FPIP) (2015-2017)

3rd Action (finalized in December 2017): objective of this action, implemented by UNDP, is to strengthen resilience and disaster risk preparedness and prevention in southeast Albania in line with the post-disaster needs assessment following the February 2015 floods. Specifically the Action aimed to:

- Restore key flood protection infrastructure to pre-floods levels
- Reconstruction of river embankments in Vlore, Fier, Gjirokaster Berat and Korca

- Raise awareness among local authorities about specific social impacts of disasters on vulnerable categories and strengthen participatory preparedness and resilience capacities
- Assess the impact of floods on vulnerable groups, gather community perspectives on ways to cope with disasters and strengthen resilience, identify major expectations of those vulnerable groups for public action and feed such assessment and findings into the local decision-making levels for improved and socially targeted preparedness, response and development
- Raise awareness among local government actors, relevant institutions and communities about climate related risks and the need undertake adaptive measures.

2nd Action (2017-2020): objective of this PRONEWS Programme[31] is to further increase the capacity of the Albanian Civil Protection to prevent and respond to disaster management. The main results of the programme are:

- Improvement of the Legal and Institutional framework on Early Warning, Flood Management and Civil Protection through assessment, unification and updating of prefectural civil protection emergency plans, and a new law on Civil protection
- Development of Flood Hazard Maps according to the provisions of EU Floods Directive five river basins: Mati, Ishem-Erzen, Shkumbin, Seman and Vjosa
- Improvement of Flood Early Warning and integration into the European Flood Awareness System (EFAS) through the digitalization of the Hydrometeorological data of the Institute of Geoscience, energy, Water and Environment and the rehabilitation of the real-time monitoring station in the national level
- Promotion of the development of awareness raising campaigns and prevention measures among the population
- Support to access the European Union Civil Protection Mechanism (EUCPM).

The Emergency planning at the prefectural level was also assessed, upgraded and unified according to three main components: a) the national legal framework; b) the European flood directive; and c) the best emergency planning practice, to fully incorporate disaster risk reduction concerns into emergency planning. This is the base for updating and improving the existing National Emergency Plan (approved in 2004).

Adaptation to Climate Change through Transboundary Flood Risk Management in the Western Balkans' (2012-2021)[32]

This project is funded by the German Federal Ministry for Economic Cooperation and Development and aims to strengthen trans-boundary flood risk management with regard to climate change, in the Western Balkans, in the Drin catchment and other catchment areas of the region (Albania, Kosovo, North Macedonia and Montenegro) which are increasing due to climate change. The project currently acts in three key areas:

- **Flood Hazard and Risk Mapping**: The project supports partner institutions with technical and methodological expertise for the participatory development of Flood Hazard and Risk Maps (FHRM) in accordance with the EU Floods Directive.
- **Early Warning**: The project works with national and local authorities in selected pilot areas on building capacities for delivering effective and timely "end to end" early warnings. It

[31] http://www.pronewsprogramme.eu/about-the-project/
[32] https://www.giz.de/en/worldwide/29000.html

provides technical and organisational advice to national Hydro-meteorological Services to improve their capacities for forecasting and warning.
- **Institutional development**: The project supports actors at national and local levels in strengthening their strategic capacities to better coordinate Flood Risk Management.

Building resilience of Kune-Vaini Lagoon through ecosystem-based adaptation (EbA) (2016-2020)

This is a GEF SCCF funded project, implemented by UN Environment and executed by the Ministry of Tourism and Environment (MTE) of Albania. The main objective is to increase the capacity of government and local communities living near the Kune – Vaini Lagoon System (KVLS) to adapt to climate change using an integrated suite of adaptation interventions, including Ecosystem-based Adaptation (EbA) approaches. Some of the achieved results are:

- Increased national and local technical capacity to address climate change risks in coastal areas through EbA
- Increased ecosystem and livelihood resilience from flood and drought risk through pilot EbA demonstration activities in the Kune-Vaini lagoon system (a new functional tidal inlet channel between the Ceka lagoon and the Adriatic Sea is constructed, 2000m of coastal dunes adjacent to the Kune-Vain lagoons are rehabilitated with climate-resilient species according to technical protocols)
- Increased awareness of local and national stakeholders related to climate change risks and the potential of EbA to increase the resilience of local communities to climate change.

Establishing Albania's Environmental Information Management and Monitoring System' (2016-2021)

This project aimed at strengthening capacity for environmental monitoring and information management in Albania, by establishing an operational environmental information management and monitoring system (EIMS). The project addresses the need for an environmental monitoring system that is integrated throughout relevant government institutions and that uses international monitoring standards for indicator development, data collection, analysis, and policymaking. The main outcomes:

- Development of the EIMS to enable integration of global environment commitments into planning and monitoring processes.
- Development and application of uniform indicators encompassing UNFCCC, CBD and CCD concerns and global environmental threats.
- Stakeholder's capacity for information management (collection processing) of key global environment data and utilization (interpretation and reporting) is enhanced at national and local level.

Integrated climate-resilient transboundary flood risk management in the Drin River basin in the Western Balkans

The project, funded by the Adaptation Fund has recently started. The objective of the project is to assist the riparian countries Albania, North Macedonia and Montenegro to implement an integrated climate-resilient river basin flood risk management approach in order to improve their existing capacity to manage flood risk at regional, national and local levels and to enhance resilience of vulnerable communities in the DRB to climate-induced floods. The project has the following outcomes:

- **Outcome 1**: Improved climate and risk informed decision-making, availability and use of climate information
- **Outcome 2**: Improved institutional, legislative and policy framework for FRM, and development of climate change adaptation and FRM strategy and plans at the basin, sub-basin, national and sub-national levels
- **Outcome 3**: Strengthened community resilience through improved flood forecasting and early warning, implementation of structural and non-structural measures and the enhanced local capacity for climate change adaptation and flood risk management.

Advancing Albania's planning for medium and long-term adaptation through the planning process of a National Adaptation Plan (NAP).

The project is funded by GCF as part of the Readiness Programme and will enable Albania to plan and attract larger scale finance for more resilient future by strengthening the adaptation planning processes. The project has the following outcomes:

- **Outcome 1**: the strengthening of a national mandate, strategy and steering mechanism that focuses on assessing and addressing capacity gaps (particularly in the priority sectors of tourism, urban development, agriculture, transport, and energy)
- **Outcome 2**: the development of a NAP Strategy action plan document and its implementation plan
- **Outcome 3**: the development of financing, monitoring and evaluation strategies to ensure that capacities and funding options are institutionalized for the long-term sustainability of adaptation planning beyond the life of the project.

The initiative combines central and local level work. At the central level, the focus sectors are tourism, urban development, agriculture, transport, and energy. At the local level, the vulnerable municipalities will be targeted to define local NAP implementation roadmaps at the municipal level building resilience and ensuring that local development is risk informed ensuring disaster risk management mechanisms are in place.

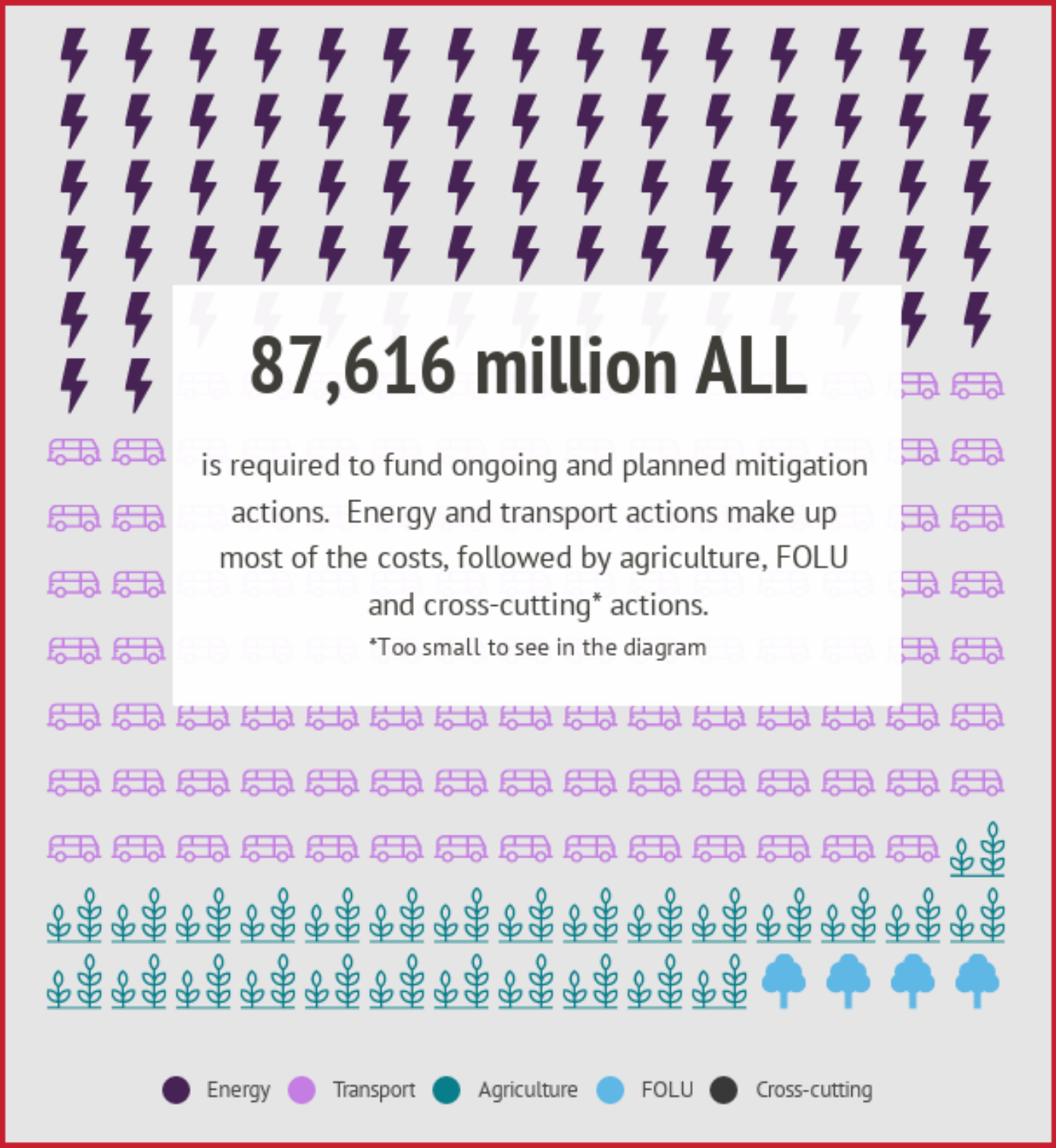
River Basin Management Plans

The Preparation of River Basin Management Plans (RBMP) for the Drini-Buna and Semani River Basins is part of the institutional support for Integrated Water Resources Management (IWRM) component of the Albania Water Resources and Irrigation Project (WRIP). The WRIP is financed by the World Bank, the Swedish International Development Cooperation Agency (Sida) and the Government of Albania and is designed to lay the foundations for more rational and accountable water resources management. RBMP Reports consider climate change impacts on water resources for irrigation, floods and other elements.

Development of Shkumbini River Basin Management & Climate Change Adaptation Plan (2018)

This EU funded IBECA project considers the climate change pressures on water environment, including abstraction and artificial flow pressures, flooding, soil erosion. The RBMP also includes climate change mitigation and adaptation plan.

Albania BUR1 gaps and needs



5 Constraints, gaps and needs

5.1 Financial, technical, capacity-building and technology needs

The national vision strongly focused on the three main components of climate change in Albania: mitigation, adaptation, and sustainable development. The following sections outline the national needs to effectively implement the mitigation and adaptation action plans discussed in this report.

5.1.1 National Mitigation Plan

The Mitigation Plan has been drafted based on a number of sectoral strategies, existing legal framework and draft laws / plans. The measures envisaged by the sectors are not new measures. The sources of their financing are provided in the respective documents. The National Mitigation Plan (NMP) has summarized the measures affecting the GHG emissions and analysed the total costs and sources of funding.

Since 2005, Albania introduced the Integrated Planning System (IPS) which aims to ensure coherence, effectiveness and harmonization on strategic planning, public finance and policy monitoring. Specifically, the IPS shall ensure the coherence of the National Strategy for Development and Integration (NSDI), the long term sectoral and cross-sectoral strategies and the Medium-Term Budget Program (MTBP). A key element of the IPS is that the sectoral strategies should guide the MTBP and the annual state budget.

The Action Plan for each of the sectors is cost-based based on the PBA 2020-2022 documents submitted by the line Ministries for the first phase of the MTBP.

Table 13: Financial resources for the implementation of the Mitigation Plan (in 000 ALL)

Sector	State Budget	EU	Other Donors	Financial Gap	Total
Energy	23,422,408	-	6,551,819	6,906,638	29,974,227
Transport	38,354,551	262,320	6,811,289	5,270,346	45,428,160
Agriculture	9,663,350	-	1,064,214	-	10,727,564
Forestry and other land use	1,471,226	-	-	4,480	1,471,226
Cross-sectoral	-	-	15,000	15,000	15,000
Total	**72,911,535**	**262,320**	**14,442,322**	**12,196,464**	**87,616,177**

Table 14: Distribution of funds by year (short-term)

Sector	2019	2020	2021	Total
Energy	405,200	2,578,362	7,445,752	10,429,314
Transport	4,490,150	16,309,586	15,320,984	36,120,720
Agriculture	2,355,607	3,065,704	2,591,000	8,012,311
Forestry and other land use	325,386	403,640	413,600	1,142,626
Cross-sectoral	-	15,000	-	15,000
Total	**7,576,343**	**22,357,292**	**25,771,336**	**55,719,971**

As can be seen from the table, most of the measures have been costed to be implemented during the 3-year period 2019-2021 based on the planned budget made by the line ministries in the documents of PBA 2020-2022 prepared for the first phase of this process.

Table 15: Distribution of funds by years (mid-term)

Sector	2022	2023	2024	Total
Energy	12,452,204	311,619	666,960	13,430,783
Transport	2,637,396	808,538	5,643,316	9,089,250
Agriculture	2,715,253	-	-	2,715,253
Forestry and other land use	38,600	250,000	40,000	328,600
Cross-sectoral	-	-	-	-
Total	**17,843,453**	**1,370,157**	**6,350,276**	**25,563,886**

Even the measures that will be implemented during 2022 are mostly based on the budget made by the line ministries in the documents of PBA 2020-2022 prepared for the first phase of this process.

Table 16: Distribution of funds by years (long-term)

Sector	2025	2026	2027	Total
Energy	910,130	5,204,000	-	6,114,130
Transport	217,070	1,120	-	218,190
Agriculture	-	-	-	-
Forestry and other land use	-	-	-	-
Cross Sectorial	-	-	-	
Total	**1,127,200**	**5,205,120**	**-**	**6,332,320**

The financial gap turns out to be largely in the measures to be implemented after 2022, the costs of which are based on existing documents such as the Biodiversity Strategy Policy Document, the National Energy Efficiency Action Plan, etc. the financial gap is projected to be partially funded by the state budget and the rest by donors. This fact should delegitimize the implementing institutions to provide sufficient funds for the implementation of these measures in the medium-term budget documents of the coming years and to engage to seek funding from various donors.

5.1.2 National Adaptation Plan

The Adaptation Plan identifies 15 priority actions, which were designed by the Climate Change inter-ministerial working group (IMWG) members through an extensive capacity development and participatory approach. These priority actions (adaptation measures) are perceived in the form of a project fiches, so that the respective actors can later develop them further for funding.

Table 17: List of adaptation measures designated as Priority Actions

Subject area	Rationale / main goals	Potential substantial elements	Responsible actors
Overarching Actions / implementation framework			
No. 1: Steering of the adaptation process in Albania	• Ensure implementation of measures envisaged in the NAP document • Ensure necessary adjustments of NAP process based on experiences	• Delegate powers to the Ministry responsible for climate change, the Ministry of Tourism and the Environment • Ensure regular meetings of Interminis-terial Working Group (IMWG) for general steering and on selected key topics for each session • Develop overall process roadmap including timelines, responsibilities and resources • Regular review and up-date of NAP process • Link with Monitoring and Evaluation and Reporting Mechanism	• Ministry of Tourism and Environment (lead) • Prime Minister office (involved)
No. 2: Overarching mainstreaming initiative	• Climate Change Adaptation is reflected in NSDI and sector strategies • Climate Change Adaptation is being promoted in accession assistance in line with the EU climate policy objectives	• Promote mainstreaming concepts and tools (Climate Proofing, Climate Lens, climate sensitive, Stategic Environmental Assesment (SEA) etc.) • Coordinate mainstreaming pilots in Albania • Climate Change Adaptation mainstreaming in NSDI implementation • Climate Change Adaptation mainstreaming into IPA process	• Ministry of Tourism and Environment • Support: Relevant donors
No. 3: Climate finance readiness	• Successfully access Albania's public budget for financing NAP implementation • Gain indirect or direct access to GCF funding for Albania's NAP implementation	• Setting up a climate finance unit • Develop strategic framework • Climate budgeting / labelling pilots • Promote access to climate finance • Ensure learning and innovation	• Ministry of Tourism and Environment / NDA (lead) • UNDP (support)
No. 4: Implementation monitoring system	• Assess progress towards the climate resilience objectives • Establish Result Based Monitoring System (RBM)	• Overall concept of Result Based adaptation Monitoring (RBM) system • Gap analysis of existing Monitoring & Evaluation systems • Institutional set-up for Monitoring & Evaluation • Operationalize Monitoring & Evaluation system with regular reporting	• Ministry of Tourism and Environment (lead) • Ministry of Europe and Foreign Affairs • Ministry of Infrastructure and Energy

			• Institute of GeoSciences, Energy, Water and Environment
No.5: Public information and involvement initiative	• Capacity building of relevant public institutions on Climate Change Adaptation • Raising awareness and involvement of civil society on Climate Change Adaptation	• Capacity building for public institutions • Outreach through educational institutions • Civil society outreach and involvement • Extension of information for relevant economic sectors	• Ministry of Tourism and Environment • Ministry of Education, Sport and Youth • Universities • Media • NGOs
No. 6: Initiative for capacity building on climate change adaptation	• Support through targeted trainings to raise the knowledge and personal skills of actors and stakeholders involved in the NAP process • The development of institutional structures, regulations and policies in selected sectors of the NAP process are supported by donors and institutions of excellence	• Assess training needs and elaborate training plan • Conduct trainings • Selected measures of institutional capacity building	• Ministry of Tourism and Environment • UNDP • Donor Agencies
Sector-wise and cross-sector strategic actions			
No. 7: Climate Resilient Irrigation, Drainage and Flood protection	• Calculation of water needs and supply potential for crops with consideration of climate change • Infrastructure improvement and maintenance for irrigation and flood protection	• Recalculate irrigation needs in a changing climate • Assess flood risks • Select priority actions on flood risk management based on above mentioned assessments • Training	• Ministry of Agriculture and Rural Development • (lead) • Local Governments
No. 8: Integrated Water Resources Management	• Climate change adaptation measures are adequately reflected in the implementation plan and process for pilot river basin management plans and will be also part of the new river basin management plans	• Mainstreaming of Climate Change Adaptation into the RMBPs • The implementation process for the RBMPs will be designed in a way that climate change is adequately reflected during implementation	• Ministry of Agriculture and Rural Development • National Water Council
No. 9: Adaptation in agriculture sector	• Adaptation to climate change in agricultural sector through farm protection, crop yield management, information systems and livestock management	• Adapted agricultural practices and infrastructure • Improved information services for farmers	• MARD • National Food Authority • Local Government • Farmers

No. 10: Promote implementation of Adaptation Strategy for Health Sector	• Apply best approaches for vector control, public health measures and preparedness for extreme events (heat waves)	• Public awareness and training • Capacity building for health institutions	• Ministry of Health and Social Protection • Institute of Public Health • IGEWE-i • National Food Authority
No. 11: Integrated Cross-Sectorial Plan for the Coast (ICPC)	• Promote adaptation in coastal areas through local plans	• Introducing and adapting the EU instruments and policies relevant to coastal areas ecosystems and biodiversity • Enforcement of legislation related to the constructions in the coastal area • Improve the management of coastal areas • Erosion control • Buildings and climate change • Concrete Pilot Projects	• MIE/NTPA • Municipalities • Universities • NGOs
No. 12: Initiative for municipal adaptation	• Municipalities are capacitated for local climate change adaptation plans	• Provide a Guide which would facilitate the municipalities with simple knowhow on how to integrate climate change adaptation into the city planning • Trainings, advisory services • Pilot measures for local adaptation measures	• MIE / NTPA • Local municipalities
No. 13: Adaptation in tourism	• Integrated Tourism Sector Objectives and Plans reflecting climate change impacts are being developed	• Provide the necessary legal basis, general or sectoral strategies, action plans etc. which will include the appropriate policies and measures • Prepare a sectorial strategy taking in consideration climate issues • Support local and national sectors dealing with climate change	• Ministry of Tourism and Environment
No. 14: Upgrading civil defence prepare redness and disaster risk reduction	• Increase the capacity of the Albanian General Directorate for Civil Emergencies to prevent and respond to climate related disaster management	• Develop a regional flood hazard map following EU Flood Directive. • Preparation of a Floods Early Warning System and its integration into the European Flood Awareness System (EFAS) • Cost-Benefit Analysis, prioritization and financing of measures in strengthening flood warning systems	• Ministry of Interior Affairs • IGEWE

		• Awareness/Visibility/Communication: improve flood awareness of the public by informing on the risk, early warning systems and the plan to follow in case of an emergency • Support Albania in preparing for membership to the Union Civil Protection Mechanism (EUCPM) • Support to IGEWE for the strengthening of Hydrometeorological network and services	
No. 15: Building the resilience of Kune Vain Lagoon System through the Ecosystem based Adaptation (EbA).	• The Climate change effects into the Kune Vain Lagoon System will be addressed through an integrated suite of adaptation interventions including EbA	• Increase the capacity of government and local communities living nearby the KVLS to adapt to climate change using an integrated suite of adaptation interventions, including EbA • Build the climate resilience of the Kune-Vaini lagoon system using demonstration of best practice and concrete EbA and other adaptation interventions • Increase awareness of local and national stakeholders to climate change risks and the potential of EbA to increase the resilience of local communities to climate change	• Ministry of Tourism and Environment • GEF • UNEP

The cost estimation of the Adaptation Plan is done in close cooperation with working group members. Nevertheless, the NAP budget requirements will be periodically reviewed. Adaptation is a new concept and efforts are done steered by the Ministry of Tourism and Environment to mainstream the related cost in the MTPB and annual state budget.

For the sake of the long-term NAP financing, the following were developed:

- Guidance on a successful process to access adaptation finance, including the identification of entry points
- An overview of relevant opportunities in relation to potential national and international sources of adaptation finance
- Steps to be taken to access adaptation finance in the coming years and initiating the development of a roadmap.

The total cost for the implementation of the NAP, is estimated to be approximately 11 billion Albanian Lek (ALL), or approximately 80 million Eur.

This cost is prescribed for 15 priority actions divided into two sub thematic groups. 1.2 billion Albanian Lek foreseen for activities that have to do with overarching actions and implementation framework and 9.8 billion Albanian Lek for cross sectorial activities.

From the overall budget estimation of 11 billion ALL, 2.9 billion ALL are partly covered by the state budget (mainly through human resources) and partly through donors such as EU, SIDA, WB, UNEP, UNDP. The financial gap for the priority actions is elaborated at the level of approximately 10%, or approximately 1 billion ALL. The most cost demanding actions are those for agriculture due to the infrastructure nature of the required interventions.

Table 18: NAP Budget requirements for Priority Actions 2017 – 2020 (in Million Lek)

List of measures	Total budget	Government	Donors	Others	Financial Gap
Overarching Actions / implementation framework					
PA 1	10,800.00	10,800.00	-	-	-
PA 2	16,000.00	-	5,000.00	-	11,000.00
PA 3	150,000.00	4,920.00	49,200.00	-	95,880.00
PA 4	688,000.00	-	688,000.00	-	-
PA 5	93,750.00		50,000.00	43,750.00	-
PA 6	246,000.00		246,000.00	-	-
Sector-wise and cross-sector strategic actions					
PA7	1,841,500.00	412,000.00	900,000.00	7,500.00	522,000.00
PA8	1,044,500.00	174,000.00	870,500.00	-	-
PA9	4,925,000.00	1,960,000.00	2,965,000.00	-	-
PA10	145,000.00	73,000.00	-	-	72,000.00
PA11	148,500.00	15,000.00	-	-	133,500.00
PA12	202,500.00	13,500.00	-	-	189,000.00
PA13	81,200.00	16,000.00	-	-	65,200.00
PA14	1,201,500.00	243,000.00	958,500.00	-	-
PA15	242,000.00	48,400.00	193,600.00	-	-
Total	**11,036,250.00**	**2,970,620.00**	**6,925,800.00**	**51,250.00**	**1,088,580.00**

5.2 Financial resources, capacity-building, technical and technology support received

Since the NC3, efforts have continued for strengthening the capacity of the staff responsible for climate change or related issues. Training courses and workshops have been provided to the relevant staff of NEA, MoTE, MoIE, MoARDWA, Technical Water Secretariat, etc. by different training providers in the frame of different projects, such as IBECA, ECRAN, TAIEX, RIPAP, PRO NEWS and SANE27 and donors such as the EU, Environment Agency of Austria, Environment Agency of Germany, Swedish Environment Protection Agency, Energy Community and REC. They took place both in Albania and other countries of the region or Members States.

5.2.1 IBECA Project

This EU funded project (2015-2018) aimed to support the sustainable development of the country via improved environmental and climate change requirements and management by enabling Government Institutions to develop, implement and enforce environmental and climate change legislation to EU standards. Its component A was dedicated to increasing effectiveness of environmental and climate change strategy implementation by building and implementing a sector plan, as well as transposition and implementation of priority EU environmental and Climate Change Acquis. It also provided capacity building to the MoTE and NEA on the EU ETS Directive, MMR Regulation, etc.

This project included numerous discussions on the preparation of the Draft Climate Change Mitigation Strategy and Plan[33], Draft Law "On climate change", draft DCM "On monitoring and reporting of GHGs and other climate related information at the national level" until their finalisation.

5.2.2 ECRAN Project

Financed by the EU and managed by the European Commission in the period October 2013-September 2016, ECRAN assisted the beneficiary countries[34] in exchange of information and experience related to preparation for accession. It helped to strengthen regional cooperation between the EU candidate countries and potential candidates in the fields of environment and climate action and assisted their progress in the transposition and implementation of the EU environmental and climate Acquis.

ECRAN built on experience gained and results achieved by the RENA (Regional Environmental Network for Accession). The activities under its climate action component were implemented through a system of Working Groups and tasks as follows:

- **Group 1: Climate Policy Development and Building Climate Awareness:** Capacity building on modelling, scenario development; capacity building on selected climate Acquis; national High-level seminars; practical hands-on assistance on low-carbon policy and legislative development.
- **Group 2: GHG Inventory Systems and the EU Monitoring Mechanism Regulation:** Capacity building on GHG inventory process for the Energy Sector (CRF Sector 1) in line with the MMR and the UNFCCC; Capacity building on GHG inventory process for the other Sectors (CRF Sectors 2 - 6) in line with the MMR and the UNFCCC requirements.
- **Group 3: Emissions Trading:** Regional Training Programme on the EU MMR and A&V Regulations; Training missions to EU Member States; ETS Implementation and ETS strategy and roadmap development
- **Group 4: Adaptation:** Best practices on adaptation and regional training on vulnerability assessments; Support for the identification of adaptation options.

[33] Approved as part of the Strategic Documents and Plans on mitigation of GHGs and adaptation to climate change
[34] Albania, Bosnia and Herzegovina, Croatia, FyROM, Kosovo, Montenegro, Serbia and Turkey.

5.2.3 RIPAP Project

This EU funded project (August 2017-October 2018) supported the beneficiary countries[35] in the development of resource-efficient, low-emissions and climate-resilient economies. It provided capacity building in understanding and implementing climate mitigation actions, their impacts and co-benefits. It was designed to help beneficiaries understand and work towards meeting the Paris Agreement goals. It also acted as a regional focal point, enhancing cooperation through the exchange of information, best practices and relevant experiences.

The project had 3 components:

1. Identifying climate policies and strategies to support implementation of IPA beneficiaries' commitments under the Paris climate agreement
2. Assistance in preparing plans for capacity building on national GHG inventories
3. Strengthening Monitoring, Reporting, Verification and Accreditation (MRVA) for the EU ETS.

5.2.4 PRO NEWS Programme

The EU funded Programme for Improving National Early Warning System and Flood Prevention in Albania (PRO NEWS) (2017-2020) is a project managed by the EU Delegation to Albania. It aims to increase Albania's resilience to floods by strengthening its National Early Warning System, improving disaster prevention in line with EU practices, and assisting the country to access the European Union Civil Protection Mechanism. It provides training and capacity building to the Albanian General Directorate for Civil Emergencies (GDCE). Since the NC3 the following training activities have taken place in Albania:

Technical assistance workshop *(September 11th, 2019):* Experts from the PRO NEWS implementing consortium discussed and worked together on some of the main aspects concerned with countries' membership in the Union Civil Protection Mechanism, including joint hands-on exercise with the purpose to trigger reflections on the functioning of the Mechanism and improve knowledge of key operational features involving Albania as future participating state, including mission cycle implications, based also on the recently approved new civil protection law, and preparation for official meetings.

National Workshop on New Guidelines and Emergency Planning *(28 June 2018):* Besides GDCE, representatives of Albanian Prefectures and other national stakeholders on Emergency Planning in Albania, together with Consortium Partners (DPC, CIMA, REC) participated. The final version of the Guidelines for Prefectural Emergency Planning was presented and discussed, and final draft of Plans was completed.

Guidelines for the new Emergency Planning (*12-13 March 2017):* Besides GDCE, 12 representatives from Prefectures and other national stakeholders on Emergency Planning in Albania, together with Consortium Partners (DPC, CIMA, REC) participated. The final report on the Assessment on Emergency Plans to all the 12 Albanian Prefectures was presented. The results and the score cards related to the assessment of respective existing emergency plans were discussed with the purpose to jointly identify areas in need of attention and gaps to be filled. The workshop focused on the finalisation of the new guidelines for prefectural emergency planning. Participants jointly finalised the index of the proposed guidelines and discussed the envisaged contents in collaboration with relevant institutions.

National workshop Levelling up on Emergency Planning (*October 5th-6th, 2017):* Besides GDCE, representatives of the Albanian prefectures and other national stakeholders participated. They

[35] Albania, Bosnia and Herzegovina, FyROM, Kosovo, Montenegro, Serbia and Turkey

exchanged views and increased awareness on relevant good practices and finalise the assessment of existing emergency plans through a participatory approach. This workshop contributed to the overall goal of improving Albania's legal and institutional framework on Early Warning, Flood Management, Civil Protection and Emergency Planning.

Training course on the use of myDewetra 2.0 platform *(27th September 2017):* The training course was organised for the personnel of GDCE. The myDewetra 2.0 platform is a real-time integrated system for hydro-meteorological and marine environmental monitoring and forecasting, created by CIMA foundation, on behalf of the Italian Civil Protection Department). Since 2012, Dewetra platform is promoted by the Commission of Hydrology of the World Meteorological Organization as a system for improving flood forecasting and warning. Participants were given access to the platform and its operational tools (observational, forecasts and static data already available on the Dewetra) that can help to the procedures currently in place at GDCE for prediction, prevention and mitigation of natural disasters, with a particular emphasis to the early warning system.

5.2.5 SANE27 Project

This project (2018-2020) funded and implemented by the Swedish Environment Protection Agency "Supporting Negotiations for Environmental Chapter 27 (environment and climate change)" is supporting the GoA and the MoTE in particular to prepare for screening and the EU negotiation process on environment and climate change. It is also supporting the enhancement of the role of CSOs/NGOs within EU accession negotiations related to Environment and Climate Change. The work carried on Climate Change sub-chapter (preparation of Tables of Concordance, Screening Pre-Assessment documents, etc.) was done in full cooperation with MoTE staff and other related line ministries.

5.2.6 EU Flood Protection Infrastructure Project

This EU/UNDP financed project, implemented by UNDP was carried in the period September 2015-July 2017, covering the territories of Vlore, Fier, Gjirokaster, Berat, Korce,Selenice,Himare, Libohove. Project partners were the Ministry of Agriculture Rural Development and Water Administration (MARDWA) Institute of Geosciences, Energy, Water and Environment (IGEWE) National Territory Planning Agency (NTPA) Local government authorities in the respective flood-affected areas.

The overall objective is to strengthen resilience and disaster risk preparedness and prevention in southeast Albania in line with the post-disaster needs assessment following the February 2015 floods. Specifically the Action will aim to:

1. Restore key flood protection infrastructure to pre-floods levels so as to ensure protection of agricultural land and livelihoods and enable the resumption of economic activities and agricultural production in the identified priority regions of Vlore, Fier, Gjirokaster Berat and Korca

Local authorities become aware of specific social impacts of disasters on vulnerable categories and capable to strengthen participatory preparedness and resilience capacities that respond to community expectations

Local government actors, relevant institutions and communities in Vjosa area are informed and capable to understand climate related risks and undertake adaptive measures.

5.2.7 Biomass energy for productive use for small and medium enterprises (SMEs) in the olive oil sector

The objective of this GEF funded project (2016-2019) was to increase the use of biomass in industrial energy consumption for productive use through demonstrated use of modern biomass technologies in Small and Medium-sized Enterprises (SMEs) in the olive oil industry. Project Components include:

1. Technology demonstrated for use of modern biomass technologies in industrial processes in Albania
2. The enabling market and regulatory environment for biomass technology in industry created in Albania
3. Monitoring and Evaluation and Knowledge Management.

The outcomes for the project were: 1) introducing the state-of-the-art olive pomace technologies for 15 pilot enterprise with an total investment of approximately 3 MUSD; preparing 50 bankable projects for other enterprises which are in negotiation with different banks for getting loans to implement the respective olive pomace technologies; and 3) the increased utilisation of industrial biomass waste for energy purposes through technological innovation to trigger transformation of the olive oil industry. Also the strengthened capacities on the application of modern biomass technologies for key actors in the policy and industrial sectors in the olive oil and other sectors with high replication potential. The project also developed a detailed assessment of the biomass potential for industrial uses and the way forward for replication and create a subsequent pipeline of projects helping to develop a supportive regulatory environment.

5.2.8 Building the resilience of Kune – Vaini Lagoon through ecosystem-based adaptation (EbA)

This is a GEF funded project (2016-2020). Its main objective is to increase the capacity of government and local communities living near the Kune – Vaini Lagoon System (KVLS) to adapt to climate change using an integrated suite of adaptation interventions, including Ecosystem-based Adaptation (EbA) approaches. The main components of the project are:

1. Technical capacity to address climate change risks through EbA
2. Demonstration of best practice and concrete EbA interventions in the Kune – Vaini lagoon system
3. Awareness and knowledge on effective EbA.

Some of results that will be achieved are the increased national and local technical capacity to address climate change risks in coastal areas through EbA, and the increased ecosystem and livelihood resilience from flood and drought risk through pilot EbA demonstration activities in the Kune-Vaini lagoon system. The project aims to enhance the awareness of local and national stakeholders of climate change risks and the potential of EbA to increase the resilience of local communities to climate change.

5.2.9 Climate-friendly Integrated Solid Waste Management and Circular Economy Project (DKTI)

This is a BMZ-GIZ funded project (November 2016-2019). Its main objective is to improve solid waste management systems with particular consideration of climate aspects. The main project components are drafting and updating the National Integrated Solid Waste Management Strategy, including the waste management plan and potential cost sharing opportunities. It will also provide advice on the development of inspection and licensing tools for solid waste treatment plants as well as carry out human capacity development measures on national level and local level (Himara, Peqin and Rrogozhina).

5.2.10 Regional Project "Support Establishment and Advancement of Pollutant Release and Transfer Registers (PRTR) in Western Balkan Countries and in Moldova"

Funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, supervised by the German Environment Agency (UBA), and implemented by the Regional Environmental Center (REC), with the participation of Four Parties to PRTR Protocol: Albania,

Serbia, FyROM[36], and Moldova. March 1, 2015 -February 28, 2017. The project provided training and study tours to the NEA.

Project objectives included the strengthening of the transparency and efficiency of PRTR reporting, and to build capacities of authorities responsible for regular reporting and operators. The project aimed to share experience and practical knowledge in sub-regional workshops to improve their practices in operating PRTRs. The project also provided support launching regular PRTR reporting in Albania by updating, testing and activating the formerly developed online reporting tool to start regular reporting and develop a publicly accessible PRTR website. The project improved implementation capacities by providing training to authorities and operators, developing guidance for operators and reporting entities.

5.2.11 Establishing Albania's Environmental Information Management and Monitoring System Aligned with the Global Reporting

This project (GEF and GoA funded) started in September 2019. The project is designed to strengthen the environmental monitoring and information management capacities in Albania by establishing an operational environmental information management and monitoring system (EIMMS). It will develop national capacities to align the national environmental information management and monitoring system with global environmental monitoring and reporting priorities, including compliance with the Multilateral Environment Agreements reporting obligations.

The main expected project outcome is to improve institutional and technical capacities to meet and sustain Rio Convention objectives and those of other MEAs. The project will work in the three following areas:

- Development of an EIMMS that will be able to integrate global environment commitments into planning and monitoring processes
- Development and application of standard indicators encompassing UNFCCC, CBD and CCD concerns and global environmental threats
- Enhancement of stakeholder capacity for information management (data collection and processing) of key global environment data and information utilisation (interpretation and reporting) at the national and local level.

The project has prepared the following documents: ROADMAP for establishing an operational environmental information management and monitoring system EIMMS; Assessment of Albania's National Capacities on Environmental Monitoring, developed the Technical Sheets for environmental indicators related to the three MEAs.

5.2.12 Additional training workshops

A list of additional trainings/workshops is given below.

- 17th Meeting on "Emissions inventory". EEA and TFEIP. (*May 2016).*
- Multi-beneficiary sectoral workshop focussing on priority GHG emission and removal categories. *(5-6 June 2018. Skopje. FyROM[37].)*
- GHG and LRTAP inventories. Albanian and Austrian Environment Agency. (November 2016.)
- Capacity building on climate change mitigation, adaptation and climate finance. Austrian Environment Agency. *(12-15 December 2016. Vienna. Austria)*

[36] Today North Macedonia
[37] Today North Macedonia

- Capacity Building on Climate Change Mitigation, Adaptation & Climate Finance –National Inventory System. Austrian Environment Agency. *(26th - 30th of September 2016. Vienna. Austria)*
- 18th Joint EIONET and UNECE Task Force on "Emissions inventories and projections". *(11-12 May 2017. Krakow, Poland)*
- Technical Working Group on Energy and Climate. Energy Community. *(21 November 2019. Vienna. Austria)*
- Workshop "Katowice Rulebook - what's next?". Energy Community. (*12 September 2019. Warsaw, Poland)*
- High-Level Policy Talk on Coal Regions in Transition and the Energy Community. Energy Community. (*13 September 2019. Warsaw, Poland)*
- Sustainability Forum. Energy Community. *(27 June 2019. Vienna. Austria)*
- 3rd Energy and Climate Technical Working Group. Energy Community. *(21 March 2019. Vienna. Austria)*
- Workshop on Modelling options for NECPs in the Energy Community. Energy Community. *(20 March 2019. Vienna. Austria)*
- Capacity Development for MoE/CCU and National Environmental Agency. GIZ. *(July 2016. Pogradec. Albania).*
- Training Seminar on Inventory of Greenhouse Gas Emissions according to the methodology of the 2006 IPCC Guidelines. UNDP. (*15-17 May 2019)*
- Training Seminar on Inventory of Greenhouse Gas Emissions according to the methodology of the 2006 IPCC Guidelines Waste sector. UNDP. (*28 October, 20 November and 2 December 2020*)
- Training Seminar on Inventory of Greenhouse Gas Emissions according to the methodology of the 2006 IPCC Guidelines Energy sector. UNDP. (*December 2020*)
- Training Seminar on Monitoring, Reporting and Verification on Climate Change. UNDP. (*29 October 2020*)
- Training Seminar on NDCs revision. UNFCCC. (*21-23 September 2020*)
- Training Seminar on the Risk Reduction from Natural Catastrophises. UNDP. (*30 September 2020*)
- Training Seminar on Gender and Climate Change. UNDP. (*27 July 2020*)
- Training Seminar on NDC Revision of Albania. UNDP. (*25 January 2021*)
- Training Seminar on Climate Change and Communication. UNDP. (*12 March 2021*)

5.2.13 Green Economy Financing Facility (GEFF)

In Autumn 2018, the GEFF was established in Albania, aiming to decrease energy consumption in the housing sector, reduce air pollution and improve the comfort of living by extending loans through partner banks to support investments in green technologies. The EU has allocated over €1.8 million for incentives for the GEFF Programme while the Union Bank and Fondi BESA have signed up as the first two local partner financial institutions, with credit lines worth in total €9 million.

Albanian households can select the technologies they wish to invest in items such as thermal insulation, double-glazed windows, high-efficiency boilers, heat pumps, solar collectors/solar water heaters and photovoltaic systems.

By investing in these measures, households will be eligible to apply for an EU grant of up to 20 per cent of their investment. Vendors and producers of energy efficient solutions for the residential sector can also access such financing. In addition, the programme will Austria's Federal Ministry of Finance has pledged to provide funding for technical assistance, including energy audits for the renovation of apartment buildings.

GEFF in Albania is part of the EBRD's €85 million Western Balkans Green Economy Financing Facility. The programme is a joint initiative of the EU, the Austrian Federal Ministry of Finance and beneficiary countries cooperating under the Western Balkans Investment Framework (WBIF). It is implemented under the umbrella of the Regional Energy Efficiency Programme for the Western Balkans (REEP Plus), funded by the EU and implemented in partnership with the Energy Community Secretariat. REEP Plus has also delivered policy support for harmonising the country's law on energy efficiency and regulations for energy efficiency in buildings with the relevant European Directives.

On December 2018, the first disbursement was made to Fondi BESA, Albania's largest microfinance institution, of €1.5 million for on-lending to support investments in energy efficiency technologies, materials and measures in privately-owned residential dwellings or buildings. The total loan amount is €3 million.

5.2.14 Green for Growth Fund (GGF)

The GGF (Green for Growth Fund) is a public-private partnership that leverages risk-capital provided by public institutions with additional private capital. It is implemented by Finance in Motion and provides medium to long-term financing for energy efficiency and renewable energy products/projects to strong and reputable commercial banks, micro-finance institutions leasing companies, and other non-bank financial institutions committed to the same energy saving objectives. The financial institutions on-lend these funds to sub-borrowers such as households, household associations, small and medium enterprises, large business, municipalities, public sector entities and renewable energy projects. GGF offers the following financing instruments:

- Medium to long-term senior loans
- Subordinated loans
- Syndicated loans
- Letters of credit
- Guarantees
- Mezzanine debt instruments
- Local debt securities.

Albania is at an early stage of implementation, and the Fund is looking for areas of interest by Banks in the country.

5.2.15 Wind parks

There is a large number of priority producers in Albania composed of SHPPs, Solar PvPPs and Wind PPs, some of which are already in operation, while others are in the planning phase as shown above. Based on data collected by MIE supported by the EU Project "Support in the Energy Efficiency Sector and the Renewable Energy Sources (RES) Development with Contract No: CNP-SER-2018-01", there are currently 173 HPPs, 11 PvPps and 0 WPPs in operation. Based on data collected there are planned and issued the respective concessions/authorisations for 358 HPPs, 17 PvPps and 11 WPPs.

By the end of 2020, 11 companies have been licensed by the ERE to generate electricity from wind parks, with an installed capacity of about 886 MW, mainly in the coastal area from north of Lezha up to south of Saranda. No investment has started yet.

5.2.16 Photovoltaic Plants

The first bidding procedure (auction) was carried for selecting the bidder for the development of the project for the construction of the photovoltaic plant for the generation of electricity with installed

capacity of 50 MW, as part of the Support Measures, in the Akërni Zonë (Vlora) and the construction of additional capacity of 50 MW, which will not be part of the support measures.

The winning bid provides a 50 MW energy price of 59.9 euro/MW for 15 years and an additional capacity of 50 MW (100 MW in total) without support for energy purchases. The project will have a value of about 70 million euro and will generate additional employment. This project will be an important step in the diversification of energy resources in Albania.

Albania's state-owned power utility KESH plans to install a 12.9 MW floating solar power plant on the Vau i Dejes reservoir. The Vau i Dejes reservoir is part of HPP Vau i Dejes, one of three HPPs on the Drin River Cascade. KESH seeks to diversify its energy mix, which is almost entirely dependent on hydropower plants (HPPs). In August 2020, Albania signed a contract for the 140 MW Karavasta project with Voltalia, which would now be the biggest photovoltaic power plant of its kind in South-eastern Europe. The price achieved on auction for Karavasta is the lowest solar power price in Balkans. Voltalia has offered to sell electricity for just EUR 24.89 per MWh as the fixed price for half of the 140 MW for 15 years, while the contract is for 30 years.

During the first half of 2021, Albania will launch the third auction for the construction of a solar photovoltaic park, with a planned capacity of 100 MW located in the area of Spitalla.

5.2.17 Photovoltaic energy supply as back up for three National park centres (2019)

This project was managed by INCA and funded by GEF SGP. The objective was to use solar energy at the Protected Areas information centers (Divjaka-Karavasta, Llogara and Theth). Photovoltaic solar panels will be installed on the roofs of the centres thus promoting not only the natural values of PAs but also the use of renewable energy by reducing CO_2 emissions and helping to mitigate climate change impacts.

5.2.18 Waste to Energy Plants

When the National Waste Management Strategy and Plan 2010-2025 was adopted, there were no incinerators in Albania. In 2017 the first Waste to Energy Plant was built and started to operate in Elbasan (140 ton/day). The Draft Strategic Policy Document and National Integrated Waste Management Plan 2018-2033 foresees the construction of two other incinerators: Fier (200 ton/day) and Tirana (920 tons/day). The incineration capacity installed and designed together is estimated at about 459,900 tonnes/year, i.e at least 40% of the total waste generated in 2016 in the country.

6 Monitoring, reporting and verification

6.1 Introduction

As part of Albania's Intended Nationally Determined Contribution (INDC) submitted to the UNFCCC, Albania commits to reducing CO_2 emissions in 2030 by 11.5% compared to a projected 2030 value using a BAU scenario starting from 2016. The results of the preparation of the INDC form the basis of the Environmental and Climate Change Strategy. The National Climate Change Strategy (NCCS) has been developed to support the enforcing of the EU Environmental and Climate Acquis. The strategy has been approved but not yet implemented. The Climate Change Law has been endorsed. The Draft Decision on monitoring and reporting GHG emissions and other information relevant to climate change at the national level (draft DCM) is currently under discussion. The strategy, law and decision all give key roles to the Ministry of Tourism and Environment and the National Environment Agency (NEA) for Monitoring, Reporting and Verification (MRV).

6.1.1 National MRV system

Albania’s national MRV (transparency framework) system is being developed to achieve the following key goals:

- Engage with relevant stakeholders in a system that supports the rapid and cost-effective implementation of climate action.
- Ensure a sustainable and continuously improving institutional memory with long-term teams of experts who can monitor, report and verify data.
- Produce transparent and informative national documents in a timely manner supporting Albania’s contribution to the Paris Agreement's long-term goals.

This approach is designed to focus on the key stakeholders (action implementers, supporters and monitors) and on identifying critical datasets, processes and outputs needed for the system to be of value.

The main aims of Albania’s MRV system are to:

- Gather data on Albania's climate change related challenges including GHG emissions, vulnerabilities and possible impacts
- Gather data on Albania's climate change related opportunities including low-carbon development, new economic opportunities and GHG removals
- Report on Albania's mitigation and adaptation progress, ambition, actions, support and wider impacts to inform decision makers
- Establish a network of national experts in climate change and climate actions
- Provide technical advice on climate change related challenges, actions and progress to key stakeholders in the government, those involved in national negotiations and action implementation, businesses and the public
- Provide transparent and high-quality reports including NCs, BURs and NDCs.

6.1.2 MRV system management portal

Albania has developed a prototype MRV management portal to strengthen the data and information collection processes for MRV under GHG inventories, mitigation, adaptation and climate finance. This portal provides a secure platform for climate action information to be stored and managed. The input data can then be used to produce the outputs required for national and international reporting such as BURs and NCs. The portal can be used to store information to track activities and projects that are

being undertaken to enhance transparency of climate change action. It therefore supports a cohesive approach to managing activities in this area.

6.1.3 MRV system structure

The structure for the MRV system, with components for mitigation, adaptation, climate finance and support, are provided in Figure 31 to Figure 33. These diagrams highlight key institutional arrangements that are currently being developed by Albania, including:

- Inter-ministerial Committee on Climate Change to aid with prioritisation of activities in the MRV system
- National focal point responsible for ultimate reporting
- Management and coordination role
- Technical team of experts to compile, calculate and process relevant information

There are five components that will establish a development approach across the Mitigation, Adaptation and Support (climate finance) domains:

- Organisational mandates - establishing and maintaining the institutional, legal and procedural arrangements that will enable the production of timely and continually improving outputs.
- Data flow - establishing and maintaining data collection and management systems to collect, store and analyse the data required for the system outputs including GHG inventories, climate vulnerabilities and climate actions.
- Expertise - establishing and maintaining a team of experts with appropriate skills and capacity to produce and develop the MRV system outputs.
- Systems and tools - designing, implementing and maintaining effective tools and systems to support a sustainable MRV system.
- Stakeholder engagement - undertaking activities to ensure all stakeholders and wider audiences understand relevant aspects of the MRV system outputs, roles and responsibilities including the GHG inventory.

The MRV system will take into consideration relevant domestic legal and institutional organisational structures, systems and capacities. It will outline a cost-effective solution that is mindful of national circumstances and national needs. Each of these components are considered in the sections below. Recommendations for future development activities across all components are provided in **Table 19**.

6.2 Mitigation

6.2.1 Organisational mandates

The Ministry of Tourism and Environment, as the national focal point for climate change, was responsible for the final sign-off of the GHG inventory and mitigation information contained in this report. National technical experts were contracted by the UNDP under the Climate Change programme to carry out the update of the GHG inventory, projection scenarios and accompanying reports. This project-based update was performed over a seven-month project by five national experts: Energy Sector expert and Technical Coordinator, IPPU Sector expert, AFOLU Sector expert, Waste Sector expert, and a national data collection expert. The project was co-ordinated by UNDP in collaboration with the National Environment Agency and the Ministry for Tourism and Environment. The data collection process for the GHG inventory and projections has not yet been formalised in Albania. However, many of the key datasets including the Energy Balance are officially reported datasets by organisations such as INSTAT, which ensures the quality and completeness of the data.

Albania has currently approved the national Climate Change Law through which the Decision on MRV will formalise roles and responsibilities for the co-ordination, monitoring, reporting and verification of the GHG inventory and projections. This Decision will also formalise data collection ensuring that data providers produce relevant datasets to the national compilation teams in a timely manner and in the format required for their calculations. These are detailed in data reporting templates within the Decision itself. The Climate Change Law has been endorsed. It is envisaged that the corresponding Decision on MRV will be endorsed by the end of 2021.

6.2.2 Expertise

Although the work described above was performed by experts contracted for a short-term project, the national individuals chosen for the work have a wealth of experience in compiling the Albanian national inventory and projections. For the Energy, AFOLU and Waste sectors, the national experts were also involved in the NC3, NC2 and NC1. For the IPPU sector, there was a new national expert who was able to communicate with and learn from the national expert that was involved in the previous inventory. This shows that whilst Albania has a short-term project-based system for developing GHG inventories and projections, there is strong national knowledge and pool of experts present within the country ensuring the previous work is built upon to improve the next cycle of work.

Training was provided to the national experts through a week-long course focussing on the 2006 IPCC Guidelines and the accompanying IPCC Software. This training was funded by the UNDP/UNEP/GEF Global Support Programme. This enabled the national experts to use the 2006 Guidelines when developing the inventory rather than the 1996 Guidelines, which were used for the NC3. The project team undertook an impact assessment of the change in Guidelines to fully understand the implications of moving to the newer Guidelines.

The national experts also had access to GHG Management Institute's online IPCC training courses, which provides training on emission sources and estimation methodologies based on the 2006 IPCC Guidelines. Although the work is conducted through short-term, project-based contracts, the national experts are able to attend all meetings, discussions and training regarding the GHG inventory and projections.

Throughout the compilation process, QA/QC activities were performed by the national experts and relevant stakeholders. The Technical Coordinator was responsible for checking the calculations and outputs for all sectors. There were weekly meetings with the team to discuss quality issues and agree on solutions. The UNDP Climate Change Programme, as co-ordinator of the project, reviewed the outputs. A stakeholder workshop was performed to present the preliminary results to relevant stakeholders and therefore receive their feedback to improve the data, assumptions and methodologies. A peer review exercise was conducted through UNDP during which the information was reviewed and recommendations on improvements were provided. Albania looks forward to benefitting from the International Consultation and Analysis (ICA) process, which will contribute towards capacity-building and lead to further improvements in the quality of subsequent BURs.

The national experts provide, along with the required reporting outputs for the BUR, methodological documentation to transparently explain the assumptions, methods and data used to compile the estimates. This supports the sustainability of the MRV system.

There is restructuring taking place in the public sector in Albania and there are new agencies being set-up related to climate mitigation and adaptation: energy efficiency agency, civil emergency agency, forest agency, etc. The MRV roles within these agencies have not yet been defined so further support is needed to ensure that the experts understand their responsibilities under MRV and how information should feed through to the NEA or Ministry of Tourism and Environment.

Through the Climate Change Law, it is envisaged that the NEA will take a more active role in the development of the GHG inventory and projections. The NEA currently compiles the air pollution inventory under the Convention on Long-Range Transboundary Air Pollution (CLRTAP) and, therefore, has knowledge of the compilation processes for an inventory. However, it does not currently have knowledge of the GHG inventory and projections. If the NEA are to provide a more active role in this area, then knowledge transfer is key. This could be conducted through a project during which the national experts support the designated experts in the NEA with the compilation of the next GHG inventory and projections.

6.2.3 Data flows

The data used in the compilation of the GHG inventory and projections is provided on an ad-hoc basis and the data requests are not formalised to ensure that the information is provided to the team in a timely manner. Some of the key datasets including the Energy Balance are published and therefore publicly available to the team. For other datasets, the national experts provide a template for the information that they require in the format needed for their calculations. There are still gaps in the data obtained for the calculations and areas where expert judgement, interpolation or extrapolation has been used. There are some instances where data provided by stakeholders did not meet the quality standards required to be included in the calculations. These data availability limitations lead to high uncertainties in the resulting analyses.

The Climate Change Law will formalise the data request process and timelines for the GHG inventory and projections. The accompanying MRV Decision will provide data providers with clear templates for the data required. This formalisation of the data flow is seen as a priority improvement to the current MRV system for climate mitigation

6.2.4 Systems and tools

The underlying data, information and documentation related to the GHG inventory and projections is archived at UNDP. The information is also stored on the local computers of the national experts. There are, therefore, two copies of all electronic files in two different locations. This comprehensive archiving process supports the robustness of the MRV system.

The GHG inventory was compiled using the IPCC Software (version 2.54). The Energy and Transport sector projections were compiled using LEAP. The GACMO model was used to develop cost benefit analyses. Excel spreadsheets were used throughout the calculation process. These software packages have no licensing requirement beyond the standard Microsoft licences for Excel. Training in the use of all these software packages has been provided to the national experts.

The Climate Change Law envisages the Ministry of Tourism and Environment, and the NEA having a more active role in the coordination and compilation work regarding the GHG inventory and projections. As such, the knowledge of the application of these tools will need to be transferred to these organisations. There is currently no system used to collate information related to these activities and Albania envisages the implementation of an MRV tool to support this collation and tracking of information.

6.2.5 Stakeholder engagement

During the project, stakeholder engagement activities took place. The national experts had meetings with data providers to discuss the reliability and trends of the data. There is a steering committee for the project, which includes representatives from relevant ministries, NEA and INSTAT, who were consulted on the preliminary findings of the project. There was a national stakeholder workshop during which the draft outputs were presented for comment. Through these engagement activities, the

national experts also conducted training for the ministries, NEA and universities to develop additional national expertise and understanding of the process and outputs.

During the project, a Steering Committee was established to provide information and policy guidance. The Steering Committee was regularly updated on the progress and outcomes from the project. This approach to stakeholder engagement was also implemented during the NC3 project. These Steering Committees are not permanent structures and do not run beyond the end of the project. The Steering Committee comprised of representatives from across government departments, academics and NGOs. This approach to stakeholder engagement is affective during the project, but the envisaged reestablishment of the Inter-ministerial Committee on Climate Change will provide a long-term and stable forum for these activities.

There has not yet been any engagement with the general public. It is envisaged that a public facing website will be developed by the end of 2021 to provide visitors with information related to climate change. This information may also include summaries of the GHG inventory and projections analyses.

The results of the mitigation assessments carried out by Albania are published in international reports available to all interested stakeholders. There is currently a drive to improve engagement at other levels by providing information that is easy to digest and disseminate for a wider audience.

6.3 Adaptation

6.3.1 Organisational mandates

The Ministry of Tourism and Environment, as the national focal point for climate change, was responsible for the final sign-off of the adaptation information compiled for the NC and this report. National technical experts were contracted by the UNDP under the Climate Change programme to carry out the update of the climate, impact, risk and adaptation analyses and accompanying reports. This project-based update was performed over a seven-month project by approximately 15 national experts with expertise that included risk assessment, early warning, GIS, soil, water resources, agriculture, biodiversity, erosion, settlements and health. The project was co-ordinated by UNDP in collaboration with the Ministry for Tourism and Environment and Institute for Geosciences, Environment and Energy (IGHEUM). The data collection process has not yet been formalised in Albania and there are challenges for the project team concerning data collection.

Albania has approved the national Climate Change Law through which the Decision on MRV will formalise roles and responsibilities for the co-ordination, monitoring, reporting and verification of adaptation information. It is envisaged that the corresponding Decision on MRV will be endorsed by the end of 2021.

Through this legislation, the Institute for Geosciences, Environment and Energy may become the main technical institution for risk and vulnerability analyses, but this is not clear in the draft legislative text. This public institution was formally the Hydrometeorological Institute, which merged with some other departments from a couple of other institutes then under the Academy of Sciences and has since been moved to be part of the Tirana Polytechnical University. During this move, expertise was weakened within the organisation. There is currently very little knowledge within the institution itself, so this shift will require a significant drive for building capacity.

6.3.2 Expertise

The expertise developed in previous work was directly transferred to this work because of continuity between the national experts contracted to carry out the work. This continuity across all NCs has supported the development of specialist, nationally specific expertise for this area. There is a need to

upskill junior staff to ensure continuity is maintained if senior experts are no longer available to do the work. Addressing this challenge began during the NC4 when four experts were brought into the team that had not worked on this area in the past. They were able to learn from those that have been involved for many years.

Due to the continuity of the team, there has been a clear group of experts to benefit from training opportunities continually updating their knowledge for many years. For example, further GIS training was provided during the NC4. There is always a need to update this knowledge especially regarding models as recommended by the IPCC and UNFCCC, and updates to the LEAP model used by the team. There is especially a need to improve the knowledge on models developing/downscaling the climate scenarios and assessing the impact of climate change on different economic sectors. For example, improved knowledge is needed to assess the impact of climate change on tourism considering the tourism climate index.

Throughout the analysis compilation process, QA/QC activities were performed by the national experts and relevant stakeholders. The Technical Coordinator was responsible for checking the calculations and outputs for all sectors; the UNDP Climate Change Programme as co-ordinator of the project reviewed the outputs; a stakeholder workshop was performed to present the preliminary results to relevant stakeholders and therefore receive their feedback to improve the data, assumptions and methodologies; a peer review exercise was conducted through UNDP during which experts from the central UNDP office reviewed and provided recommendations on improvements.

Regarding implementation of adaptation actions, there have been several projects that look at flood risk management in Albania however, these have all been with different partners. There is a general need to strengthen the capacity of technical experts within Albania such as academia and the Institute of Geosciences, Energy, Water and Environment so that these implementation projects can be performed by national experts, where effective.

The future MRV system through the implementation of the Climate Change Law will see considerable effort required to upskill experts within the Institute for Geosciences, Environment and Energy. Activities under the NC4 supported this by providing training to identified experts.

6.3.3 Data flows

The team of experts that performed the analysis were involved in previous analyses so had access to all information and data used in previous work. This enabled the team to build on previous work. However, there are challenges with obtaining data for some of the assessments. For example, whist the automatic monitoring stations are feeding automatically into a system that is accessible to the team, there are many manual monitoring stations that are not currently manned. It is, therefore, not possible to obtain data from these stations leading to data gaps. Once data have been obtained by the team, they go through rigorous internal QA/QC processes to ensure the quality of the calculations and outputs.

6.3.4 Systems and tools

The model inputs, outputs and all other analyses and underlying data are stored by the national experts, UNDP and the Ministry of Tourism and Environment. This ensures that enough back-up of all documentation is in place. The analyses for adaptation information require many modelling packages. These tools cover sectors such as water, agriculture, livestock, forest, crops, biodiversity, tourism & population and health. The modelling packages include WEAP for water resource management analyses, SimClim 4.0 for Desktop for temperature and precipitation analyses, according to IPCC Fifth Assessment Report scenarios, LEAP and WEAP for impact analyses of the energy and water sector, respectively. The models used for the analyses are generally recommended by the IPCC. Some of the

models require licences, which impact on the resources available for national development of expertise.

6.3.5 Stakeholder engagement

During the project, a steering committee was established and included representatives from relevant ministries and other organisations, who were consulted on the preliminary findings of the project. There was a national stakeholder workshop during which the draft outputs were presented for comment. Through these engagement activities, the national experts also conducted training for the ministries, Institute for Geosciences, Environment and Energy and universities to develop additional national expertise and understanding of the process and outputs. The experience from previous NCs is that the knowledge of these stakeholders does not necessarily lead to meaningful input to the final outputs and analyses. There is a need to improve this engagement to support relevant stakeholders with complimentary expertise to this work provide meaningful feedback and critique the drafted outputs.

The outputs from this work were communicated to the general public through the production of publicly available articles and TV interviews. It is envisaged that a public facing website will be developed by the end of 2021 as part of the website for the Ministry of Tourism and Environment to provide visitors with information related to climate change. This information may also include summaries of the risks and vulnerabilities of Albania to climate change as well as the adaptation actions that are taking place.

6.4 Support and climate finance

6.4.1 Organisational mandates

Climate support is provided via financial support from public, private, international and national entities. It can also be provided via technology transfer and capacity building. Tracking these activities can support the effective implementation and reporting of climate finance. There is currently no central process for tracking these activities within Albania. The Ministry of Finance and Economy tracks the projects co-ordinated by aid agencies and receives monthly progress reports for all activities. These reports follow a consistent reporting template. Each line ministry individually tracks the projects for which they are managing and under some of these projects, such as those funded by the EC, progress reports are submitted which are a further source of information regarding climate support. The Climate Change Law instates the Ministry of Tourism and Environment as the authority that will track climate finance. The ministry will need to track all activities linked to climate change and track and analyse the support mechanisms through each.

6.4.2 Expertise

There is a need to expand the MRV requirements for climate support in the Ministry of Tourism and Environment and for all relevant stakeholders. There is not currently a system in place to track these activities or the national experts to run the system because more capacity building is required to understand when climate support is applicable. The Ministry of Finance has general expertise regarding MRV process for financial tracking, which should be used to improve the knowledge of experts in the Ministry of Tourism and Environment.

6.4.3 Data flows

Information related to climate support is available from the Ministry of Finance via the monthly reports they receive from line ministries. Further information related to relevant projects is recorded by individual line ministries co-ordinating each project. This information is not currently brought together

in one place to assess the climate support that is provided to Albania. Through the Climate Change Law, the Ministry of Tourism and Environment will take on this role as the central co-ordinator. Representatives from this ministry will, therefore, need sufficient knowledge of projects related to climate mitigation and adaptation. This knowledge should, wherever possible, be gained through already established data flows such as the finance reporting to the Ministry of Finance. These data flows should be adapted, if required, to ensure that the Ministry of Tourism and Environment is collected all required information for the MRV of climate support.

6.4.4 Systems and tools

There is currently no system or tool in place to monitor, report and verify climate support. The Ministry of Finance uses ORACLE for state budget analysis, but it has not been possible to expand this to accommodate for the granularity required by climate support MRV. This tracking system may not include all international funds. When the Climate Change Law is being established, an appropriate climate support tracking system will need to be implemented. It should meet the national and international needs concerning MRV of climate support.

6.4.5 Stakeholder engagement

The considerations regarding climate support are not communicated to stakeholders or the general public. It is envisaged that a public facing website will be developed by the end of 2021 as part of the website for the Ministry of Tourism and Environment to provide visitors with information related to climate change. This information may include summaries of the climate support activities in Albania. This may include those that have been undertaken, those that are being undertaken and those that are still to be agreed.

6.5 Recommendations

Table 19: Recommendations on the development of Albania's MRV system

Component	Element	Recommendation	Priority
All	Organisational mandates	Finalise and implement the Decision on monitoring and reporting GHG emissions and other information relevant to climate change at the national level	Medium
All	Organisational mandates	Clarify the roles and responsibilities within the MRV system considering the data flows	High
Support and finance, adaptation	Organisational mandates	Increase the capacity of the Ministry for Tourism and Environment allocating personnel to the management of MRV activities	Medium
Support and finance	Expertise	Training for the Ministry of Tourism and Environment and other stakeholders such as relevant committee members on climate support.	High
Support and finance	Expertise	Mentoring across a period where the Ministry for Tourism and Environment set-up the MRV system for climate support.	Medium
All	Systems and tools	Develop an MRV tool for tracking information related to climate support and action needed for reporting and informing stakeholders.	Medium
All	Stakeholder engagement	Re-establish the Inter-ministerial Committee on Climate Change	Medium
Support and finance, adaptation	Stakeholder engagement	Identify engagement activities that can be carried out to increase the transparency and understanding of climate change activities in Albania. This could include a public-facing	Low

Component	Element	Recommendation	Priority
		website via Ministry of Tourism and Environment containing information and infographics that are easy to digest and usable in national reports.	
Adaptation	Organisational mandates	Increase the capacity of the Institute for Geosciences, Environment and Energy so they are able to take on the new roles and responsibilities detailed in the Decision.	Low
Adaptation	Expertise	Training for the Institute for Geosciences, Environment and Energy on climate change risk and vulnerability assessments.	Low
Adaptation	Expertise	Training for national experts in the applicability and use of related tools and models for their analyses.	Medium
All	Data flows	Map the data flows applicable to the MRV system to highlight gaps and weaknesses in the data flows and then identify actions to overcome these gaps and weaknesses, such as the manual monitoring stations that are not currently providing valuable data.	High
Mitigation	Organisational mandates	Increase the capacity of the NEA so they are able to take on the new roles and responsibilities detailed in the Decision.	High
Mitigation	Expertise	Training for the NEA on GHG inventories, mitigation action management and GHG projections compilation.	Low
Mitigation	Expertise	Mentoring for the next inventory compilation team through which international and national experts are available throughout the compilation process to answer questions and provide guidance.	Medium
Mitigation	Expertise	Nominate experts to take part in the UNFCCC Review of GHG inventories and therefore undertake the training and examinations for GHG inventories provided by UNFCCC	Low
Mitigation	Systems and tools	Set-up a central file storage system managed by the Ministry of Tourism and Environment where all files can be stored and accessed by relevant stakeholders.	Low

Figure 31: Institutional arrangements for GHG inventory and mitigation

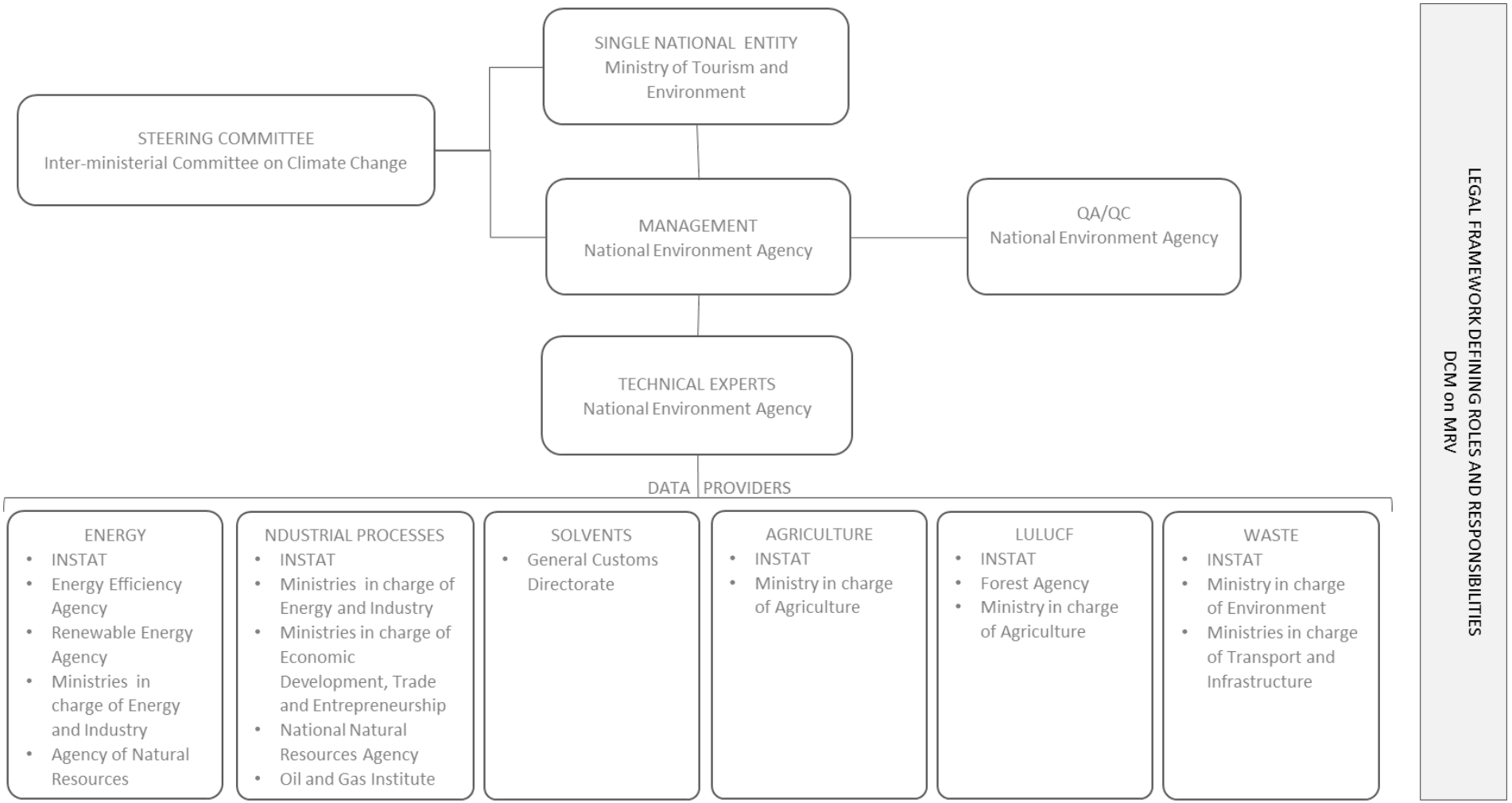


Figure 32: Institutional arrangements for adaptation

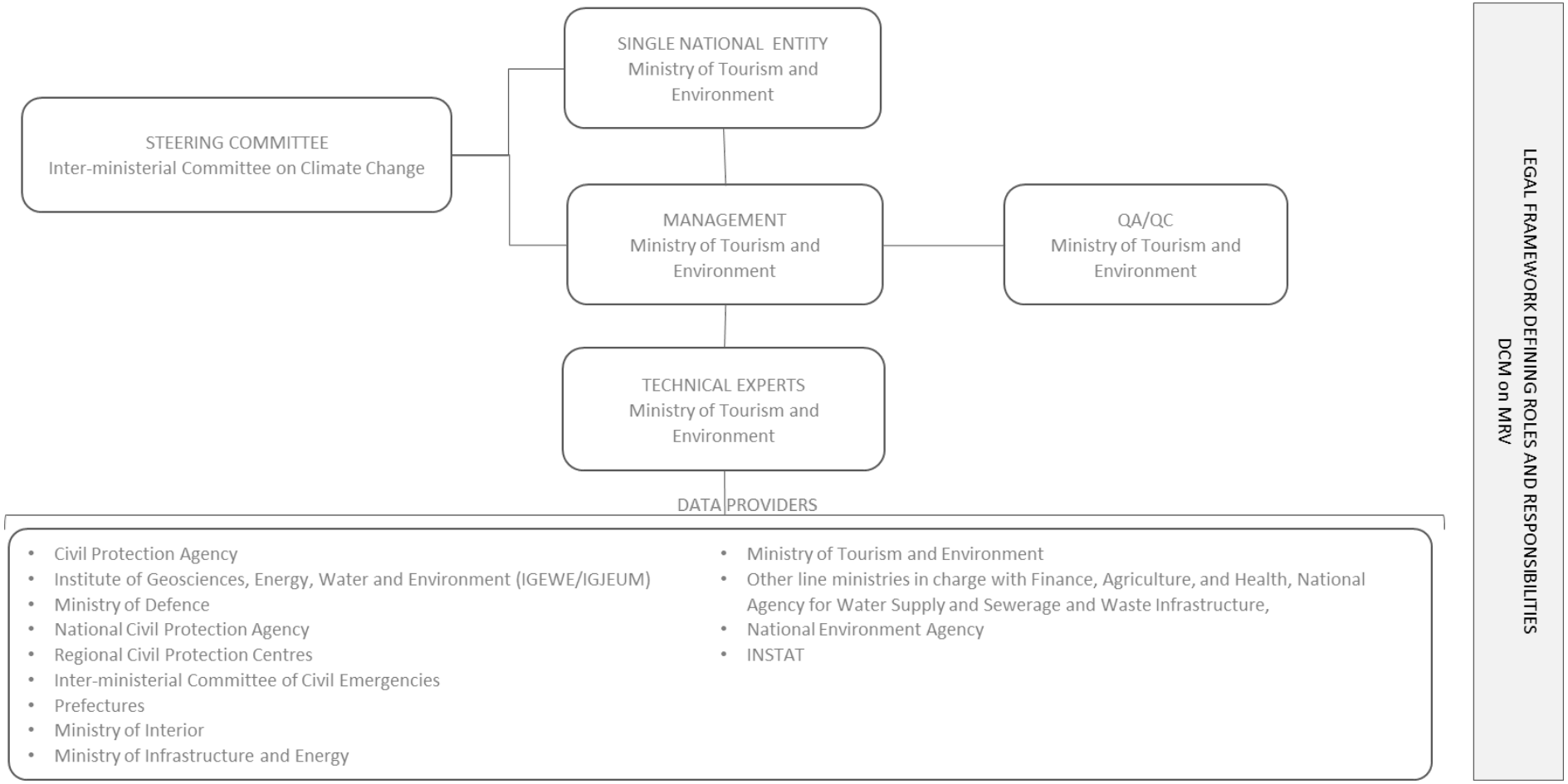
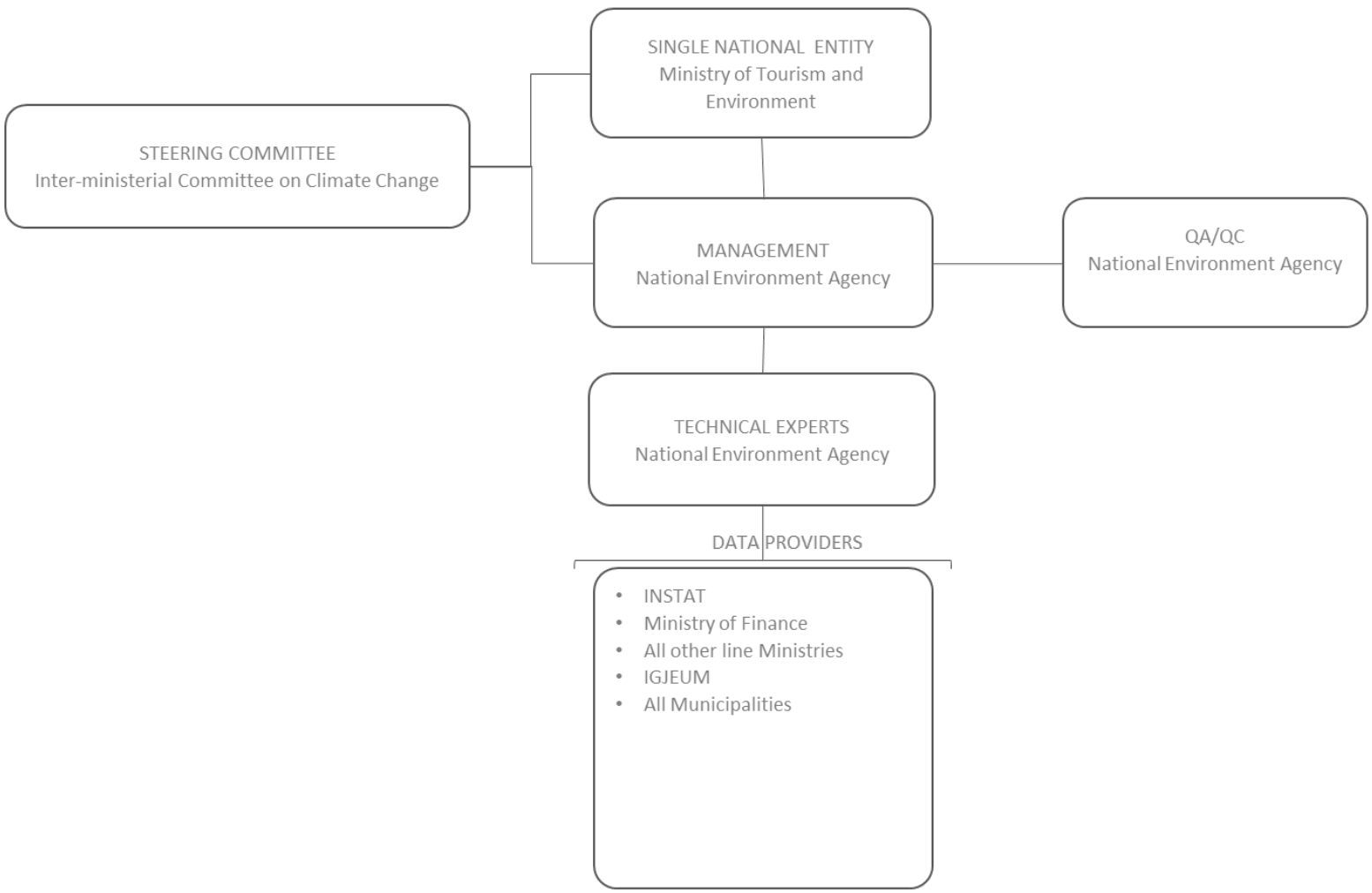


Figure 33: Institutional arrangements for climate finance and support



7 Other information

7.1 Climate change and gender equality

In recent years, with the Albanian ratification of international conventions and agenda in relation to climate change, progress has been made in the design of policy and legal strategic documents for addressing climate change. The Government of Albania has adopted, by DCM 466, date 3.07.2019 the National Strategy on Climate Change (NSCC) and its two annexes, the National Action Plan on Mitigation (NAPM) and the National Adaptation Plan (NAP). The National Integrated Energy and Climate strategy was formulated, as an engagement of Albania at the Ministerial Meeting of the Energy Community in 2017.

The UNFCCC reports have highlighted the important linkages between climate action and gender equality. Subsequently, the 2015 Paris Agreement referred to gender-responsive approaches, as well as to the goals of gender equality and empowerment of women (UNFCCC, 2015). Moreover, the government efforts for achieving Sustainable Development Goals in 2030 are requiring progress towards for gender equality as a stand-alone goal and a cross-cutting issue across a number of other goals (United Nations, 2015).

In Albania, policy steps to bring gender mainstreaming into climate change policies are not yet thoroughly addressed by national policies. Except gender considerations inserted at the legal components related to climate change (Law no. 45/2019 "On civil protection" approved on 18/07/2019 and the Law on Climate change approved by DCM 499 date 17.7.2019), there are no separate gender sensitive objectives and actions and the language used especially in the narrative description of these strategies is almost gender blind.

Considering the scarce efforts made regarding gender mainstreaming, an analysis has recently been undertaken on the state of gender equality in relation to the impacts of climate change. Information was collected through a literature review, structured survey with local experts, semi-structured interviews with farmers, community leaders, nurseries and doctors and validation seminars with national experts. Considering the findings of the survey and the discussions with the group of experts engaged for the preparation of the NC4 and this report, there are various points to be considered prior to the design of measures to address gender inequalities in climate change.

The results of the analysis show that women are more affected compared to men due to a higher engagement in farming especially in livestock activities. Survey findings are consistent with previous studies carried on women in agriculture such as UNWOMEN, (2017), Gerdoci and Mece, (2017), Dauti and Zhllima (2017), Zhllima (2018). According to the survey with local experts, men are mostly oriented to work in sectors such as vineyards, olives and fruit trees.

In terms of access to services and information from advisory services, men have more access than women. Men are also in the vast majority when representing the farm as an administrative unit. Deciding on investments and contracting with a buyer (76%) and so on, are mostly carried out and managed by men. Respondents indicate that mostly men have the right to move free outside the village.

Therefore, consideration has to be taken on involving more women, especially on cultivation techniques, pest management and water management. Information and preparation is higher amongst women in regards to livestock management. However since men are more involved in forage cultivation and harvesting, both groups should be carefully targeted. With regard to energy efficiency improvements, women are perceived to be more informed and prepared compared to men. With

regards to actions related to wood preservation, men are perceived to be more informed and prepared than women. However, women are more aware and influenced by issues related to biodiversity.

Capacity building interventions should consider the constraints hampering women's efforts on participating in capacity building events such as training and field demonstration. Low time availability due to being too burdened with homecare, low access to transport for meetings at administrative units and low financial access requires a careful selection of timing and location for events. Moreover, weak awareness to climate change impact and weak financial support increases the need for a provision of awareness campaign and budgetary support (grants and investments) related to capacity building interventions.

To overcome these challenges, support with technology packages (protocols, demonstration equipment, laboratory kits for land and water analyses), support of transport costs and support of advisory services and coaching in groups are recommended. These elements were taken into consideration while designing the measures presented below, and while assessing the budget of the activities related to each measure.

A series of measures is necessary for promoting equitable participation and influence by women and men in adaptation decision-making processes. This will help allow equitable access by both women and men to financial resources and other benefits resulting from investments in adaptation. The main objectives are to:

i. Promote gender equality in decision making on climate change policies on central levels of policymaking and strengthen capacities of institutions to integrate gender considerations in climate change policies

ii. Update the relevant national and local strategic documents in order to integrate best practices and information with gender and climate change issues taken into consideration

iii. Develop and pilot gender-related climate change adaptation and mitigation projects with demonstration and awareness focus in agriculture as well as energy at local level with focus on Vjosa river

iv. Engage stakeholders in the process of the monitoring of Action Plans in relation to National Strategy on Climate Change (NSCC), the National Action Plan on Mitigation (NAPM) and the National Adaptation Plan (NAP) (DCM 466, date 3.07.2019).

Considering these four objectives, a set of interrelated activities has been developed along with timelines, target indicators, stakeholders and budget. This forms the gender equality action plan and is provided in the table below. The time frame of the action plan is the years 2021-2027. The selected timeline coincides with the timing of other sector and cross-sector strategies in Albania. The monitoring process will be guided first by designing SMART indicators for monitoring activities, carrying monitoring activities as well as preparing the monitoring report.

Table 20: Gender equality action plan

Objective	Actions	Indicators	2021-2027	Stakeholders	Budget (USD)
1. Promote gender equality in decision making on climate change policies on central levels of policymaking and strengthen capacities of institutions to integrate gender considerations in climate change policies.	1.1. Studying with gender lenses of those strategies, programs, plans, and acts that are related to climate change and identify potential spheres were gender gaps prevail.	1.1.1 no of documents identified 1.1.2 no of governmental bodies tackled 1.1.3 Study report published	Year 1	Ministries of Line, Ministerial Group on climate change, Gender Equality specialists of line Ministries, NGOs, Academia, INSTAT	50,000
	1.2. Develop training materials for integrating best practices, information and risk scenarios, with gender and climate change issues taken into consideration	1.2.1 developed training manuals with separate folder for each topic	Year 2		
	1.3. Identify key important actors for training and deliver series of trainings by considering women's participation.	1.3.1 no of trainings organised for integrating best practices information and risk scenarios, with gender and climate change issues. The feedback training forms 1.3.2. no of participants women 1.3.4. The quotes of training participants			
2. Update the relevant national and local strategic documents in order to integrate best practices, information and risk scenarios, with gender and climate change issues taken into consideration	2.1. Integrate gender responsiveness and climate change in National Gender Strategy, National Strategy for Climate Change, Agriculture and Rural Development Strategy, Water and Irrigation Strategy, as well as relevant programmes and legal acts	2.1.1. no of programmes, plans, policies, acts which integrate gender in climate change;(after training) integrating gender and climate change 2.1.2. Share of funds allocated for gender and climate change	Year 2	Ministries of Line, Ministerial Group on climate change, Gender Equality specialists of line Ministries, NGOs, Academia, INSTAT	500,000
	2.2. Integrate gender in the local development plans by helping in pilot Municipalities	2.2.1. Number of plans which contains separate objectives and activities for gender and climate change 2.2.2. Share of funds allocated for gender and climate change in pilot municipalities	Year 3	Municipalities in the Vjosa river basin, NAEMNGOs, Academia, INSTAT.	

Objective	Actions	Indicators	2021-2027	Stakeholders	Budget (USD)
3. Developing and piloting gender-based climate change adaptation and mitigation projects in water, energy and agriculture at local level with focus on Vjosa river delta.	3.1. Conducting gender lenses analysis and research of local practices with focus on agriculture land use e as well as energy use in central and local level.	3.1.1. Study report published 3.1.2. Number of research entities involved in research related to water, energy and agriculture	Year 1	Municipalities located in Vjosa River Basin, MARD, ATTCs, Regional Agencies, Agricultural University of Tirana, UNDP, Media, Local NGOs	3,000,000
	3.2. Improve the understanding for both women and men and awareness of the use of climate data, water analysis and land analysis data	3.2.1 developed leaflets with separate content for each topic	Year 2		
	3.3 Increasing knowledge and awareness on gender specific roles in coping with impact related to climate change in irrigation, land use and use of energy resources	3.3.1 TOR for trainers 3.3.2. no of trainings on crop variety, agronomic practices, livestock management and nutrition, and water and energy efficiency. 3.3.3 training material 3.3.4. Soil and water analysis kits 3.3.5. No of participants 3.3.6 Feedback forms related to level of knowledge on climate change impacts and options for adaptation by gender	Year 2		
	3.4. Develop field/farm demonstration activities that promote investments in technology and practices that enable women farmers to cope effectively with the impacts of climate change on land use, water management, energy use and biodiversity management	3.4.1 no of field/farm demonstration activities on agriculture, water management, energy use and biodiversity management 3.4.2 toolkit and promotion material 3.4.3.no of participants 3.4.4.No. of women that are aware of integrated water management 3.4.5 Feedback forms related to level of knowledge of women on water irrigation, land conservation, and use of renewable energy	Year 3		

Objective	Actions	Indicators	2021-2027	Stakeholders	Budget (USD)
4. Engage stakeholders in the process of the monitoring of Action Plans on Climate Change National Action Plan on Mitigation (NAPM) and the National Adaptation Plan (NAP) (DCM 466, date 3.07.2019);	4.1 Designation of monitoring indicators	4.1.1 no of indicators 4.1.2 the quality of SMART indicators	Year 1 to 7	MoSHP, Gender specialists of the MoTE, Gender specialists of other Ministries, Gender specialists in municipalities; gender expert with social affairs with legal revision tasks	500,000
	4.2. Development and implementation of the monitoring activities	4.2.1. Questionnaires and semi- structured interviews 4.2.2. Reporting templates 4.2.3. List of institutions and responsible persons for reporting			
	4.3. Preparation and delivery of monitoring report	4.3.1 The format of reporting 4.3.2 the quality of the monitoring report 4.3.3 no of monitored institutions 4.3.4 no of stakeholders engaged in the process			
Total Budget					4,050,000

7.2 Shared Socioeconomic Pathways

Shared Socioeconomic Pathways (SSP) related to population and GDP for the VRB are developed through downscaling of respective global scenarios (as per IPCC Fifth Assessment Report) for 10, 25 and 50 years ahead. The following key indicators were evaluated: water resources, agriculture and tourism for 25 and 50 years ahead for the VRB. The SSP scenarios adjusted for Albania are presented in the table below.

Table 21: SSP scenarios adjusted for Albania

SSP1	**Sustainability – Taking the Green Road (Low challenges to mitigation and adaptation)** Under this SSP, the sustainable path the world is embracing will affect the dynamics of economic development and environmental quality in every country. International support and integration policies will ensure the implementation of green policies in Albania. Albania will face more education investments, more healthcare supply, moderate to high economic growth, shifted toward human well-being, and less inequality. Due to a more educated population, the country will face lower population growth. Population in total will decline throughout the century. Due to a lower level of inequality, more people would be able to travel for leisure, thus affecting tourism sector. Lower resources intensity and lower population will imply lower demand for water. Management of water resources are also expected to improve. Stronger regulation on environment will also impact agriculture sector. Agriculture will experience improvements in productivity due to application of best practices in the sector and the improvements in technology. High sustainability means less food consumption, therefore again affecting agriculture production.
SSP2	**Middle of the Road (Medium challenges to mitigation and adaptation)** As the world follows a path in which trends do not shift markedly from historical patterns, Albania will experience similar social, economic, and technological developments as the ones it experiences today. GDP composition does not change, making the country highly reliant on service sector, and less on agriculture and industry. Albania remains a service economy, with activities mostly concentrated in financial services, hospitality, retail, and less in health, human services, information technology and education. Less efforts in environmental management, will lead to further degradation of environmental systems. Few efforts to achieve sustainability goals will affect management of resources. This path will cause moderate economic growth, larger population growth compared to SSP1, similar inequality levels to the ones experienced today. Population in total will decline throughout the century. The implication in different sectors is expected as follows: • Water demand will increase due to the larger population compared to SSP1. • Tourism sector might be affected by the larger population, but on the other hand, the persisting inequality among the population will affect tourism demand in the VRB. The combined impact of these two driving forces on tourism is uncertain. • Less emphasis and developments in technology will affect agricultural production, lowering agricultural production yield.
SSP3	**Regional Rivalry – A Rocky Road (High challenges to mitigation and adaptation)** Under such scenario, stronger levels of nationalism will lead to strong constrains in international collaboration. For a country like Albania, highly reliant on international support, this will cause a substantial impact on economic development and economic growth. Slow economic development, with low rates of growth, causing even more inequality, are some of the highlights of the future under this scenario. Low investments in education, technology and healthcare and few environmental actions will strongly impact the wellbeing of the population. A less educated population will lead to a higher rates of population growth, compared to other scenarios. Higher needs for food and water, accompanied with more disregard toward the environment, will cause resources exploitation. Less technological development will impact the

	production levels in agriculture sector, which on the other hand have to comply the needs of a rising population. Low level of economic development on the other hand will affect consumption, by making it lower. Tourism sector in the VRB will face decline due to the rise of poverty and inequality among regions.
SSP4	**Inequality – A Road Divided (Low challenges to mitigation, high challenges to adaptation)** This scenario see a world with rising inequality. Education and healthcare access are reserved to only one part of the population. This causes high stratification among the country. This will highly affect Albania, a country currently suffering from the increasing stratification of the population. The jeopardised social cohesion might cause high political instability and conflicts. Fragmentation is also observed in the manner of implementation of different policies, for instance in environmental field. Population will decline among the rich and increase among the poor.
SSP5	**Fossil-fuelled Development – Taking the Highway (High challenges to mitigation, low challenges to adaptation)** This scenario will see growth in all sectors in Albania, high investment in education and healthcare, causing less inequality, decline of population, high levels of economic growth, and increase in environmental action. The declining population will cause lower demand for water. High technological development will increase production yield in agriculture. Tourism will be negatively affected by the decline in population, but positively affected by the high economic growth rates and lower inequality levels. The overall effect on tourism in Vjosa will result from the combined effects of population decline and economic growth.

The respective SSP projections for GDP and population in VRB are presented in the figures below. Population scenarios show different numbers of population dynamics in the future. Consistent with the narratives, population is lowest in the SSP1, SSP4 and SSP5 and the highest in SSP3 respectively.

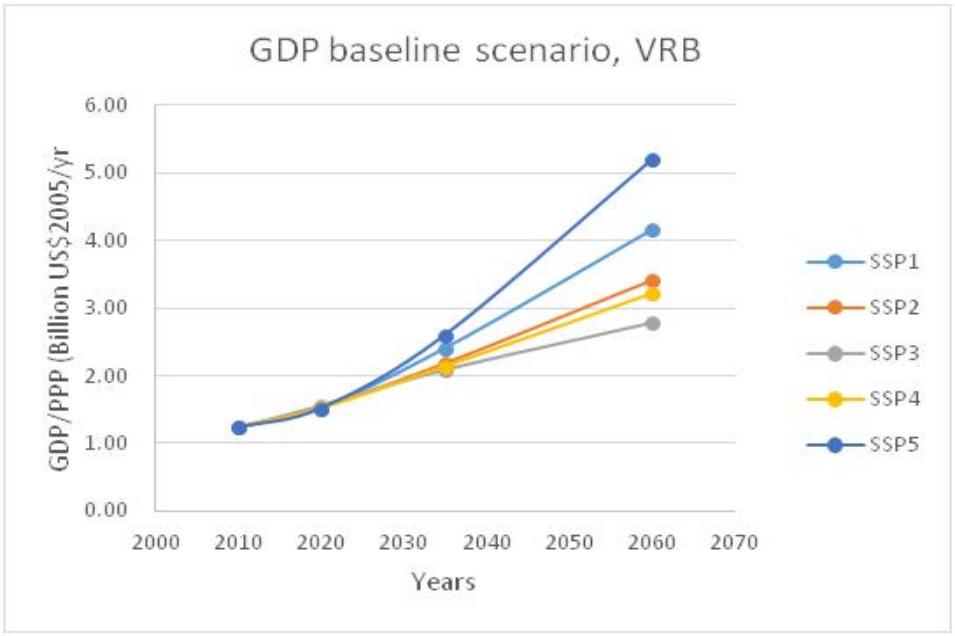


Figure 34: Baseline Scenarios of GDP, VRB

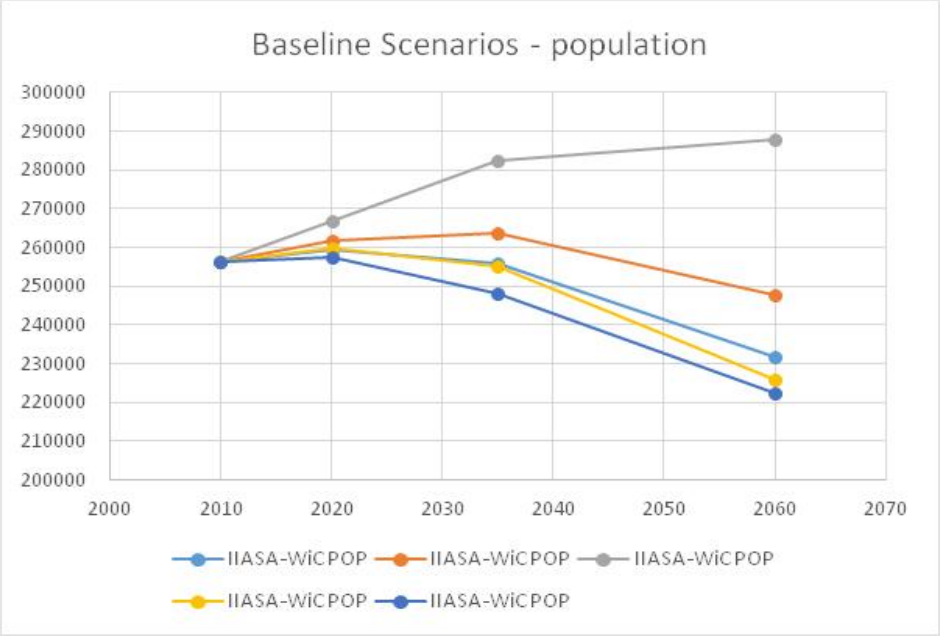


Figure 35: Baseline Scenarios of GDP, VRB

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