

Annex 2

Pre-Feasibility Study

to the GCF Funding Proposal (Simplified Approval Process)

ALBAdapt – Climate Services for a Resilient Albania

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Version 4

Submitted by:

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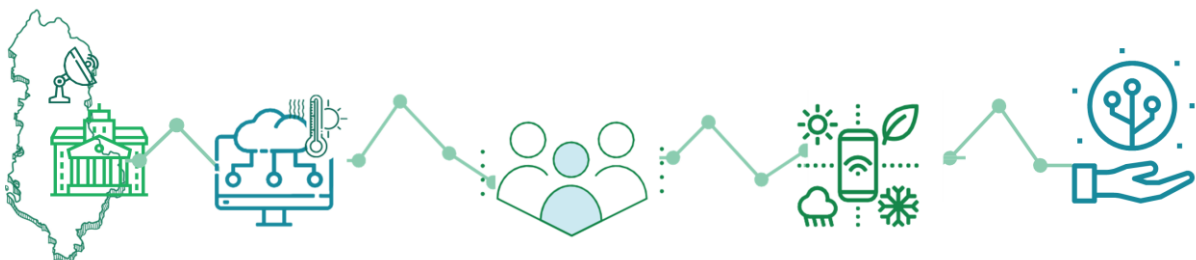


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Abbreviations and Acronyms

1BUR	First Biennial Update Report
4NC	Fourth National Communication
AAF	Albanian Armed Forces
ADF	Albanian Development Fund
AI	Artificial intelligence
AIDA	Albanian Investment Development Agency
AKEP	Electronic and Postal Communications Authority
AKP	National Forestry Agency
AKSHI	National Agency for Information Society
AKZM	National Agency for Protected Areas
AL-DRMAP	Albania Disaster Risk Mitigation and Adaptation Project
ALL	Albanian Lek (national currency)
AMBU	Albanian Agency for Management of Water Resources
ARC	Albanian Red Cross
ASIG	Albanian Authority for Geographical Information
AVC	Automatic voice calling
AWOS	Automated weather observing system
B2B	Business to business
B2C	Business to consumer
BEREC	Body of European Regulators for Electronic Communications
BMZ	German Federal Ministry for Economic Cooperation and Development
BRIGAIID	Bridging the Gap for Innovations in Disaster Resilience (EU Horizon 2020 funded)
BUR	Biennial update report to the UNFCCC
C3S	Copernicus Climate Change Service
CAP	Common Alerting Protocol
CB	Cell broadcast
CCAWB	Adaptation to Climate Change through Transboundary Flood Risk Management in the Western Balkans
CF	Challenge Fund
CHD	Country Hydrometeorological Diagnostic
CMIP	Coupled Model Intercomparison Project
CoP	Community of practice
CP	Country programme
CPRC	Civil protection regional centre
CSIS	Climate services information system
CSO	Civil society organisation
CVA	Cash and voucher assistance
DCM	Decision of the Council of Ministers
DRM	Disaster risk management
DRR	Disaster risk reduction
DST	Decision support tool
DWD	Deutscher Wetterdienst (German Weather Service)
EAP	Early action protocol
EbA	Ecosystem-based adaptation
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
EMS	Emergency management system
ENPV	Economic net present value
ERE	Energy Regulatory Authority
ERRA	Emergency Regional Risks Atlas
ESMF	Environmental and social management framework
ETSI	European Telecommunications Standards Institute
EU	European Union

EU CPM	European Union Civil Protection Mechanism
EUMETCAL	EUMETSAT Education and Training Collaborative Network
EUMETNET	European Meteorological Network
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
EWS	Early warning system
FAA	Funded activity agreement
FAO	Food and Agriculture Organization of the United Nations
FbA	Forecast-based action
FbF	Forecast-based financing
FFGS	Flash Flood Guidance System
FMI	Finnish Meteorological Institute
FP	Funding proposal
GBON	Global Basic Observing Network
GBV	Gender-based violence
GCAP	Global Call to Action against Poverty
GDP	Gross domestic product
GEE	Gender equality employee
GEF	Global Environment Facility
GFCS	Global Framework for Climate Services
GFDRR	Global Facility for Disaster Reduction and Recovery
GHG	Greenhouse gas
GII	Global Innovation Index
GIS	Geographical information system
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GLTP	General Local Territorial Plan
GNP	General National Spatial Plan
GNTTP	General National Territorial Plan
GoA	Government of Albania
GSM	General System for Mobile Communications
GTS	Global Telecommunication System
HEI	Higher education institution
IbF	Impact-based forecast
ICEEE	International Conference on Energy, Ecology and Environment
ICPD	Italian Civil Protection Department
ICSP	Integrated Cross-Sectoral Plan for the Coastal Belt
ICT	Information and communications technology
IFRC	International Federation of Red Cross and Red Crescent Societies
IFS	Integrated forecasting system
IGEO	Institute of Geosciences
IGEWE	Institute of Geoscience, Energy, Water and Environment
IHMS	Institute of Hydrometeorology and Seismology of Montenegro
IMF	International Monetary Fund
INSTAT	Institute of Statistics
IRENA	International Renewable Energy Agency
IRMF	Integrated results management framework
IRR	Internal rate of return
ISO	Innovation support organization
iTAP	Independent Technical Advisory Panel
ITU	International Telecommunications Union
JICA	Japan International Cooperation Agency
KESH	Albanian Power Corporation
KfW	Kreditanstalt für Wiederaufbau
LAAP	Local adaptation action plan
LAF	Local area forecast
LB-SMS	Location-based SMS
LDC	Least developed country

LDP	Local detailed plan
LGBTQ	Lesbian, gay, bisexual, trans-sexual and queer/questioning
LGU	Local government unit
LTE	Long-Term Evolution (mobile phone standard)
Mbps	Megabits per second
MCH-DBS	Meteorological, climatological and hydrological database management system
MHEWS	Multi-hazard early warning system
MHSP	Ministry of Health and Social Protection
MMS	Military Meteorological Service
MoARD	Ministry of Agriculture and Rural Development
MoFE	Ministry of Finance and Economy
MoHSP	Ministry of Health and Social Protection
MoTE	Ministry of Tourism and the Environment
MOU	Memorandum of understanding
MoV	Means of verification
MRV	Monitoring, reporting and verification
MTBP	Medium-term budget process
MVP	Minimum viable product
NCPA	National Civil Protection Agency
NAP	National adaptation plan
NbS	Nature-based solutions
NC	National communication to the UNFCCC
NCCS	National Climate Change Strategy
NCIS	National climate information system
NDA	National designated authority
NDC	Nationally determined contribution
NDRRAP	National Disaster Risk Reduction Action Plan
NDRRS	National Disaster Risk Reduction Strategy
NEBS	National Emergency Broadcast System
NFCS	National Framework for Climate Services
NFWA	Women Founders Network Albania
NGO	Non-governmental organisation
NMHS	National meteorological and hydrological service
NOCCE	National Operations Centre for Civil Emergencies
NPV	Net present value
NSDI	National Strategy for Development and Integration
NTPA	National Territorial Planning Agency
NWP	Numerical weather prediction
O&M	Operations and maintenance
OASIS	Organization for the Advancement of Structured Information Standards
OFP	Operational focal point
OSCAR	Observing Systems Capability Analysis and Review
PDNA	Post-disaster needs assessment
PMC	Project management costs / project management committee
PMO	Prime Minister's Office
PMU	Project management unit
PSC	Project steering committee
RCP	Representative concentration pathway
REAP	Risk-informed Early Action Partnership
RESEAL	Resilience Strengthening in Albania
ProNEWS	Programme for Improving National Early Warning System and Flood Prevention in Albania
RCOF	Regional Climate Outlook Forum
SASPAC	State Agency for Strategic Programming and Aid Coordination
SCCF	Special Climate Change Fund
SDC	Swiss Development Cooperation

SDG	Sustainable development goal
SEAH	Sexual exploitation, abuse and harassment
SECAP	Sustainable energy and climate action plan
SECO	State Secretariat for Economic Affairs (Switzerland)
SEECOF	South-East European Climate Outlook Forum
SEECOP	South-East European Consortium for Operational Weather Prediction
SEEFFGS	South-East Europe Flash Flood Guidance System
SEE-MHEWS-A	South-East European Multi-Hazard Early Warning Advisory System
SIDS	Small island developing state
SOP	Standard operating procedure
SP	Strategic Project (of the National Disaster Risk Reduction Strategy / Action Plan)
TAF	Terminal aerodrome forecast
ToC	Theory of change
tCO ₂ eq	Tonnes of carbon dioxide equivalent
TNA	Technology needs assessment
TS	Technical specification
TSCD	Territorial stakeholder climate dialogue
TSD	Territorial stakeholder dialogue
TWG	Technical working group
UIP	User interface platform
UMTS	Universal Mobile Telecommunication System
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations International Children's Emergency Fund
UN OCHA	United Nations Office for the Coordination of Humanitarian Affairs
URI	Urban Research Institute
UPT	Polytechnic University of Tirana
USAID	United States Agency for International Development
WFNA	Women Founders Network Albania
WIGOS	WMO Integrated Global Observing System
WIPO	World Intellectual Property Organisation
WIS	WMO Information System
WMO	World Meteorological Organization
ZAMG	Zentralanstalt für Meteorologie und Geodynamik (Austrian Meteorological Service)

Executive Summary

In late 2019, the Albanian Ministry of Tourism and Environment (MoTE) as the National Designated Agency (NDA) for the Green Climate Fund (GCF), in collaboration with development partners came up with a GCF country program. The NDA then requested GIZ to begin the project development for a proposal in the field of Climate Services, Early Warning and Climate Risk Management. This document contains the information and project design elements compiled during the Pre-feasibility study that serve as the basis for the development of the GCF project Funding Proposal (FP) “ALBAdapt: Climate Services for a Resilient Albania”.

With a population of 2.8 million and a land size estimated at 28,748 km², Albania lies in the west of the Balkan peninsula. The surrounding steep mountains (in the north, east and south) that transition into coastal lowlands towards the Adriatic in the west and the Ionian Sea in the south influence Albania's Mediterranean climate, which is characterised by hot and dry summers and almost half of annual precipitation is falling during mild winters. However, the Albanian climate is changing. Temperatures are rising and the frequency and intensity of heat waves are increasing. Precipitation in summer is decreasing, while winter months are projected to see an increase in precipitation, including increased frequency and intensity of torrential rain. Albania already ranks highest in terms of overall disaster risk amongst all European countries, due to very high exposure to extreme natural events – a situation that is further exacerbated by climate change.

Particularly in the low-lying coastal area, all three factors – hazard, exposure, and vulnerability – combine to form a significant risk from climate change. Climate related hazards will affect the coastal zone in multiple ways, including through impacts on the key sectors of agriculture and tourism. Already today, climate-related hazards are hitting many individuals unprepared – a future increase in their frequency and intensity will not only cause loss and damage to infrastructure but amplify the risk of injury and preventable death among population, especially among vulnerable groups. In addition to direct anthropogenic pressure, coastal ecosystems as well as their livelihood and protective services are increasingly affected by climate change. The project will put in place a comprehensive suite of measures to remove identified barriers in order to achieve the project objective and, ultimately, address the climate problem.

The project's objective is to increase the adaptive capacity and climate resilience of Albania's coastal zone through the generation, coordination, uptake and effective use of climate information and services (CIS), as well as by strengthening climate risk management capacities (Outcome). The project will contribute to the GCF results framework (fund level impacts) by enabling increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions, as well as increased resilience of infrastructure, the built environment and ecosystems and their services to climate change threats.

1. Introduction

1.1 The ALBAdapt Project

Albania is the most climate-vulnerable country in Europe. It is very exposed to extreme weather and climate-related events, a situation that is being further exacerbated by climate change. Future increases in the frequency and severity of floods and droughts, and secondary impacts such as landslides and wildfires, are forecast. Albania's economy is unusually dependent upon climate-sensitive sectors: agriculture accounts for 20% of GDP and employs ~60% of the workforce, 99% of electricity is generated from hydro-power, and tourism accounts for 8% of GDP and 38% of total exports. While everyone is at risk, climate impacts are particularly acute for people living in the coastal zone, where agriculture and tourism are highly vulnerable.

Albania's capacity to cope with climate impacts is hampered by an inability – of the government and of other stakeholders, notably the private sector – to produce high-quality, science-based information and to translate this information into warnings and decision support tools to reduce climate risks facing vulnerable communities and sectors. Albania is the only country in Europe that does not have a dedicated 24/7 national meteorological and hydrological service (NMHS). There is no national framework for climate services (NFCS) that engages stakeholders and provides the space for co-production and facilitation of better climate risk-informed decisions and solutions, including ecosystem-based adaptation. There is little innovation in service provision, with the result that impact-based forecasting and forecast-based action, for example, have not yet been adopted in Albania. Linkages with regional hydro-meteorological programmes and initiatives are weak, despite the enhanced forecasting and early warning capabilities they offer – and the reciprocal benefits they would receive from improved Albanian hydro-met observations and data-sharing.

Links between the NMHS and the early warning system are currently administratively and operationally weak. Effectively, there is no single multi-hazard early warning system (MHEWS) and the partial, fragmented system that currently operates is not sufficiently 'joined up' with the NMHS. Moreover, Albania's early warning system is not truly multi-platform, is inefficient and offers little certainty that all individuals, particularly vulnerable individuals, will be reached in a timely manner.

The ALBAdapt project will increase the adaptive capacity and climate resilience of Albania, through generation, coordination and effective use of climate information – in the form of a functional NMHS and NFCS – and a people-centred MHEWS that enables economic sectors and local communities (including vulnerable groups) to undertake actions in advance of, in anticipation of and in response to tailored warnings disseminated across multiple channels, including mobile telecommunications.

Component 1 of the project will implement foundational activities that support the development of a strengthened NMHS, accompanied by complementary platform services: a national climate information system (NCIS) and a user interface platform (UIP). Component 2 will put in place a robust, people-centred MHEWS that is strongly coupled to the NMHS and which supports the first steps in transitioning to impact-based forecasts and forecast-based action (FbA). Component 3 will support two critical aspects of climate investment: (i) private sector engagement with, and innovation in, climate services, and (ii) investment in nature-based adaptation solutions – ecosystem-based adaptation (EbA) / eco-disaster risk reduction (eco-DRR).

The ALBAdapt project will, inter alia: strengthen the capacities of the institutions involved in collecting and processing hydro-meteorological data in Albania and, equally crucially, fundamentally transform the institutional underpinnings of the NMHS and MHEWS to enhance clarity of roles and responsibilities, and to facilitate information exchange in a truly 'joined up' system; begin the process of mobilising private sector involvement in the provision of climate services, thereby partially detaching service provision from government budget constraints and introducing market discipline (user-oriented focus, dynamic adjustment, profit-seeking motivation) into the hydro-met sector; and improve the usability and usefulness of the hydro-met and early warning systems, thereby cementing their importance to policy-makers, local communities and end-users.

1.2 Background

In 2019 a call for project ideas was opened by the Albanian National Designated Authority (NDA) with the aim of bringing together all interested parties to form a country program (CP) for the Green Climate Fund (GCF). During March-April 2020 a series of hearings and presentations were organized which resulted in a consolidated GCF CP, including GIZ's idea for Early Warning Systems (EWS) / CI. Following this development, the Albanian NDA for the GCF, the MoTE (represented by Dr. Ornela ÇUÇI, the deputy minister), officially approached the GIZ project Climate Change Adaptation through Flood Risk Management in the Western Balkans (CCA WB, funded by the German Federal Ministry for Economic Cooperation and Development, BMZ) to develop a fully-fledged GCF proposal on Climate Information and Early Warning System (EWS) (Figure 1). A project development team was established, consisting of CCAWB, the GIZ Business Development Unit for the GCF (Business Development Unit – GCF) as well as internal and external experts. The envisaged objective of the project is to strengthen the adaptive and climate risk management capacities of state and non-state actors in Albania through the demand-driven generation and application of CIS for climate-resilient development.

The project idea was presented at the GIZ GCF Project Approval Committee (PAC), which supported the project concept and approach, and thus the further development of a project the CN. The idea was included in the Entity Work Programme of GIZ by the GCF. During various consultations with the NDA and Albanian partner organisations, the commitment of the Government of Albania (GoA) to the project was confirmed. The project development team has also consulted other donor agencies and international institutions. This Pre-feasibility study lays the foundation for the project funding proposal.

Figure 1: Chronology of the project idea development and internal processes timeline



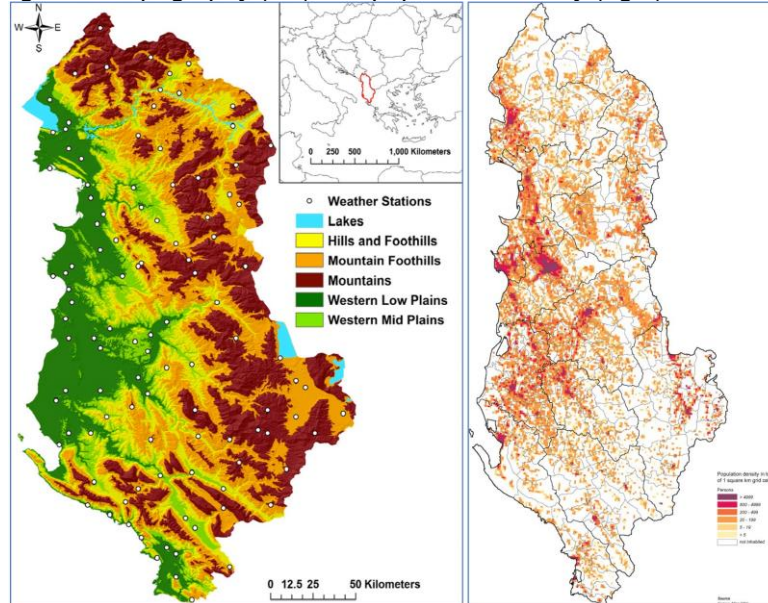
Source: Own elaboration

2. Context

2.1 Geography

With a population of 2.8 million and a land area of approximately 28,700 km², Albania lies in the west of the Balkan peninsula. The country is surrounded by steep mountains in the north, east and south, and coastal lowlands in the west adjacent to the Adriatic Sea. Forests occupy 36% of the land area, accompanied by arable land (24%) and pastureland (16%). The hydrological system consists of 11 principal rivers, 152 tributaries, 4 large lakes and 247 small lakes (NCPA, 2022). More than 97% of the population lives within 100 km of the coast (Figure 2) and two-thirds in urban areas (World Bank Data Bank, 2023b). The country's Mediterranean climate is characterized by mild winters (during which almost half of annual precipitation occurs) and hot, dry summers.

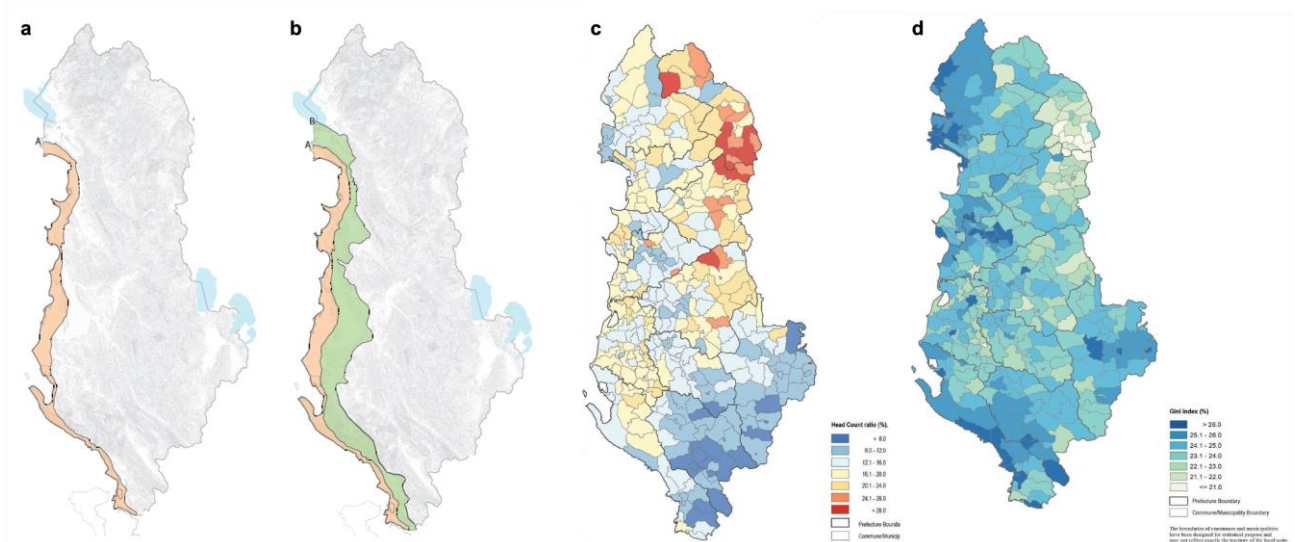
Figure 2: Topography (left) and population density (right) of Albania



Source: Teqja et al., 2018

In general, Albania's climate is typical for a Mediterranean country, with warm, dry summers and rainy winter months. With increasing distance from the coast and higher elevation, the climate becomes more continental. The coastal belt plays a prominent role in the country and is only one of two zones – the other being the Tirana-Durres zone (which is, itself, located largely in the coastal belt) – that has an integrated cross-sectoral plan (Pasko, 2016). The coastal belt accounts for approximately one-third of the national territory, half of the population and 37% of GDP (National Territorial Planning Agency and Ministry of Urban Development, 2015). The coastal belt, and notably Durres County, has the highest population density in the country, with a density 20 times higher than that of the mountainous north (UNECE, 2018). The coastal belt plays a disproportionately important role in the context of tourism and agriculture. Two of the country's principal tourist destinations, Vlora and Durres, are located in the 'urban strip' of the coastal belt (Figure 3) (Republic of Albania Institute of Statistics, 2019) and the sector is expected to continue growing by over 4% per year until 2030 (Mani et al., 2022). One-quarter of the coastal belt is agricultural land, representing two-thirds of all cultivated land in Albania, 60% of its fruit trees and 75% of its vegetable production (World Bank, 2022a). Most farmers (about 74%) are smallholders who cultivate cereals, fruits, vegetables and fodder on farms averaging 1.2 ha in size (FAO, 2018a). Because of its mixed urban / rural character and sustained in-migration from poor upland areas of the country over the past 2 decades, the coastal belt is characterized by high levels of income inequality. It is also extremely vulnerable to climate change.

Figure 3: The coastal belt: (a) urban strip, (b) agricultural strip, (c) poverty head count, (d) poverty gini coefficient



Source: National Territorial Planning Agency and Ministry of Urban Development, 2015

2.2 Demographics

The current demographic trend for Albania shows that the population will decrease in the upcoming years. In 2019, the Albanian population was estimated at 2.9m inhabitants and it is projected to fall to 2.7m by 2031 (INSTAT, 2020a). The most important reason for the negative trend is a comparably low fertility rate of 1.37 live births per woman in 2018 (EU-28 average: 1.59). In addition, the net migration rate continues to be negative, even though the rates today are much lower compared to the large migration waves of the 1990s (INSTAT, 2020a). Albania has seen increasing urbanisation over the past three decades and today 62% of Albania's population live in urban areas compared with 38% in rural regions (World Bank, 2019a). Urban agglomerations are mostly situated in the Albanian lowlands.

2.3 Governance

Albania is a parliamentary republic. Since 2014, local governance in Albania has been subject to a series of structural, institutional and public policy reforms. Based on the Constitution of the Republic of Albania, and subsequent legislation, the governance system in Albania consists of the central government level and the local self-government level.

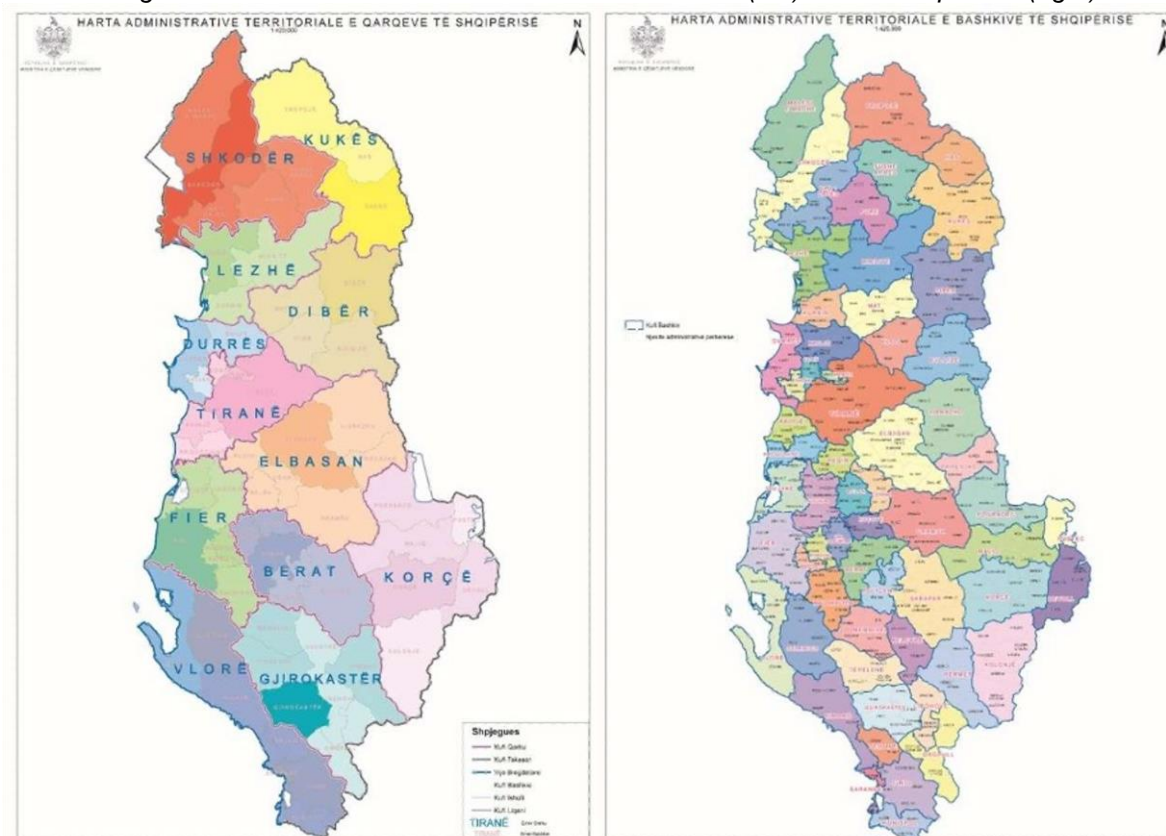
The central government acts as the highest body of executive power that stabilizes, together with other constitutional bodies of the state, political decision-making, and formulates the goals that the state intends to pursue through administrative activity. The Constitution of Albania stipulates that the Council of Ministers exercises any state function that is not given to other state or local government bodies (Article 95 point 2 of the Constitution of Republic of Albania).

The second governing level is the local self-government level. In 2014, the new Law on Territorial Administrative Reform (TAR) was adopted, consolidating 373 Local Government Units (LGUs) into 61 municipalities while reconfirming the 12 districts (Figure 4). The consolidation of local self-government units through the administrative and territorial reform was accompanied by the approval of a new law on local self-government, a new strategy for decentralization, and the devolution of some new functions to the local level.

Following the dissolution of the Socialist Republic in 1991, Albania has sustained strong economic growth, growing from the poorest nation in Europe in the early 1990s to middle-income status in 2008 (Lleshaj and Bezo, 2021)– albeit with a GDP per capita that is still only one-third of the EU average

(Albanian Daily News, May 2023). Albania ranks 67 on the Human Development Index (out of 191 countries), placing it in the bottom five European countries (UNDP, 2022b). The services sector – notably tourism and remittances from abroad – contributes 54% of GDP, followed by industry (24%; notably, food processing, textiles, cement, chemicals, energy and mining) and agriculture (22%; livestock, field crops such as wheat and maize, and fruit production).

Figure 4: Administrative division of Albania: Counties (left) and municipalities (right)



Source: Law No.115/2014: On the territorial administrative division of local governing units in the Republic of Albania

The idea that local and regional development policies can be more effectively addressed at the sub-national level is now widely accepted in Albania. Local administrations, with the level of autonomy they enjoy, are important actors in local economic development. Local government ensures governance at a level as close as possible to the citizens through recognizing the existence of different identities and values of communities, respecting the fundamental rights and freedoms of citizens sanctioned in the Constitution or other laws, choosing different types of services and local public facilities for the benefit of the community, the effective exercise of functions, competencies and tasks by local government bodies, the provision of services in appropriate forms and the effective promotion of community participation in local government.

The 2015 Law on Local Self-Government (Law no. 139/2015, On Local Self-Government (LSGL)) substantially increased the role of democratically elected local governments in Albania by assigning to them a number of new functions. These included civil protection and firefighting, irrigation and drainage, providing counselling services to farmers, and managing and maintaining forests, pastures, and rural roads. Article 27 of 2015 Law no.139, indicates that municipalities are also responsible for the creation and administration of local grant schemes for agriculture and rural development, funded from the local budget and / or co-financed by third parties, guaranteeing gender-balanced access. In parallel, the National Cross-Cutting Strategy for Decentralization and Local Governance 2015-2020 (NCSDLG), approved in 2015 (Council of Ministers Decree (CMD)), is driven by the ambition of empowering new

municipalities through the establishment of efficient systems at local level, enabling the latter to improve the quality of public services, local democracy and sustainable development of new territories.

Complementing the legislative framework with a law dedicated to local finances was of particular importance for local governments. Nevertheless, while the available financial resources to the 61 municipalities are assessed to have followed an upward trend, their allocation seems to have had different effects on local economic development. So far, the decentralization process has been accompanied by increased social and economic disparities at the municipal, county and regional level, depending on the size of the municipalities, characteristics of the institutions of local governments, sources of revenues and other particularities, demonstrating the need for further reforms that can improve and lead to a more appropriate decentralization that strengthens local capacities and can be tailored to local needs. This means transferring competencies and responsibilities that recognize special legal status, transferring competencies based on the capacities and skills of municipalities, and strongly supporting fiscal decentralization (such that similar municipalities might have similar rights in raising revenues and expenditure assignments).

It should be stated that transfer of different competences in the framework of the decentralisation process still needs to be associated with proper funding and support from the national government. A clear case to illustrate this are the new responsibilities that LGUs have from the new law on Civil Protection (45/2019), Article 30 which are associated with additional budget support.

Funds allocated from central government to LGUs include:

- Conditional transfers from central government based on objective criteria and priority ranking of the needs of the local self-government unit, economic conditions, infrastructure requirements, as well as on the development strategies at the national and regional level. These funds are very important and have a direct impact on the local budget, mainly for investments and public services performed by these units.
- Unconditional transfers from the central government to LGUs to finance self-operation, as well as for achieving equal distribution of financial resources between local self-government units. Unconditional transfer is assigned as a fixed percentage of public income, as defined by a law governing local finances, and distribution according to the formula prescribed by law.

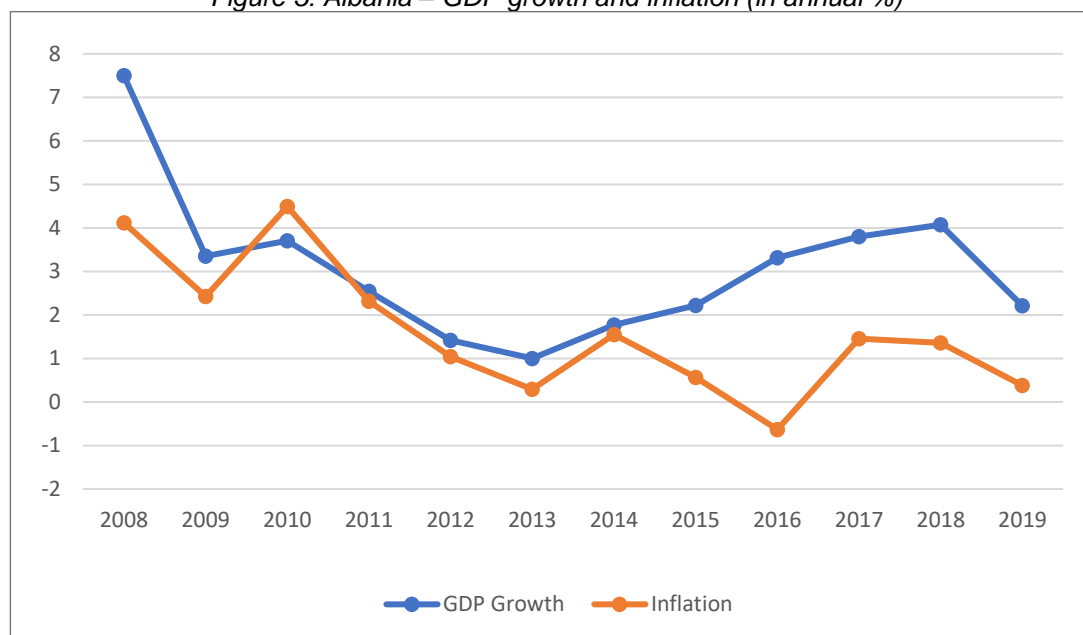
It is mainly a distribution system based on the formula which is annually approved by the annual law of the state budget. The LGUs can spend unconditional transfers according to their own priorities.

2.4 Macroeconomic Situation

Following the dissolution of the Socialist Republic in 1991, Albania has sustained strong economic growth, growing from the poorest nation in Europe in the early 1990s to middle-income status in 2008. Albania's Gross Domestic Product (GDP) is US\$ 19.3 billion (2022) (World Bank Data Bank, 2023a). Albania ranks 67 on the Human Development Index (out of 191 countries), placing it in the bottom five European countries (UNDP, 2022b). The services sector – notably tourism and remittances from abroad – contributes 54% of GDP, followed by industry (24%; notably, food processing, textiles, cement, chemicals, energy and mining) and agriculture (22%; livestock, field crops such as wheat and maize, and fruit production).

Albania has experienced years of continuous growth in the last decade, with Gross Domestic Product (GDP) growth exceeding inflation for all years since 2011. After being badly hit by the global financial crisis in 2008, GDP growth slowed down from +7.5% in 2008 to +1% in 2013 (Trading Economics, 2020). It recovered after 2013 and reached its peak of +4.1% in 2018 before decreasing again to +2.2% in 2019 and -3.7% in 2020 (World Bank, 2020a).

Figure 5: Albania – GDP growth and inflation (in annual %)



Source: World Bank, 2020b

Despite the progress in economic growth in recent years (before the Covid-19 pandemic), GDP per capita is still low compared to its European neighbours. While GDP per capita stood at EUR 27,780 (on average) in 2017 in the EU-28 countries, GDP per capita was EUR 4,024 in Albania at the same time (Ministry of Health and Social Protection of Albania; Institute of Statistics of the Republic of Albania, 2020).

As shown in Table 1, agriculture is still a particularly important sector of the Albanian economy. It accounts for 36.7% of total employment and generates 18.5% of value added of GDP in 2019. Most farms are family-owned, and farm production is mainly used for self-consumption (UN, 2020a). A considerable share (20%) of workers, are employed in industry. Nevertheless, the services sector is now the most important sector, accounting for 43.3% of total employment and 48.6% of value added of GDP.

Table 1: Albania - employment and value added by economic sectors in 2019

Economic Sector	Employment (in % of total employment)	Value added (% of GDP)
Agriculture	36.7	18.5
Industry	20.0	20.2
Services	43.3	48.6

Albania's current account deficit stood at 8% of GDP in 2019 and reflects the country's high reliance on imported goods. It can already be observed that the Covid-19 pandemic has had a negative effect on the current account balance, which raises serious concerns about the future prospects of Albania's external competitiveness (IMF, 2020b).

It remains to be observed what lasting effects the Covid-19 pandemic will have on the Albanian economy; the latest outlook published by the International Monetary Fund (IMF) in October 2020 projects a GDP growth rate of -7.5% for 2020, which would represent the first year of negative growth since 1997 (IMF, 2020d). The Albanian Government responded quickly with the objective of containing as much as possible the spread of the pandemic and avoiding exponential growth of infection rates which, given the fragile state of the Albanian health system, would have been disastrous.

The first and immediate response of the government was characterized by extensive rigorous public health measures during the first two months of the epidemic. In order to protect the population and businesses during the pandemic, the Government enacted a fiscal stimulus package in the form of two

sets of economic policy measures consisting of budget spending, sovereign guarantees and tax deferrals. The fiscal packages, amounting to about 2.8 per cent of GDP, also included a mixture of tax moratoriums, loan guarantees and wage subsidies for those businesses and individuals in dire economic distress. These fiscal measures have been adopted on top of the existing earthquake relief and recovery package included in the 2020 budget, totalling 1.2 per cent of GDP.

In addition to fiscal measures, monetary policy and macroeconomic measures were taken to further support the economy and to alleviate the impact of the pandemic. In March 2020, the Central Bank of Albania cut the interest rate to a record low of 0.5 per cent from 1.0 per cent and allowed borrowers affected by the pandemic to postpone their debt service payments. Despite the measures taken by the Albanian Government to tackle the crisis, a recent assessment by the World Bank (WB) reveals that extreme poverty in Albania could double in the short term, assuming self-employed people lose 100% of their incomes and wage employees lose 50% in affected sectors. Without response measures, poverty could increase from 40% (yearly average) to 44% (based on the two scenarios), which is equivalent to the situation back in 2012 and 2005. The WB's modelling suggests that the Albanian economy contracted by five percent during 2020, creating further pressure on public debt and fiscal vulnerability while enhancing the risk of workers losing their incomes, particularly in the most affected sectors such as tourism and hospitality, manufacturing, and non-essential trade.

In the second quarter of 2020, the recession deepened to an economic contraction of 10.2%. This was mainly driven by a contraction in investment, private and public consumption as well as a large fall in exports of 35%. This drop may be explained by the large share of Albania's exports to Italy (48%), which itself fell into a notable recession of almost 18% in the second quarter of 2020 (OECD, 2021).

Tourism, which accounts for more than 20% of Albania's GDP, was one of the most affected sectors during the pandemic. In July 2020, the number of foreign tourists was found to have decreased by 61.5% compared to last year (OECD, 2021). Some of the reasons that make the Albanian economy so fragile and so heavily impacted by the pandemic situation are:

- The reduction in tourists coming from abroad: Only 20% of the expected foreign tourists arrived in Albanian destinations in 2020 (OECD, 2021);
- The close ties Albania has with the Italian economy, which has itself been badly hit by this crisis. Imports and exports with Italy have decreased considerably
- The decrease of remittances from the Albanian diaspora, which are an important source of funding for Albania (World Bank, 2020b);
- The importance of the informal sector. Informal workers have been, and continue to be, particularly at risk during the crisis. Their limited access to social security schemes got amplified by being left out of the government salaries support package.

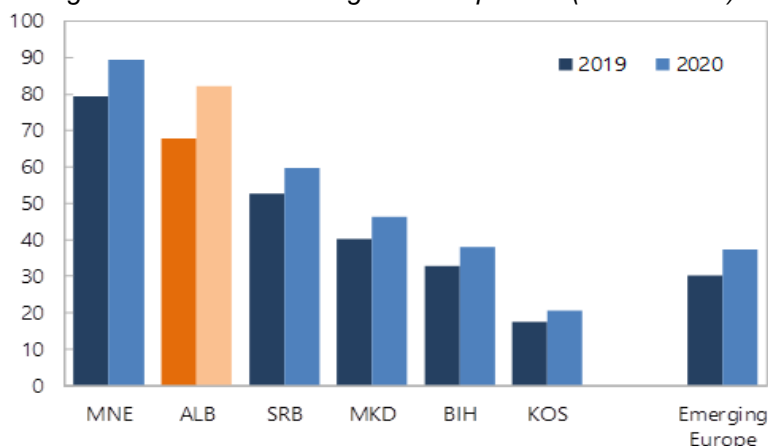
According to the American rating agency Standard & Poors, Albania is ranked among the 15 countries most affected by the pandemic (Standard and Poors, 2020). Based on the tourism development strategy in Albania 2019-2023, tourism directly provides 8.5% of GDP and indirectly up to 26.2%. The sector directly employs 93,000 and indirectly about 291,000 people. According to the government data stated in the strategy, the number of tourists in a year is estimated at over five million people and was increasing by about 17-20% per year (Ministry of Tourism and Environment, 2018). Prof. Dr. Arben Malaj, in an interview for Faktoje.al, states that the negative impact on tourism will, in turn, affect agriculture, which provides 18 percent of GDP as well as income for the rural population (approximately 40% of the Albanian population) (Faktoje.al, 2020). The decrease in number of tourists will also lead to a reduction in the consumption of agricultural products, as well as a reduction in agro-tourism and agribusiness.

2.5 Public Finances

Before Albania was hit by a severe earthquake in 2019 and prior to the on-going Covid-19 pandemic, considerable progress had been made regarding the enhancement of the country's public finances. Its relatively high level of public debt fell from 73.3% of GDP in 2016 to 67.8% of GDP in 2019 (IMF, 2020a). For 2020, however, the twin crisis substantially weakened the outlook for the state of Albania's public finances and the IMF estimates that government debt will rise above 80% of GDP in 2020 (see Figure

6) (IMF, 2020b). As a result, Albania will experience the largest absolute percentage increase in public debt compared to other countries on the Balkan peninsula.

Figure 6: Public debt - Regional comparison (in % of GDP)



Source: IMF, 2020b

Furthermore, it is projected that the fiscal deficit will increase to around 6.8% of GDP in 2020 and the budget for 2021 predicts a deficit of 6.5% of GDP (IMF, 2020d). Both indicators demonstrate that Albania's ability to independently implement fiscal measures is limited and likely to decrease in the short- to medium-term.

The Albanian currency, ALL, depreciated by almost 7% by the end of March compared to the start of the year. However, the currency slowly became more stable, and remained at the average rate of ALL 124 per euro (EUR) in Q3, close to last year's average of ALL 123 per euro. The depreciation of ALL against EUR and the strong increase in food prices caused the Consumer Price Index (CPI) inflation rate in Albania to pick up from 1.4% in 2019 to 1.9% in 2020 Q2, although still below the 3% target (OECD, 2020).

Albania's banking sector, consisting of 16 banks, continues to be dominated by institutions with foreign shareholders - mostly Italian, Austrian, Greek, or Turkish. In total, foreign institutions account for around 90% of bank assets. The country's three largest banks manage almost 60% of bank assets. Overall, the global financial crisis and the euro crisis have had relatively little impact on the Albanian banking sector and the Albanian banking sector is considered well capitalized. The Albanian banking system continues to be burdened with non-performing loans. Lending to the private sector is developing slowly despite the decline in interest rates.

Foreign investment is a key driver of growth and employment in Albania but continues to require a significant improvement in the business and investment climate. This is particularly due to the significant improvement in the category for obtaining construction permits, but there was also clear progress in the categories for electricity supply and the payment of taxes. In comparison with other Central and Eastern European economies, Albania ranks 16th out of 25: ahead of Kosovo and Bosnia-Herzegovina, but behind Croatia, Serbia, Macedonia and Montenegro.

2.6 Market Environment

Even thirty years after the end of communist rule, its legacy is still visible, and the competitiveness of Albania's economy continues to display major deficiencies. As in many other previously communist countries, trust between citizens and the government is low. This has dire consequences for entrepreneurial activities: it can be observed that there is a widespread lack of motivation to follow entrepreneurship as a career choice and, consequently, there is limited exposure to successful and innovative businesses that can act as role models. In addition, corruption and widespread informality further hamper entrepreneurship activities and access to finance is difficult for start-ups as only very little support is available from public funds.

The Albanian start-up sector has stagnated and, for the last few years, no significant growth in numbers of innovative start-ups with potential to disrupt the Albanian market has been measured. The Government has not been able to reverse this trend and revive the business sector due to very limited resources in terms of financial and technical support. Overall, the Albanian start-up support ecosystem has been developing slowly. While most support organisations are concentrated in Tiranë, NGOs have assumed the role of private sector development organisations in the regions. Initiatives to set up accelerators or incubators in the classical sense are in their infancy outside of Tiranë. In addition, Albanian support organisations are all fighting for a share of the very small start-up market and are disproportionately focused on their own survival rather than on helping start-ups (Hach and Trenkmann, 2019).

University-industry / private sector collaboration is currently very low, with both sides not recognizing the potential to cooperate. The fact that the government is slowly realizing the potential of start-ups for Albania's economic growth is currently demonstrated by the development of a legal framework for start-ups. The start-up ecosystem can be described as nascent, with most activities being at the "Awareness & Inspiration" (pre-ideation and a little in the ideation) phase. Especially in the regions, the start-up ecosystem remains underdeveloped. To compete with regional partners and the overall European start-up ecosystem, it is fundamental that the Albanian start-up ecosystem takes the plunge and moves into the "Awakening & Manifesto" phase (Hach and Trenkmann, 2019).

On the bright side, Albania's population is very young with a median age of 36.2 years, strong foreign language skills and a high output of university graduates. Additionally, it has a large diaspora (1.4m Albanians live abroad) that could support domestic development through funds and knowledge (Tabak and Borkovic, 2019), (Hach and Trenkmann, 2019).

2.7 Labour Market and Gender

The Albanian economy continues to be characterized by high unemployment. According to official data, the unemployment rate in 2020 was 12.2% and the employment rate was 60.6% nationwide, but with 21.5% the unemployment rate is significantly higher among young people. Although more people tend to be unemployed in rural areas than in urban ones, Vlorë (16.6%), Tiranë (13.8%) and Durrës (13.0%) also register high proportions of unemployed. When assessing these figures, the phenomena of underemployment and hidden unemployment must be taken into account. On a positive note, the government's efforts last year to formalize the national economy increased the employment rate by 8.5%.

The Albanian labour market is characterised by significant disparities between women and men. In 2018, the labour force participation rate of working-age Albanian women was 17.2 percentage points lower than for men (59.7% compared to 76.9%) and the employment rate was 12.3 percentage points lower (52.4% compared to 66.7%) (INSTAT, 2020a). The main reason for this gap is that Albanian women are primarily responsible for unpaid household responsibilities, including care work and childcare. In the Time Use Survey conducted by the Albanian Institute of Statistics (INSTAT) in 2011, less than 50% of men reported unpaid work compared with over 90% of women (INSTAT, 2011). Employed Albanian women also allocate 4 hours to unpaid work in comparison to less than one hour for men (INSTAT, 2011). Finally, the official gender pay gap was 10.7% in 2018; however, it is likely that the real figure is higher, as widespread informality in the labour market leads to under-reporting of wages, especially higher wages for men, at the tax office (INSTAT, 2020b). The overall unemployment rate currently stands at around 12%, after a slight increase following the beginning of the Covid-19 pandemic and a subsequent rise in unemployment among young people (around 21.5% for 15- to 29-year-olds) (IMF, 2020b). However, the reliability of these figures is limited because of the comparatively high degree of informality in the Albanian labour market (Tabak and Borkovic, 2019).

2.8 Micro, Small and Medium Enterprises

Micro, small and medium enterprises (MSMEs) remain the backbone of the Albanian economy, generating income and creating jobs for the majority of Albania's workforce. They account for 70% of the investments and employ about 80% of all workers. Most of the MSMEs operate in the trade sector

(41.5%) and in the service sector (20%). More than 90% of all businesses can even be classified as micro-enterprises. These are mostly found in the agricultural sector (World Bank, 2018).

Based on the data from INSTAT, about 70% of value added was realized by MSMEs in 2018. While micro-enterprises are generating the highest percentage of value added in the accommodation and food services sector (69.2%), small enterprises are realizing 28.6% of value added in the trade sector. Medium enterprises are realizing the highest percentage of value added in the manufacturing sector (38.2%). According to the World Economic Forum Global Competitiveness Report, access to finance is the third greatest constraint in Albania for enterprise development and competitiveness, after tax rates and corruption. The MSME sector is generally characterized by high informality (especially in agriculture), limited availability of collateral, low levels of financial capability, and limited uptake of digital transactions.

Many farms show considerable deficits in business management, as well as in process optimization. Improvements in marketing, productivity and product organization must be expanded. Deficiencies at many MSMEs exist in creativity and innovative thinking. The smallest enterprises still have a need for customized service offerings from financial service providers. Provision of credit to MSMEs is further undermined by weak law enforcement, shallow secondary markets for collateral, and, in some instances, stringent customer due diligence and documentation policies (World Bank, 2018).

This situation is exacerbated by ongoing structural problems in the agricultural sector, such as micro-structured and sometimes unclear ownership, a lack of technical and business knowledge, and an aging population of farmers. Often, farms cannot obtain loans because land ownership issues have not been clarified. In addition, the purchase of land to operate profitably is usually not possible for the same reason. Also, there is often a lack of appropriate expertise and organizational skills to make investments. Furthermore, there is a great mistrust towards the financial sector and politics (World Bank, 2018).

Within the framework of the EU, approximation instruments such as the Instrument for Pre-Accession Assistance for Rural Development (IPARD) and farm registers and other administrative bases are being established. The aim is to cover about 30% of the estimated 300,000 predominantly small-scale farms already operating commercially, as well as to promote downstream processing of agricultural products, agricultural diversification and the development of MSEs in the rural regions that produce for the downstream processing industry or produce directly for domestic and export markets.

Of the estimated 300,000 predominantly small-structured, agricultural businesses, only a very small percentage are formalized. 60% of jobs depend on the agricultural sector (about 20% Gross National Product (GNP) contribution), which is why, despite all the difficulties mentioned above, attempts are being made to encourage farmers with clarified land ownership to invest by means of investment promotion measures and the offer of up to 50-65% subsidized grants in the form of micro-credits, thus substantially improving their productivity and economic situation. To ensure that farmers' business plans also lead to higher profitability, integrated training concepts are developed together with the private and government extension sector, which, in addition to technical and financial management know-how, also aim to promote production communities and contract farming models (World Bank, 2018).

In order to promote (economic) development also at the decentralized level, the Albanian government has promoted a model for regional economic development and has started some reform to improve the business environment. The institutions established as part of this reform have now been established and are beginning to implement their first projects. A one-stop shop was set up for swift and inexpensive registration of new businesses. E-procurement has been introduced. Various administrative issues can be resolved online. Tax procedures have been simplified. Recent policy measures have mainly focused on entrepreneurship, 'second chance', 'responsive administration' and skills and innovation. However, the underlying law has not yet been introduced into the parliamentary process, which has, to date, resulted in a lack of penetration and sustainability of these structures. Strengthening financial sector infrastructure as well as the legal and regulatory framework for secured transaction and credit reporting could support an expansion of lending to MSMEs.

Measures include the creation of an enabling legal framework allowing for the development of private credit bureaus and alternative data processors with appropriate data and consumer protection safeguards. The availability of a wider range of financing instruments that meet the varying needs of

MSMEs should be further enhanced. Microfinance institutions (MFIs), the second largest providers of finance, especially in rural areas, face difficulties in either accessing affordable wholesale funding or appropriate risk sharing mechanisms. Financial leasing is limited mainly to motor vehicles, with a weak secondary market for repossessed equipment presenting the biggest constraint for its development. Venture capital funds and/or angel investor networks that would target start-up or scale-up ready MSMEs are also missing. Accounts receivable based finance (e.g., factoring or invoice discounting) is barely practiced (World Bank, 2018). The Government appears committed to improve MSME finance to support MSMEs' contribution to economic growth, but better coordination and structure is needed to facilitate implementation of initiatives and regulatory reforms. Additionally, lack of consolidated and reliable data on MSMEs presents an obstacle to the efficient prioritization and implementation of MSME development policies, including on access to finance.

3. Climate Change Policy and Risk Governance

The ALBAdapt project supports the Government of Albania (GoA) in its efforts to improve its national meteorological and hydrological services to develop an effective Multi-Hazard Early Warning System (MHEWS) for climate-related events and related hazards, and to promote green infrastructure development for effective climate adaptation. The project reinforces the government's efforts to support the **UNFCCC** and the **Paris Agreement** (United Nations, 2015), as well as the **Sendai Framework for Disaster Risk Reduction**, especially Priority 4 (invest in people-centered early warning systems), and the **Sustainable Development Goals**.

3.1 Institutional Context

The **Ministry of Tourism and Environment** is responsible for matters relating to the environment, climate change and the sustainable management of natural resources. MoTE serves as the focal point for international environment conventions, including the United Nations Framework on Climate Change (UNFCCC), as well as serving as the National Designated Authority (NDA) for the GCF and the Political and Operational Focal Point for the Global Environment Facility (GEF). MoTE is the lead institution for the National Climate Change Strategy and chairs the Inter-Ministerial Working Group on Climate Change (IMWGCC) (Ministry of Tourism and Environment, 2018).

Albania's **National Meteorological and Hydrological Service (NMHS)** is tasked with providing public weather forecasts and warnings – typically characterized by the acronym CIEWS, for climate information and early warning systems – as well as agro-meteorological, hydrological and climate services. The Institute of Geosciences (IGEO) serves as Albania's NMHS, with complementary – and, in some cases, overlapping – support provided by Albcontrol Meteorological Service (Albcontrol MET) and the Military Meteorological Service (MMS) of Albania.

The **Institute of Geosciences (IGEO)** is a unit of the Polytechnic University of Tirana (UPT) and acts under the Law on Higher Education and Scientific Research in Higher Education Institutions (2015). Formerly known as the Institute of Geoscience, Energy, Water and Environment (IGEWE), the mandate and duties of IGEO are defined in a dedicated order (Order IGEO, 2011). Other regulatory frameworks applicable to the duties of IGEO include the Law on Civil Protection (2019) and the Law on Climate Change (2020) – see below. The Director of IGEO serves as Albania's representative at the World Meteorological Organization (WMO). IGEO is responsible for a network of 83 synoptic surface stations, of which 63 are manually operated; however, a considerable number of these stations are non-operational. IGEO has received, and continues to receive, support from a range of international organisations, among them the German government through the European Commission, USAID, the World Bank (GFDRR), UNDP, JICA, GIZ and others.

Albcontrol, formerly known as the National Air Traffic Agency, manages and controls the airspace of Albania. Albcontrol was created in 1992 as a state-owned enterprise and was restructured as a state-owned joint stock company in 1997. The Meteorological Directorate (Albcontrol Met), one of 17 operating units, is responsible for operating automated weather observing systems (AWOS) at Tirana and Kukës airports. Albcontrol Met produces regular 24-hour terminal aerodrome forecasts (TAFs) and local area forecasts (LAFs) for defined weather parameters, as well as 7-day weather outlooks.

The **Military Meteorological Service (MMS)**, part of the Ministry of Defence, operates according to the Law for the Military Meteorological Service (MMS Decree, 2004). Using a network of 13 manual and 2 automatic weather stations, MMS produces 1-5-day weather forecasts, primarily for military users but also through commercial contracts for television and radio weather bulletins.

The **National Civil Protection Agency (NCPA)** has the central mandate for risk forecasting and prevention, civil protection and disaster risk reduction. In civil emergency situations, NCPA coordinates multi-agency responses through the National Operations Centre for Civil Emergencies (NOCCE). NCPA, which is an agency under the Ministry of Defence, was established by Civil Protection Law No. 45 (2019). It has ~60 employees, divided into six departments and four Civil Protection Regional Centres (CPRCs). NCPA is the lead institution for the National Strategy for Disaster Risk Reduction and Civil Protection.

The **Water Resources Management Agency (AMBU)** was established under the Prime Minister's Office by the Law on Integrated Water Resources Management (2018). AMBU is responsible for the good governance of water resources and the sustainability of freshwater ecosystems at the national level, while water resource management at the basin level is performed by River Basin Councils and River Basin Management Offices. Because of Albania's high dependence on hydro-electric power and its vulnerability to seasonal river flooding, AMBU manages an extensive programme of hydrological monitoring and flood risk mapping.

The **National Territorial Planning Agency (NTPA)** is the principal institution responsible for territorial planning and development. Situated under the Ministry of Interior, NTPA's legal basis is provided by Law No. 107 (2014) and Decision of the Council of Ministers (DCM) No. 427 (2016). It coordinates planning documents at local and central levels in order to ensure that plans are harmonised and mutually supportive. The General National Territorial Plan (GNTP) is complemented at national level by 2 cross-sectoral plans – the Integrated Cross-Sectoral Plan for the Coastal Belt and the Integrated Cross-Sectoral Plan for the Tirana-Durres Region – and at the local level by General Local Territorial Plans (GLTPs) and Local Detailed Plans (LDPs). GLTPs and LDPs are both developed at local (municipal) level, with GLTPs approved at the national level and LDPs by the local mayor.

The **Albanian Authority for Geographical Information (ASIG)** is a state agency established in 2013 under the Law on Organisation and Functioning of the National Infrastructure of Geospatial Information. ASIG operates under the supervision of the Prime Minister's Office (PMO) and is primarily responsible for surveying, mapping and land-use registration. ASIG maintains an Emergency Regional Risks Atlas (ERRA) and provides a related public geoportal with over 200 layers relating to (inter alia) geology, terrain, land-use, hydrology, transport networks, protected areas, etc. Environmental hazards are, however, not included and there is no automatic, or even structured, data-sharing with IGEO, NCPA or municipalities (World Bank, 2022a).

The **Albanian Development Fund (ADF)** is an autonomous public agency with a mandate to encourage sustainable, balanced and cohesive socio-economic development at municipal and regional levels. ADF provides financial assistance to municipalities and counties in the form of (inter alia) grants, loans and guarantees to improve local infrastructure, public services and institutional capacities. In the period 2016-2020, ADF disbursed Euro 480 million of financial support. ADF's principal focus to date has been on road infrastructure projects, water supply and sewerage, and urbanization; a growing area of focus is the tourism sector, where AFD is currently supporting the development of studies and intervention plans at regional level. Current and recent AFD donors include the World Bank, the European Union, the European Bank for Reconstruction and Development (EBRD), KfW and the Saudi Fund for Development.

The **Albanian Red Cross (ARC)**, part of the International Red Cross and Red Crescent Movement, was founded in 1920 and is the oldest humanitarian association in Albania. Its current activities are guided by Law No. 7864 (1994). With 80,000 members, 2,000 volunteers and 39 branches, ARC is the principal non-governmental organization that provides volunteer support for disaster prevention, preparedness and response – a role that is explicitly acknowledged in the National Plan for Civil Protection. ARC maintains disaster-trained volunteer teams throughout the country and operates an active, community-level education programme.

3.2 International Commitments

Having joined the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and being a signatory to the Kyoto protocol (2004), Albania ratified the Paris Agreement in early 2016. The country submitted its first Nationally Determined Contribution (NDC, i.e. INDC) to the UNFCCC Secretariat in 2015 (Ministry of Environment, 2016). Due to, inter alia, a lack of heavy industry and its power generation coming almost entirely from renewable energy (i.e. hydropower, a climate-sensitive energy source), Albania's Green House Gas (GHG) emissions are relatively low, amounting to only 1.6 tonnes per capita in 2015 – a value that is amongst the lowest in Europe (World Bank, 2016). The impacts of climate change, on the other hand, are substantial. The country committed "to reduce CO₂ emissions compared to the baseline scenario in the period of 2016 to 2030 by 11.5%" (World Bank, 2016; Government of Albania, 2016b). Additionally, with the amending of the NDC in the Revised

Nationally Determined Contribution, the country has increased the mitigation and adaptation goals, with the GHG objectives striving to diminish the CO₂ emissions by 20.9% within 2030.

EU accession. Albania has been an official candidate for accession to the European Union (EU) since 2014 (European Commission, 2023). In July 2022, the first inter-governmental conference between the EU and Albania took place, in Brussels. In November 2022, Albania joined the European Union Civil Protection Mechanism (EU CPM) (European Commission, 2022). Much of the legislative and institutional reform undertaken by the government of Albania in the past decade can be understood in the context of preparing the country for eventual EU membership (Beshku and Mullisi, 2018), (Kellerman, 2019). The Law on Civil Protection, for example, seeks to align Albania with European Council Directive No. 1313 (2013), 'On a Union Civil Protection Mechanism', which outlines emergency response capacities. Similarly, Albania is trying to align its flood management system with the requirements of European Directive No. 60 (2007), 'On the Assessment and Management of Flood Risks', which requires identification of potential flood risk areas, flood hazard and flood risk mapping, and flood risk management planning. Albania is judged by the EU to be making good progress on the development and reform of domestic legislation (European Commission, 2022). However, it is struggling to turn progress made 'on paper' into progress 'on the ground', largely because of limitations in technical and administrative capacity in government institutions at both national and local levels, lack of coordination between institutions, lack of finance and, ultimately, the scale of the challenge in overcoming years of inadequate attention to environmental priorities (Env.Net, 2020), (Gomes, 2019). The main path for emission reduction is through maintaining low emissions from electricity generation and, more generally, decoupling growth from increases in GHG emissions in other sectors (including transport and agriculture, two emissions-intensive sectors) (Government of Albania, 2016b).

Albania's second NDC, includes the country's adaptation priorities, by including information on "Climate Change Adaptation focused in the sectors of Tourism, Settlements and Population alongside the Coastal Zone of Albania" (UNDP, 2019). The project is aligned with the adaptation priorities set out in Albania's Revised **Nationally Determined Contribution** (NDC, 2021) (Republic of Albania, 2021). The NDC adopts a territorial focus towards adaptation in the Albanian coastal belt and the surrounding lowlands. Priority measures identified in the NDC include:

- i. Mainstreaming adaptation into sectoral, regional development and spatial planning regulations and procedures;
- ii. Awareness-raising on climate change impacts and potential solutions;
- iii. Ensuring effective co-generation and communication of (user-oriented and usable) climate information for relevant sectoral and territorial actors, including through early warning systems;
- iv. Enhancing technical capacities of public and private actors with regard to risk assessments and the design and implementation of adaptation measures based on actionable climate information; and
- v. Nature-based solutions (NbS) for adaptation approaches.

3.3 National Communications

So far, comprehensive information on climate change impacts and vulnerabilities, as well as adaptation goals, has been provided in the First (2002), Second (2009) and Third (2016) and Forth National Communication (NC) to the UNFCCC; the preparation of the Albania's First Biennial Update Report (1BUR) started in January 2019 and are ongoing. The 1BUR is expected in 2021; The Fourth National Communication (4NC) is to be finalised by December 2022 (UNDP, 2019). Early results of these processes have been included in this study. The 4NC will highlight impacts of climate change on key socio-economic sectors (energy, agriculture, tourism and health) and natural resources (with a special focus on the water sector) that have been observed during the last decade in Albania. The IPCC's new set of climate scenarios (IPCC AR 5, 2014) will be used for downscaling. A stocktaking exercise will be conducted to map out the country zones / territories that are most vulnerable to climate risks. In addition, a back-to-back study will explore the link between DRR and Climate Change Adaptation (CCA) for the development of response measures in the Vjosa river basin. The 1BUR and the 4NC will also present updated information related to Albania's financial, technical and capacity needs to address the adverse effects of climate change.

Albania's **Fourth National Communication to the UNFCCC** (2022) (Republic of Albania, 2022a) outlines anticipated climate change impacts in key areas, including crops, livestock and forestry, and disaster risks. It notes that floods, flash floods and forest fires account for more than 90% of climate-related hazards. A number of priority adaptation needs are identified, including:

- i. Mainstreaming climate change adaptation into territorial development planning;
- ii. The establishment of early warning systems for mitigation and prevention of disaster risks, and;
- iii. Application of ecosystem-based adaptation (EbA) and nature-based solutions (NbS).

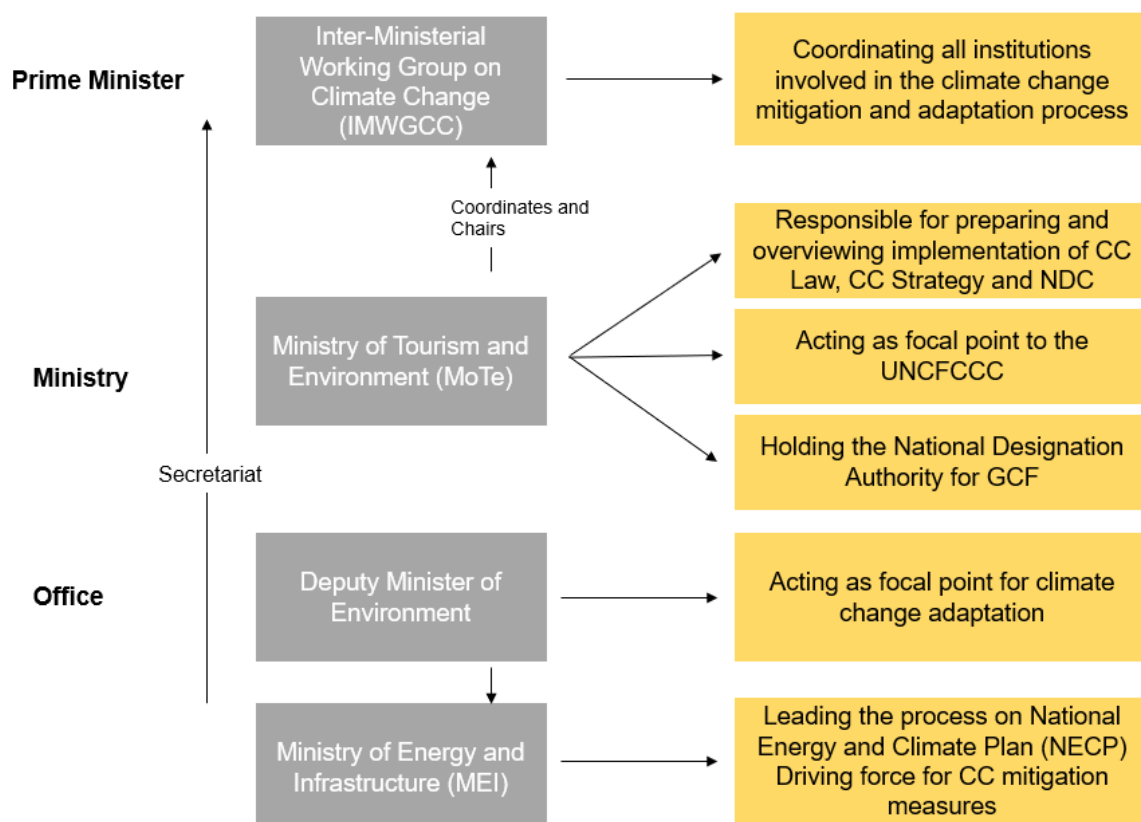
Institutional capacities, inter-institutional coordination and data collection / collation are noted as representing significant constraints on current adaptation response capabilities. The need for an improved hydro-meteorological observation network, data management and forecasting system, in conjunction with hazard monitoring, mapping, forecasting and warning functionality, is specifically highlighted (page 169). The **First Biennial Update Report** (BUR, 2021) (Republic of Albania, 2021b) identifies disaster risk management as a key requirement for Albania to adapt to climate change. The BUR also notes that Albania's legislative framework for climate change (see below) does not place sufficient emphasis on gender-related issues and that a more proactive gender approach is required. The **UNFCCC Technology Needs Assessment** (TNA, 2004) (Ministry of Environment, Forest and Water Administration, 2004) focuses on Albania's coastal belt because of its particular vulnerability to a range of climate change impacts and its economic and demographic importance. Improvement of the hydro-meteorological monitoring and forecasting system is identified as one of six priority adaptation clusters.

Besides the comprehensive NCs, several sectoral and regional studies provide climate models, impact and vulnerability assessments and identified adaptation measures, mostly as a result of donor-funded projects. However, these studies and data collection processes were not coordinated well at the national level (UNDP, 2016).

3.4 Inter-Ministerial Working Group on Climate Change

Established in 2014 by a Council of Ministers Decision, the Inter-Ministerial Working Group on Climate Change (IMWGCC, see Figure 7) is the GoA's central body mandated to promote a harmonised response to climate change, both with regards to adaptation and mitigation. It comprises representatives and key experts ('technical focal points') from 15 ministries, has the mandate to draft policies related to climate change, promote institutional coordination across ministries, and contribute to UNFCCC processes (Ministry of Environment, 2016). It thus has a key role in mainstreaming climate change. Besides being the focal point to the UNFCCC, the MoTE, mandated by the Prime Minister, chairs and coordinates the IMWGCC, whose secretariat was hosted at the Climate Change and Air Unit (established in 2016) of the MoTE (Dibra, Tafaj, and Borde, 2019), (GIZ, 2018a), (UNDP - Albania, 2016). As of September 2017, the Climate Change and Air Unit was dissolved due to the government restructuring, leaving the MoTE without a designated unit dealing with climate change issues – a development that has the potential to jeopardise the climate agenda of the country. The limited human resources and related structures responsible for climate change are increasingly recognised by the donor community and civil society active in the sector (European Commission, 2018a), (European Commission, 2019a), (European Commission, 2020).

Figure 7: Climate governance structure of Albania



Source: Own elaboration

3.5 Law on Climate Change

Albania embarked on a National Adaptation Plan (NAP) process in 2014 and adopted a National Climate Change Strategy (NCCS; for both, see more details below) as recently as 2019. The decision by the Government of Albania (GoA) to draft and eventually enact a stand-alone “Law on Climate Change” was an important step towards solving many of the climate change related institutional and policy issues in the country (Republic of Albania, 2016). The Law was adopted by the Albanian Parliament on 17th December 2020 (Assembly of the Republic of Albania, 2020). The purpose of the law is to contribute to the “reduction of the country’s GHG emissions” and to “accelerate adaptation to climate change with a view to mitigating the harmful effects of climate change” (Assembly of the Republic of Albania, 2020). The Law (2020) (Law Nr. 155, dt 17.12.2020) seeks to increase “the ability to adapt to the harmful effects of climate change” as well as “mainstreaming climate change into all existing and future sectoral and inter-sectoral policies and practices”. It obliges line ministries and local government units to integrate climate change mitigation and adaptation issues into their legislation, strategies, plans, programmes, and projects, particularly in the sectors of transport, energy, water, agriculture and rural development, urban development, and disaster management. The lead agency under the Law is the Ministry of Tourism and Environment (MoTE), which chairs the Inter-Ministerial Working Group on Climate Change (IMWGCC). The Institute of Geosciences (IGEO), formerly known as Institute of Geoscience, Energy, Water and Environment (IGEWE), is identified by the Law as the key institution for the provision of weather- and climate-related data and information.

The law makes binding provisions for the institutional implementation of national and international commitments (GIZ, 2018a). It also clearly defines the national objectives with regards to climate change, including to increase “the ability to adapt to the harmful effects of climate change, at central, local and national level” (Article 4, Paragraph 1, Letter b), and stipulates the importance of mainstreaming climate change “into all existing and future sectoral and inter-sectoral policies and practices “(Article 4, Paragraph 2, Letter d; further specified in Article 6). Article 5 (Paragraph 1 and 2) of the law confirms the purpose of the NCCS as well as the NAP. The latter (in Paragraph 4)” establishes the framework for an ongoing adaptation process in the country and sets adaptation objectives, promotes the integration of adaptation into sectoral policies of line ministries, sets out priority measures and organizes the responsibilities and mechanisms of cooperation within the adaptation processes.”

The MoTE is tasked with monitoring as well as evaluating and revising the above strategies every 4 years (Paragraph 6 and 7Article 23, Paragraph 1 (Letter a-i), of the law provides for the institutional setup and inter-ministerial coordination, clarifies institutional responsibilities and aims at institutionalizing climate related data collection as well as monitoring and reporting. The law mentions the MoTE (as the UNFCCC focal point and coordinating ministry), the National Environment Agency (NEA, GHG Inventory and Environmental Information System), all relevant line ministries (obligation to collect, keep and report climate related data and information), the Institute of Statistics (INSTAT; obligation to make available to the ministry all socio-economic, population and other related data that is relevant e.g. for vulnerability risk as well as loss and damage assessments), other relevant public and private institutions, as well as municipalities that are equally obliged to “collect, organize and keep their own climate-related data together with reports on the measures taken or planned to be taken for mitigation and adaptation to climate change, as appropriate, and share them with MoTE and the relevant line ministry”. Amongst other “public or private research institutes and academia that carry out climate-related measurements, research or studies” (Letter g), the IGEO – the main agency of the Albanian national hydrometeorological service – is mentioned explicitly as an institution that is sought to provide weather- and climate-related data and information.

While the law foresees “Capacity Building, Education, Training, Public Awareness and Participation” (Articles 25-28 und Chapter V), regulates “Green investments and Financing” (Chapter VI; including “Private Sector Involvement” in Article 31 through e.g. Public Private Partnerships), and specifies relevant bylaws, it focuses primarily on the regulation of the activities related to GHG emissions and removal and their measurement, monitoring, reporting and verification (Chapter III, Articles 8-22). Besides the aspects mentioned above, adaptation does not feature prominently in the law.

3.6 National Climate Change Strategy

The NCCS, endorsed in July 2019, came after the Council of Ministers, the IMWGCC and the relevant ministries had started preparing individual strategies and action plans for climate change (Government of Albania, 2019). It presents Albania’s overarching response to climate change by effectively integrating the plans and strategies in the fields of mitigation and adaptation in one comprehensive document. An important rationale for developing the NCCS was to adhere to environmental and climate change policy and legislation requirements for EU accession (European Commission, 2016). The strategy document mainly consists of the NAP document (Government of Albania, 2017), i.e. the result of the main national planning and consultation process towards climate-resilient development in Albania (2015-2017), as well as the National Climate Change Mitigation Action Plan (Government of Albania, 2019). Similar to the NDC and the Law on Climate Change (See Figure 8), the focus of the NCCS is on mitigation of GHG emissions, as can be seen from the strategy’s vision statement:

“Recognizing that climate change represents an urgent and potentially irreversible threat to human societies, especially for the Mediterranean area, the development towards a low-carbon economy is key for the achievement of global mitigation objectives and for allowing an adaptation response of future generation at a reasonable environmental, economic and social cost”
(Government of Albania, 2019).

The project is aligned with the adaptation Priority Actions (PAs) of the National Climate Change Strategy (NCCS) and the adaptation priorities set out in Albania’s Revised NDC. The NCCS underlines:

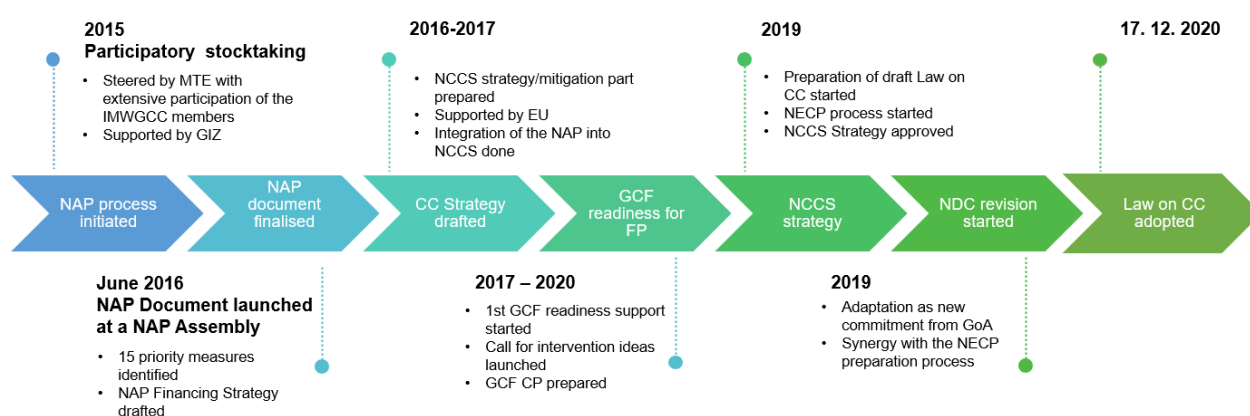
- The importance of climate information in relation to mainstreaming (PA 2);
- Climate services and information that would provide a monitoring system (PA 4);
- Cross-sector strategic action in agriculture (PA 9);
- Tourism (PA 13);
- Disaster Risk Reduction (PA 14, including early warning);
- Building ecosystem resilience through Ecosystem-based Adaptation/Nature-based Solutions (EbA/NbS) (PA 15).

The NCCS identifies six overarching strategic priorities (SPs), which are:

- **SP.1:** Ensure sustainable economic 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 for GHGs in line with EU requirements;
- **SP.3:** Strengthen the capacity of relevant institutions and inter-institutional cooperation to address climate changes issues;
- **SP.4:** Streamline climate change across sectoral strategic planning;
- **SP.5:** Reinforce capacity and awareness of climate change issues;
- **SP.6:** Align with the EU Climate Change framework across sectors.

While SP 1 and 2 only address mitigation, the remaining priorities guide both adaptation and mitigation action. SP.4 underlines the importance of successful mainstreaming as an ultimate strategic goal. The strategy document, in its chapter 4, provides information on the progress made in integrating climate change and indicates the way forward. For adaptation, the NAP process is the main process for mainstreaming climate risk and solutions for a resilient pathway.

Figure 8: Progress of climate change policy and governance, with focus on adaption over the years



Source: GIZ

3.7 National Adaptation Plan

Albania's NAP was designed as a continuous, long-lasting and cross-sectoral process. The MoTE, through the IMWGCC, coordinated the development of the NAP document and steers NAP implementation – ensuring the alignment of the outcomes with the ongoing NDC review. In fact, Albania was the first country on the Balkans to develop a NAP document in 2017 (Government of Albania, 2017). The “NAP can be understood as an umbrella, rather than a detailed operational plan specifying all actions necessary for a successful adaptation process in the country” (Government of Albania, 2019). It is guided by the principle that adaptation actions must be mainstreamed into cross-sectoral and

sectoral plans and policies. In line with this principle, the NAP document is rather concise. It provides guidance on higher level goals and indicators, process specifications, mainstreaming approaches, priority actions, financing, outreach strategies, capacity development, monitoring and revision. However, currently, due to the above-mentioned restructuring of the MoTE, coordination appears to be less intensive than in the period up until 2017, which is related to lack of human resources. Table 2 shows the overall goals and indicators and how they align with the SPs of the NCCS (Government of Albania, 2019).

Albania's National Adaptation Plan (NAP, 2021) (Republic of Albania, 2021) notes that, while climate change impacts and vulnerabilities are relatively well understood, committed action for reducing vulnerabilities is less developed. The NAP identifies three priorities – reduction of flood damage, enhanced agricultural resilience and protection of drinking water – and a range of strategic actions to achieve these priorities, including mainstreaming climate change in sectoral development and sector plans (Priority Actions 2, 7, 8, 9, 10, 13: flood protection, integrated water resources management, agriculture, health, tourism, etc.); capacity development of institutions and individuals on climate change adaptation (Priority Action 6); integrating climate change into spatial planning, notably to support the Integrated Cross-Sectoral Plan for the Coastal Belt (Priority Action 11) and municipal development plans (Priority Action 12); and implementation of a hydro-meteorological monitoring and early warning system (Priority Action 14).

Table 2: Goals and indicators of the NAP process and link to the SPs of the NCCS

Area	Goal	Indicator	Link to Strategic Priorities (SP)
Results of adaptation	<p>Goal 1: Damages through floods are reduced.</p> <p>Goal 2: Agricultural resilience against droughts is enhanced.</p> <p>Goal 3: Drinking water quality is secured for Shkodër and Fier-Vlorë Regions despite impacts from climate change.</p>	<p>Indicator 1.1: Average damages per flood event (calculated in million ALL) are reduced by five % for each subsequent period of five years.</p> <p>Indicator 2.1: Average farm outputs in yields per hectare are stable also in years with drought events.</p> <p>Indicator 3.1: Drinking water quality standards are met in all municipalities of each region.</p>	SP.6
Steering of NAP implementation	<p>Goal 4: Measures envisaged in the NAP document are reliably implemented.</p> <p>Goal 5: A 'learning process' for the NAP process is organized.</p>	<p>Indicator 4.1: A monitoring and evaluation system is established which pursues implementation status of priority actions and enables adjustments in the NAP process.</p> <p>Indicator 5.1: Assessment reports on the NAP process are released every 4 years and give recommendations on possible adjustments in the process.</p>	SP.3; SP.6
Mainstreaming	<p>Goal 6: CCA is reflected in the process of the National Strategy for Development and Integration (NSDI) formulation and implementation.</p> <p>Goal 7: CCA is being promoted in accession assistance in line with the EU climate policy objectives.</p> <p>Goal 8: Territorial Planning and Coastal Plan Regulations are directing measures for CCA to be taken by local municipalities.</p> <p>Goal 9: The Inter-sectoral Strategy for Agriculture and Rural Development (ISARD) directs resilience of agricultural production against climate change.</p> <p>Goal 10: The Integrated Water Resources Management (IWRM) Strategy and RBMP directs adaptation measures in the field of water availability.</p> <p>Goal 11: The National Energy Strategy directs adaptation measures in the field of energy production.</p>	<p>Indicator 6.1: A mechanism of regular CCA reflection is established within the NSDI implementation process.</p> <p>Indicator 6.2: At least one mainstreaming approach per year is being incorporated into a relevant sector strategy.</p> <p>Indicator 7.1: EU financial assistance within the IPA Framework is tracked in line with the OECD- Development Assistance Committee (DAC) statistical markers on climate change (Traverso et al., 2017).</p> <p>Indicator 8.1: the most vulnerable municipalities have transferred national adaptation frameworks into Local Strategies for Development and Local Government Plans.</p> <p>Indicator 9.1: Adaptation measures defined in the Inter-sectoral Strategy for Agriculture and Rural Development are being implemented.</p> <p>Indicator 10.1: CCA measures are adequately reflected in the implementation plan and process for the two pilot RBMPs.</p> <p>Indicator 11.1: Adaptation measures being defined in the National Energy Strategy are being implemented.</p>	SP.4; SP.6

Area	Goal	Indicator	Link to Strategic Priorities (SP)
Climate Financing	<p>Goal 12: Successfully access Albania's public budget for financing NAP implementation</p> <p>Goal 13: Successful project applications ensure GCF support to Albania's adaptation process.</p>	<p>Indicator 12.1: Public records prove that at least an initial US\$ 5 million of Albania's public budget is spent for NAP implementation by 01/2018.</p> <p>Indicator 13.1: The GCF has granted Albania financial support for readiness activities by 12/2016.</p> <p>Indicator 13.2: One proposal of relevance for the Albanian NAP implementation is approved by the GCF at the 03/2018 Board Meeting.</p>	SP.3; SP.5
Communication and outreach	Goal 14: The public is informed about CCA progress.	<p>Indicator 14.1: Adaptation information is included in the new Electronic Governance and Delivery of Public Services System (envisaged by NSDI).</p> <p>Indicator 14.2: One campaign per year is conducted on relevant issues of CCA.</p>	SP.4; SP. 5
Institutional set-up and capacity development	<p>Goal 15: Actors and stakeholders involved in the NAP process are knowledgeable and skilled about adaptation issues.</p> <p>Goal 16: Institutional structures, regulations and policies in selected sectors are supporting CCA.</p>	<p>Indicator 15.1: The Carbon Capture and Utilization (CCU) as well as stakeholders of the IMWG regularly attend at least one of the NAP meetings/ year.</p> <p>Indicator 16.1: 2-5 policies and regulations of relevance for the NAP process include adaptation related provisions by 2020.</p>	SP.3

The more ‘operational part’ of the NAP comprises priority actions with strategic and leverage functions (so called ‘umbrella projects’). For each priority action (of which there are 15, including overarching actions such as ‘steering the NAP process’ or ‘climate finance readiness’, see Table 3), the adaptation plan provides

- i. The lead agency;
- ii. Description of the current situation in the field of action;
- iii. Rationale for adaptation, goals and indicators;
- iv. Substantial elements and timelines;
- v. Key resources; as well as
- vi. Required resources.

The period for achieving the goals stated in the NAP document is 20 years (until 2035). Given the scale of financing required to implement NAP priorities, a dedicated financing strategy was developed. It provides guidance as to how to finance prioritized CCA actions, considering domestic government revenue and international funds and sources (both bi- as well as multilateral) (Government of Albania, 2017). (Financing Document - not published as a separate document; it became part of the NCCS).

Table 3: NAP priority actions and CIS

NAP Priority Actions		Weather and CIS (incl. early warning) mentioned explicitly:
#	Overarching actions / implementation framework (‘umbrella’)	
1	Steering of the adaptation process in Albania	
2	Overarching mainstreaming initiative	
3	Climate finance readiness	
4	Implementation of monitoring system	x
5	Communication and outreach initiative	x
6	Initiative for capacity development for CCA	
Sector-wise and cross-sector strategic actions		
7	Climate resilient irrigation, drainage and flood protection	x
8	Integrated water resources management (IWRM)	
9	Adaption in the agricultural sector (incl. information systems)	x
10	Promote implementation of adaptation strategy for health sector	x
11	Integrated cross-sectoral plan for the coast (ICSP)	
12	Initiative for municipal CCA plans	
13	Adaptation in tourism	
14	Upgrading civil defence preparedness and DRR	x
15	Building the resilience of Kune Vain Lagoon system through Ecosystem-based adaptation (EbA)	

Source: GIZ, 2018b

In accordance with Priority Action No. 2, chapter 4.6 of the NCCS illustrates how adaptation is to be integrated in cross-sectoral strategies such as the NSDI, as well as sectoral strategies. This is supported by Article 6 of the Law on Climate Change, which– obliges line ministries and LGUs to “*integrate climate change mitigation and adaptation issues into their legislation, strategies, plans, programs and projects*” (Government of Albania, Law on Climate Change, 2020). Besides stipulating the mainstreaming into the NSDI, the sectors explicitly mentioned in the law regarding mainstreaming include transport, energy, water, agriculture, rural and urban development as well as disaster management.

3.8 Mainstreaming in Cross-Sectoral Strategies

The second National Strategy for Development and Integration (NSDI-II, 2015-2020) (Republic of Albania - Council of Ministers, 2016), the National Territorial Plan (NTP) ‘Albania 2030’, and the draft Environmental Cross Cutting Strategy (ECCS) are cross-sectoral strategies that address issues related to CCA (GIZ, 2018a). At a high level, the strategic policy pillar 4: “Ensuring growth through connectivity, the sustainable use of resources and territorial development” of the NSDI-II – Albania’s core strategic document – includes the goal of “strengthened measures on adaptation to climate change”. The NSDI

is linked with the Integrated Planning System (IPS) of Albania (operating since 2006). The project supports the Integrated Cross-Sectoral Plan for the Coastal Belt (ICSP, 2017), (PINS Bregdeti), as well as the General National Spatial Plan 2015-2030 (GNP) (ISCP, 2017 and PINS Bregdeti). The National Strategy for Development and Integration (NSDI, 2016), outlines the government's medium-term vision for national social and economic development, accompanied by a set of measures to operationalize this vision (NSDI Draft Phase III). The six identified priorities are: (i) ensuring innovative, citizen-centered good governance, (ii) integrated water management, (iii) recovery and financial consolidation of the energy sector, (iv) enhancing innovation and competitiveness, (v) land-integrated management, and (vi) structural reform of the financial system. The NSDI notes Albania's high vulnerability to floods, forest fires, landslides and droughts, and the negative impacts (frequency, intensity, spatial extent, etc.) that climate change will have on these hazards, particularly in coastal areas. Strategic Objective 5.4 of the NSDI is to strengthen the collection and organisation of hazard information and to strengthen early warning systems.

Both plans are issued by the National Territorial Planning Agency (NTPA). The General National Spatial Plan 2015-2030 (GNP, 2015) provides the reference strategic framework for sustainable territorial development until 2030, with a view to ensuring balanced national economic and social development, sound management of natural resources, environmental protection, and solutions to natural and climate risks. The GNP demands the identification and implementation of measures that reduce the consequences of extreme hazard events.

The Integrated Cross-Sectoral Plan for the Coastal Belt (ICSP, 2017) (PINS Bregdeti) manages existing risks from natural disasters, especially floods, suggests climate change adaptation measures and highlights the importance of nature-based solutions as a means of adaptation. Both plans are overseen by the NTPA.

The IPS combines policy, planning and budgeting processes for national and sectoral strategies, while the NSDI represents the overarching government's vision for national social and economic development, containing sector specific plans. A 'climate lens' was applied with the aim to adjust the NSDI's sectoral strategies for water, agriculture, energy, biodiversity, tourism, health and civil protection (NAP Global Network, 2017) (UNDP, 2016). Moreover, the NSDI refers the strategy components to the Sustainable Development Goals (SGD), including Goal 13 on climate action. However, tangible action in terms of budgeting and strategy implementation in line with the adaptation objectives is still lagging behind.

As part of the effort for cross-sectoral mainstreaming, Albania has also started working on integrating adaptation into domestic budgeting. In 2016, all line ministries were required by the Ministry of Finance and Economy (MoFE) to define and identify appropriate objectives, outputs and costs related to climate change within their budget programmes feeding into the Medium-Term Budget Programme (MTBP) 2018-2020 – the main instrument for the management of public expenditure. It started as a pilot exercise with the ministries of Agriculture, Interior, Environment and Urban Development. Moreover, the MoFE is looking into upgrading to a new financial management information system that would allow tracking and reporting of climate change related expenditures (NAP Global Network, 2017). Also, the GIZ Global Project on Climate Finance Readiness project will be looking at the integration of climate finance in public finance in Albania starting in 2021 (Table 4).

Table 4: Examples of plans and strategies into which adaption was or could be mainstreamed.

Plan of relevance for mainstreaming	Planning or review time	Strategic direction of mainstreaming	Mainstreaming tool	Comments on current status
NSDI II	June 2015	Provide framework for reflection of CCA in future development and implementation of sector policies.	Climate lens	A climate lens was applied after the finalisation of the document. There is no publicly accessible information available that provides information on the level of implementation of NSDI II, whether the consultation for the National Community Development Initiative (NCDI) III started and whether recommendations from the climate lens will be taken on board.
NTP / ICSP	March 2016	Reduce vulnerability through Plan	Climate-proofing of SEA utilize expertise from Albania's NCs to UNFCCC. Provide short CCA chapter in the document.	The CCAWB project, as part of the NAP process, supported the National Territorial Planning Agency (NTPA) in revising the Terms of Reference for the SEA development of NTP. SEA has a dedicated chapter on CCA.
Coastal Development Plan	End 2016	Link with NAP implementation mechanisms	CCA expert in team, utilize expertise from TNC and GIZ projects.	
Nat. Strategy for Integrated Water Res. Man.	April 2016	Ensure climate-resilient water sector	Climate change pursued as cross-cutting element of Nat. Strategy. Substantial inputs from current projects to ensure consistency through coordination with other CCA related approaches sector activities.	The CCAWB project provided extensive feedback and input to the draft strategy for IWRM regarding the inclusion of CCA in water resources and respective adaptation measures in the action plan
National Energy Strategy	2018	Ensure climate-resilient energy sector	Climate lens envisaged depending on further progress of strategy development, utilize expertise from Albania's NCs to UNFCCC.	No information available

Source: Own elaboration

3.8.1 Mainstreaming in Sectors

The integration of CCA in sectors by the GoA has so far been addressed in the following ways (GIZ, 2018a):

- The Ministry of Health developed – as the first sector – a specific Health and CCA Strategy, which provides strategic approaches for mainstreaming CCA into health policies;
- After the flood of 2010, the Flood Risk Management Plan Shkodër Region 2012-2018 was designed to improve Flood Risk Management, especially by focusing on non-infrastructure measures, such as warning systems, economic and informational preparedness, as well as spatial planning;
- The National IWRM Strategy, once approved and implemented, will allow water resource managers to better address climate-related factors, such as droughts in the management of water resources;
- The draft National Strategy for Sustainable Tourism Development 2018-2022 aims to increase the climate resilience of the tourism sector to climate change;
- In 2015, the Ministry of Urban Development launched the ICSP, which includes climate change considerations in its SEA methodology;
- In 2015, a vulnerability assessment for Tiranë – “Adapting our City to a Changing Climate” – developed an adaptation action plan for the city;
- In 2018, Tiranë completed its Green City Action Plan (Municipality of Tirana , 2018), with strategic objectives relating to the resilience of the city’s infrastructure, businesses and population, i.e. higher resilience of Tiranë’s infrastructure in the face of chronic stresses and shock events; higher resilience and preparedness of business, community and the Municipality;
- The Ministry of Energy and Infrastructure developed a funding of the CN on urban resilience to climate change (Dibra, Tafaj and Borde, 2019);
- Adaptation was included in the ISARD 2015-2020, under the section of “Environment, land, forestry and water management and road infrastructure” (Ministry of Environment, 2016).

Despite the progress made by the Albanian Government to advance governance frameworks for climate change action, several obstacles remain. Enacting the Law on Climate Change is a powerful step forward in confronting climate change. However, the law, as well as the “Draft Decision of the Council of Ministers (DCM) on monitoring and reporting on GHGs and other climate related issues at the national level”, focus strongly on mitigation of GHGs. Adaptation is rarely explicitly mentioned in the texts but seems hidden behind formulations such as “and all other climate change measures”. The incorporation of adaptation priorities into sector plans has started but there is not yet a comprehensive, multi-sectoral approach to addressing climate vulnerabilities throughout the country. Despite promising progress of the IMWGCC, there still seems to be a lack of sufficient incentives to enable coordination between different sectoral actors. The above deficiencies go hand in hand with a lack of capacities in different sectors to steer the mainstreaming climate risk and adaptation implementation process, including for planning and budgeting. The current climate risk governance regime inhibits the effective generation and utilization of CIS (UNDP, 2016; Ministry of Environment, 2016). Also, there is still a lack of harmonization between the climate change and the (DRR) ‘sector’.

3.8.2 Disaster Risk Management

Albania approved a new law on civil protection, which presents a modern and progressive approach to disaster risk management (DRM). Under the same law, the government created the NCPA within the Ministry of Defence, while transferring the main responsibilities for DRM to the municipalities. However, the NCPA is still nascent and under-resourced. The municipalities, which play an important role in DRM, lack the resources and capacity to implement a proactive policy, resulting in weak implementation of DRM across the country. (The Law on Civil Protection, 2019) regulates DRM, including climate risk management for weather- and climate-related hazards and early warning (UNDRR, 2015). In addition to establishing the NCPA, the Law emphasizes the principle of subsidiarity – that protection, rescue and assistance in response to a disaster is the principal responsibility of the relevant local government – and the importance of risk monitoring, risk avoidance and risk reduction. Collaboration between government entities, the private sector and civil society is encouraged. The Law requires the formulation of a National

Disaster Risk Reduction (DRR) Strategy and municipality-level disaster risk reduction strategies that are harmonized with the National DRR Strategy. Municipalities are obliged to spend a minimum of 4% of their annual budgets on disaster risk reduction and civil protection. NCPA is given the responsibility of issuing early warning alerts, based on information provided by relevant government institutions.

The project will focus on strengthening the institutional, coordination and technical capacities and requirements for Multi-Hazard Impact-based Early Warning for all emergency situations including health emergencies (GFDRR and World Bank, 2020b):

- i. Within the National Civil Protection Agency (NCPA);
- ii. Across all agencies responsible for reducing climate risks;
- iii. Within coastal municipalities at high risk.

The project will also support the clarification of roles of, and coordination with, operational structures and entities that form part of the warning chain and are in charge once a threat, such as a flood or a wildfire, is underway. These include the Albanian State Police (ASP), specialised Urban Search and Rescue (USAR) teams of the Albanian Armed Forces (AAF), the Fire Protection & Rescue Service (FP&R) and the Emergency Medical Services (EMS). The project will help the GoA develop a national MHEWS policy to strengthen early warning and response throughout Albania. Albania's STAR, allocation under the eighth Global Environment Facility (GEF) funding cycle (GEF-8, 2022-2026) is US\$ 8.2 million, the bulk of which (US\$ 7.2 million or 88%) is associated with the land degradation (US\$ 4.2 million) and biodiversity (US\$ 3 million) focal areas. A further US\$ 1 million is allocated to climate change mitigation. The government has not yet decided how to spend the GEF-8 STAR allocation. At this stage, direct synergies with the GCF ALBAdapt project seem unlikely, but the same individual in the Ministry of Tourism and Environment (MoTE) serves as the GCF National Designated Authority (NDA) and the GEF Operational Focal Point (OFP), so coherence between GCF and GEF programming is assured. The National Disaster Risk Reduction Strategy (Republic of Albania, NDRRS, 2023-2030) aims to: (i) strengthen resilience at the national level through the establishment of effective, accountable, and comprehensive institutional structures of the civil protection system, and (ii) strengthen community resilience by enabling, empowering and supporting individuals, organizations and communities to act for themselves and others.

The NDRRS identifies the pressing need to:

- i. Strengthen the national hydro-meteorological system in line with WMO standards;
- ii. Align DRR measures with climate change adaptation measures; and
- iii. Build links with the broader European hydro-met infrastructure, including the European Centre for Medium-Range Weather Forecasts (ECMWF) and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT).

The ALBAdapt GCF project is included as Strategic Project (SP) 11 in the National Disaster Risk Reduction Action Plan (NDRRAP), which serves as the implementation mechanism for the NDRSS. The NDRRAP notes the complementarities of the ALBAdapt project with Disaster Risk Management Strategic Projects SP 1 (international hydro-met and early warning collaboration), SP 3 (flood risk assessment and early warning), SP 4 (drought risk assessment), SP 1

(forest fires), SP 12 (strengthening the early warning system) and SP 21 (hydro-met network) (See Table 2).

3.9 Membership In Climate And Risk-Related International Networks

Copernicus Emergency Management Service (EMS)

Copernicus is an EU programme aimed at developing European information services based on satellite Earth Observation and in situ (non-space) data (Copernicus, 2020). Copernicus is a user-driven programme and the information services provided are available to its users, mostly public authorities, on a full, open and free-of-charge basis. Albania has requested several times the EM services, including for a variety of disasters (floods, forest fires, earthquakes) (Copernicus, 2023). There is little information and awareness among Albanian institutions about Copernicus EMS and the ways Albania can benefit from it. For the time being, IGEO is a registered Institution that can request Copernicus EMS support on behalf of the Albanian government.

The Sendai Framework works hand in hand with the other 2030 Agenda agreements, including The Paris Agreement on Climate Change, The Addis Ababa Action Agenda on Financing for Development, the New Urban Sendai Agenda, and ultimately the SDGs (United Nations). It was endorsed by the UN General Assembly following the 2015 Third UN World Conference on Disaster Risk Reduction (WCDRR).

The Sendai Framework focuses on the adoption of measures which address the three dimensions of disaster risk (exposure to hazards, vulnerability and capacity, and hazard's characteristics) in order to prevent the creation of new risk, reduce existing risk and increase resilience. The Sendai Framework outlines seven global targets to guide and against which to assess progress. Albania has signed the Sendai Framework in 2015 (UNDRR, 2015), (UNDRR, 2020a).

EUMETNET

The European Meteorological Network (EUMETNET) provides a framework to enable national weather services to work together, share ideas and best practice, and to share the costs of major infrastructure investments. The additional benefit of cooperating through EUMETNET is that it provides a collective 'voice' for its members when communicating with the EU or its various agencies and bodies. EUMETNET runs programs such as EMMA/Meteoalarm (European Multi-services Meteorological Awareness) or OPERA (Operational Program for the Exchange of Weather Radar Information). IGEO is not yet part of EUMETNET.

WMO

Albania joined the WMO in 1957 (WMO, 2021b), being represented by Institute of Hydrometeorology at that time and now by IGEO. IGEO is member of 4 WMO commissions: The Commission for Agricultural Meteorology, the Commission for Basic Systems, the Commission for Climatology and the Commission for Hydrology.

EU Civil Protection Mechanism

Several EU progress reports state that Albania is lagging behind in its progress to be part of the Union Civil Protection Mechanism (UCPM). The country is strongly encouraged to accelerate preparations for joining the UCPM. It should build institutional capacity and seek to establish secure trans-European services for telematics between administrations (STESTA), which is a pre-condition for connecting to the Common Emergency Communication and Information System (CECIS). Albania is not yet part of the EU Civil Emergency instrument (European Commission, 2020).

EFAS

The aim of European Flood Awareness System (EFAS) is to support preparatory measures before major flood events strike, particularly in the large trans-national river basins and throughout Europe in general. EFAS is the first operational European system monitoring and forecasting floods across Europe.

It provides complementary, added-value information (e.g., probabilistic, medium range flood forecasts, flash flood indicators or impact forecasts) to the relevant national and regional authorities. Furthermore, EFAS keeps the [Emergency Response Coordination Centre](#) (ERCC) informed about ongoing and possibly upcoming flood events across Europe. Since 2012 EFAS is running fully operational as part of the [Copernicus EMS](#).

National Adaptation Planning (NAP) Global Network

Albania is a member of the network. The Network was established in 2014 at the 20th session of the Conference of the Parties (COP 20) in Lima, Peru, initiated by adaptation practitioners from 11 developing and developed countries. Today, the NAP Global Network connects over 1,300 participants from more than 140 countries working on national adaptation planning and action and has delivered direct support to more than 40 countries. Albania has participated in network activities, e.g., for peer-learning, and has received short term support from the NAP GN Country Hub.

3.10 Donor Investments and Projects

International bilateral and multilateral donors contribute to almost every development sector of Albania, including to climate risk management, adaptation as well as climate and weather services. In Appendix Table 21 presents a list of donors and agencies that are currently active in Albania in fields relevant to the planned GCF project.

3.10.1 GIZ Baseline Projects

The ALBAdapt project will scale-up activities and interventions that have proven to be successful in the context of hydro-met services and innovation in Albania. As summarized in Table 5, the project will build upon the experiences and proven results of two recent GIZ-executed projects.

Table 5: GIZ baseline projects for scale-up and replication

Project / Programme	Implementing Agency	Duration	Budget	Description	ALBAdapt Project
Adaptation to Climate Change through Transboundary Flood Risk Management in the Western Balkans (CCAWB)	GIZ	2012-2022	EUR 10.8 million	Capacity development; CCAWB supported the procurement and technical upgrade of a network of meteorological and hydrometric stations; introduced the WMO-sponsored Meteorological, Climatological and Hydrological Database Management System (MCH-DBS), and developed a regional flood forecasting system for the international Drin River basin (Albania, Kosovo, Montenegro, North Macedonia). The project also supported flood hazard and risk maps, increased awareness and preparedness at the national and local levels and developed emergency response plans for selected schools in Shkodër County. It contributed significantly to the Albanian National Climate Change Strategy and the National Adaptation Plan (NAP).	The ALBAdapt project will build on the products, data, stakeholder network and lessons learned from CCAWB. The modernisation of the hydro-met network will be scaled-up and the schools emergency management plan programme will be extended to ~114 schools in coastal municipalities.
EU for Innovation: Capacity Development and Linkages in the Local Innovation and Start-Up Ecosystem	European Commission, SIDA, GIZ	2018-2022	EUR 7.5 million	Piloted a range of different activities for the local innovation and start-up ecosystem (start-ups, aspiring entrepreneurs, Innovation Support Organisations (ISOs), universities and policy makers); linkage building within the Albanian innovation system and internationally.	The ALBAdapt project will build on the stakeholder network and the lessons learned from the EU for Innovation project to further strengthen capacities in the innovation ecosystem. The principal contributions will be to implement a large-scale (~500 beneficiaries) capacity building programme, to establish a digital community for advancing climate entrepreneurship, to offer incubation support to 3 climate service provider MSMEs, to develop 3 climate-related minimum viable products (MVPs) and to create more climate-informed and climate-capable ISOs.

Source: Own elaboration

3.10.2 Baseline Projects

The ALBAdapt project design is also informed by the experiences, lessons learned and achievements of other relevant baseline projects. Projects in the fields of climate change, disaster risk reduction and disaster risk management, and water and natural resource management have been identified, lessons learned, and synergies assessed as a result of exchanges with project partners and review of project documentation (Table 6).

Table 6: Projects in climate change, disaster risk reduction and disaster risk management

Project / Programme	Implementing Agency	Duration	Budget	Description	ALBAdapt Project
Programme for Improving National Early Warning System and Flood Prevention in Albania (ProNEWS)	European Commission	2017-2021	EUR 2.3 million	Developed a national flood forecasting and warning system; integrated Albania into the European Flood Awareness System (EFAS); designed an operational hydrological model for early warning and modernisation of some of the meteorological infrastructure and the IT network.	The outcomes of the ProNEWS project provide important elements of the future MHEWS by delivering flood forecasts (which will be further extended and enhanced with ALBAdapt project support). The ProNEWS project also provides part of the existing meteorological infrastructure that will be further strengthened through Component 1.
Bridging the Gap for Innovations in Disaster Resilience (BRIGAID)	European Commission	2016-2020	EUR 8.5 million	Connected innovators and end-users in a community of innovation to increase resilience to floods, droughts and extreme weather; boosted the development of technological and performance standards for adaptation options.	The ALBAdapt project will use the BRIGAID results as a baseline in vulnerability assessments required by the MHEWS (Component 2) and to inform the development of a broader innovation community for ideating and developing climate service solutions (Component 3).
South-East European Multi-Hazard Early Warning Advisory System (SEE-MHEWS-A)	WMO, USAID, World Bank, European Commission	2016-2023	US\$ 2.4 million	Supporting the NMHSs of WMO member states in the region (including Albania) to provide forecasters with tools for hazardous weather events to improve early warning; developing a platform to collect existing information, products and tools to support hazard-related decision-making by national authorities, including regional numerical weather and hydrological models.	The ALBAdapt project will enable Albania to take full advantage of this regional initiative by providing the necessary ICT and forecasting system support to the NMHS and NCPA, and by supporting greater integration of Albania into the European meteorological infrastructure (Components 1 and 2).
Albania Disaster Risk Mitigation and Adaptation Project (AL-DRMAP) – Phases 1 and 2	World Bank / GFDRR	2008-2016	US\$ 10.2 million	Supported IGEO to improve its severe weather observation and forecasting services by financing the modernisation of 40 automated hydro-meteorological monitoring stations; supported improvement of the IGEO website to improve information accessibility, as well as digitisation of some historical climate data; built the capacity of IGEO through provision of training and recommendations for improvements. This project was subsequently rated Moderately Satisfactory in its terminal evaluation, in part because the focus on technical / IT improvements was not reinforced by parallel improvements to institutional or financial capacities.	The ALBAdapt project will build on the knowledge gained from AL-DRMAP and use this experience to integrate a long-term sustainability focus within each of the 3 project components. Improvements to the monitoring network, data digitisation, data accessibility (AlbaMet NCIS), etc. will be accompanied by substantive institutional reform (backed up by legal and regulatory instruments) and capacity building. Private sector involvement in climate services will be supported as a means of introducing innovation and consumer focus and reducing the cost burden on the public sector.

Project / Programme	Implementing Agency	Duration	Budget	Description	ALBAdapt Project
Improving Disaster Risk and Loss Information in Albania	World Bank / GFDRR	2020-2022	US\$ 500,000	The main objective of the project was to help improve the management, accessibility and collection of multi-hazard risk information for better-informed disaster risk management (DRM) decision-making. The project focus was not exclusively – or even primarily – on climate-related hazards.	The ALBAdapt project will leverage the risk information collected to expand the knowledge base of hazard risks and vulnerabilities. Hazard-related decision-making will be systematised and placed on a firmer institutional and factual footing through the introduction of a decision support tool (DST).
Enabling Transboundary Cooperation and Integrated Water Resources Management in the Extended Drin River Basin	UNDP / GEF	2014-2022	US\$ 4.5 million	Promoted joint management of the shared water resources of the extended transboundary Drin River Basin, including coordination mechanisms among the various sub-basin commissions and committees (Lakes Prespa, Ohrid and Skadar).	The cooperative framework created will be used by the ALBAdapt project as a basis for development of inter-institutional agreements and standard operating procedures (SOPs) relating to the reformed NMHS, NFCS and MHEWS. The ALBAdapt project will also invest in enhanced hydrological nowcasting and hazard management capabilities.
Integrated Climate-Resilient Transboundary Flood Risk Management in the Drin River Basin in the Western Balkans	UNDP / Adaptation Fund	2019-2024	US\$ 9.9 million	Assisting the riparian countries of the Drin River Basin to implement an integrated, climate-resilient flood risk management approach and to enhance the resilience of vulnerable communities to flooding exacerbated by climate change.	The ALBAdapt project will enhance existing flood hazard management systems and capacities, and integrate them into a joined-up MHEWS. Coordination and cooperation with regional initiatives and NMHSs (including those of Drin Basin countries) will be supported and enhanced.
Building the Resilience of Kune Vaini Lagoon through Ecosystem-Based Adaptation	UNEP / SCCF	2015-2020	US\$ 13.5 million	Opened a tidal inlet to allow the free circulation of sea water, thereby regulating the salinity of the lagoon and reducing flooding; dune rehabilitation to mitigate coastal erosion and reduce habitat loss; reforestation of riparian forests; raising of the embankment at Shëngjin Island to protect adjacent agricultural land and residential areas from flooding and storm surges; baseline climate risk assessments; training of government staff and community members; production of guidelines and manuals; developed an upscaling and replication strategy.	The ALBAdapt project will build on the EbA upscaling strategy, as well as the empirical lessons-learned, generated by the SCCF project to implement EbA / eco-DRR in the coastal belt under Component 3 and to prepare the follow-up ALBAdapt Phase 2 project.

Project / Programme	Implementing Agency	Duration	Budget	Description	ALBAdapt Project
Resilience Strengthening in Albania (RESEAL)	UNDP (with contributions from the Governments of Sweden and Portugal)	2020-2024	US\$ 2.8 million	RESEAL has 2 major interlinked pillars: 1) strengthening the DRM strategic and operational framework and capacities at central level, and 2) supporting the development of local (municipal) DRR frameworks and local response capacities in harmonisation with the national DRR system and legal framework.	Component 2 (MHEWS) will integrate these activities through the MHEWS Policy. The ALBAdapt project's focus on municipalities as a key set of project stakeholders builds on the strengthening efforts of RESEAL and extends them to improve municipalities' DRR coordination with (i) central government (particularly NCPA), (ii) civil society, including the Albanian Red Cross (ARC), and (iii) new functionalities, including impact-based forecasting, FbA and school-based preparedness.
Development of Integrated System for Prevention and Early Warning of Forest Fires (North Macedonia)	Japan International Cooperation Agency (JICA)	2011-2014	EUR 3 million	Project objective in North Macedonia: strengthened capacity of crisis management centre for transmitting information to relevant domestic institutions for prevention and early warning of forest fires and coordinating response actions. The same project, with an additional component addressing eco-DRR measures, has started in Kosovo.	ALBAdapt will coordinate with JICA to integrate wildfire warnings into the multi-hazard system (MHEWS) to create a coherent warning system for all hazards (Component 2).
Development of Integrated System for Prevention and Early Warning of Forest Fires & implementing Eco-DRR measures (Kosovo)		2021-2026		JICA is currently in the development phase of a project (implementation to commence in 2024) that will replicate the North Macedonian and Kosovo experience in Albania.	
Early Warnings for All Initiative Alert Hub Initiative	WMO, UNDRRR, ITU, IFRC	2022-ongoing	Under development	Early Warnings for All is a global initiative to ensure that the world's population is protected by early warnings. The initial focus of the initiative was on Least Developed Countries (LDCs) and SIDS, but a new, imminent phase will broaden the geographical coverage. Albania has been selected as a priority country in the Europe region. Alert Hub is a parallel initiative of the International Federation of the Red Cross	The ALBAdapt project will work closely with WMO, ARC / IFRC and others to put in place a functional MHEWS, including a CAP-based mobile warning system and FbA. The ALBAdapt project development team has been coordinating closely with WMO and partners to ensure that Early Warnings for All interventions build on and support the ALBAdapt measures; significant capacity building support, in particular, is anticipated.

Project / Programme	Implementing Agency	Duration	Budget	Description	ALBAdapt Project
				<p>and Red Crescent (IFRC) to promote the use of the Common Alerting Protocol (CAP).</p> <p>Early Warnings for All places considerable emphasis on: (i) the use of mobile phone networks as distribution channels for early warnings (hence the involvement of the International Telecommunications Union, ITU) and (ii) anticipatory actions in readiness for warnings (hence the involvement of the IFRC).</p>	
GCF readiness support					
• Climate Change Measurement and monitoring, reporting and verification (MRV) System	GCF / URI	2022-2024	EUR 350,000	Support to the MRV elements of the National Climate Change Strategy; legal reforms needed for MRV administrative structures and processes; capacity building for MoTE and other institutions	The ALBAdapt project has been developed in close coordination with many of the institutions that have received readiness support, notably the NDA (MoTE). The project directly supports the NDC, the NAP, the NAP Action Plan and the National Climate Change Strategy, which were strengthened with readiness support.
• NDA Strengthening and Direct Access Process Support	GCF / GIZ	2022-2024	EUR 476,000	Strengthen NDA outreach and visibility; support the NDA to identify a suitable entity for direct access nomination; support to the AE accreditation process; development of a roadmap for financial sector engagement.	
• Enhancement of the Existing NDC	GCF / URI	2020-2022	EUR 257,000	Broadening the sectoral coverage of the NDC; incorporation of gender analysis; alignment of the NDC with SDGs; capacity building of key institutions.	

Project / Programme	Implementing Agency	Duration	Budget	Description	ALBAdapt Project
<ul style="list-style-type: none"> Adaptation Planning Support 	GCF / UNDP	2019-2023	EUR 3 million	Capacity development for NAP implementation; development of a NAP Action Plan; institutionalisation of financing, monitoring and evaluation.	
<ul style="list-style-type: none"> NDA Strengthening and Country Support 	GCF / UNEP	2016-2017	US\$ 300,000	Identification of the appropriate institution to serve as NDA; establishment of the NDA; development of the no-objection procedure; preparation of a country programme.	

Source: Own elaboration

3.11 Institutional And Regulatory Framework for Weather And Climate Services

As in many countries around the world, Albania to date is not yet in the position to deliver climate services in a systematic and comprehensive way. Traditionally, climate services (i.e. weather services) in the country – and elsewhere – have focused on short-to medium term weather forecasts (0–14 days) or sub-seasonal (one month) to seasonal climate forecasts. However, decision-makers increasingly require information on climate hazards and longer-term climate trends. This requires new types of assessments and technical expertise, as well as more effective and efficient delivery systems, which often transcend the mandates and capacities of the NMHSs (WMO, 2011). The challenges to effective climate services are as much institutional as technical.

Functioning climate services rely on credible weather and climate data provided by national and international sources. NMHS play a crucial role in this respect, e.g. in processing and tailoring information to national users. The official Albanian NMHS, that represents the country at the WMO is the Institute of Geosciences, Environment, Water and Energy (IGEO) at the Polytechnic University of Tiranë. Besides that, there are two other institutions who take over functions of a NMHS: The MMS under the Albanian Ministry of Defense as well as the Meteorological Service under the National Air Traffic Agency (MSNATA) (WMO, 2012).

To date, the picture of climate service activities in Albania is fragmented: there are mostly isolated initiatives, including for the assessment of climate risks for particular sectors, municipalities (like Tiranë) or climate-related hazards (like floods), and the identification of adaptation measures. However, they are mostly conducted in the framework of donor-funded programmes or as part of the more comprehensive, but so far rather general, assessment studies for the NC to the UNFCCC. The NMHS conducts flood forecasting and issues warning bulletins, including for floods and wildfires – services that are considered climate services.

There is not yet considerable effort devoted to building a suitable framework for climate services in the sense of the WMO's Global Framework for Climate Services (GFCS) in Albania. However, in terms of legislation and harmonization efforts relevant to climate service development, Albania is progressing. As stipulated by Article 23 under chapter IV on "Competent Authorities" of the Law on Climate Change, IGEO is the body explicitly mentioned to provide "climate-related measurements" (Law on Climate Change Article 23, Government of Albania, 2020). The new Law on Civil Protection that regulates the DRM, including early warning (a weather and climate service product), refers to "central and local institutions" that "must notify the community of a particular area, which shall be at risk of being affected by natural or other disasters" and mentions "designated institutions and structures "that shall perform the tasks of

- i. Identifying, collecting, processing, analysing, and communicating data related to immediate and expected risks;
- ii. Identifying and monitoring the phenomena presenting a risk, notifying the relevant institutions and structures;
- iii. Immediately notifying and reporting to the National Civil Protection Agency, based on their area of responsibility on identified or likely to occur occurrences and events within a short period of time, which shall constitute or may become risks for the community." (Law on Civil Protection Article 46, Government of Albania, 2019).

Though the law does not mention IGEO explicitly in this context, the institute is one of those designated institutions. IGEO has the mandate to provide information and issue warning bulletins based on data from hydrological and meteorological stations, weather forecasts, hydrological forecasts, air and water quality information to the authorities at different levels, including the NCPA, counties and municipalities whose mandate is to alert the public. The NCPA was established through the Law on Civil Protection in 2019 under the Ministry of Defence. It replaces the previous institution in charge: The General Directorate for Civil Emergencies.

IGEO is also responsible for hazards data collection and post-disaster analyses, to manage the national meteorological and hydrological networks, to provide studies about climate and hydrology, water and air quality in Albania, and to carry out studies about climate change and its impacts. The current reality of the Institute, however, does not yet allow for such services. The latest Albania report from the European Commission reaches the conclusion that, amongst other things, Albania "still needs to regulate its early warning and hydrometric-meteorological services" (European Commission, 2020).

Overall, the new Law on Civil Protection introduces a modern and progressive approach of DRR, shifting the paradigm from one of response to one of preparedness, while transferring the main responsibilities for DRM to the new NCPA as well as the municipalities. The law requires harmonization of urban planning with DRR at local and national level, regional strategies for risk assessment, risk assessment certificates for development projects, civil emergency plans at all levels and alignment with a national plan for civil emergency and includes a list of critical infrastructure. These are all relevant aspects of a functioning climate service system. In order to adhere to the above standards, municipalities will need information on all kinds of hazards, including climate-related impacts.

This is further highlighted in the new law, where the provision of risk information features prominently in Article 5, which refers to the need to make public information on risks and activities of central, local and other responsible institutions with regards to civil protection from natural or other disasters. Article 46 focuses on early warning, indicating the central mandate of the NCPA as well as 24/7 operation centres at all levels. Also, the law mentions IGEO as one of the agencies to feed data and information and provide scientific advice to the NCPA and the operation centres (Ministry of Infrastructure, 2019).

The NCPA is still a nascent institution. It is still under-resourced and needs to acquire vital expertise and capacities. The municipalities, as part of the process of decentralisation, have been given more mandates and power to make their own decisions, including in DRM and risk management of climate-related extreme events. However, they still lack the resources and capacity to implement a proactive policy, resulting in weak implementation of DRM across the country. Roles and responsibilities regarding DRM of both the NCPA and municipalities still need to be clarified. DRM strategies and national plans are outdated, and do not yet take into account recent institutional and organisational changes brought about by the new law. Nor do they include a systematic consideration of climate-related hazards and future projections of how these hazards will increase and make extreme events more intensive and frequent. The administrative capacity and infrastructure for early warning, prevention, preparedness and response are currently inadequate. Several by-laws will need to be drafted to further operationalise them (Ministry of Infrastructure, 2019).

4. National Meteorological and Hydrological Service

Albania is the only country in Europe that does not have a dedicated 24/7 NMHS and the country has made little progress in extending and upgrading its capacities. IGEO, as an academic institute at the Polytechnic University of Tiranë, dedicates most of its resources (about 70%) to teaching and research.

The project supports the GoA in its efforts to improve its national meteorological and hydrological services, to develop an effective Multi-Hazard Impact-Based Early Warning System (MHEWS) for climate-related events and related hazards. According to an interview with IGEO in February 2021, the Institute's lack of human, financial and technical resources has deepened from year to year. IGEO employs a total 58 employees (all located in Tirana, 32 Male and 26 Female). Nine work in meteorology, 13 in hydrology and three in ICT. Most personnel are involved in lecturing and the share of staff with academic background is accordingly high. Nevertheless, there is no specific policy arrangement for in-country training of NMHS staff nor degree in meteorology, hydrology or climatology in the country (although the NMHS is part of a university). Since 2015, several assessments, including by the World Meteorological Organisation (WMO), the World Bank and the Austrian Meteorological Service (ZAMG), have identified the need for structural reform of the NMHS. IGEO – assisted by ZAMG – has developed a long-term strategy and action plan, including an investment plan to improve service delivery. Through this strategy, IGEO intends to align the NMHS with global and European good practice and to achieve a modern service-focused organization. The Action Plan (ZAMG, 2016) is very comprehensive and covers all areas required for modernising the NMHS' services from an institutional, technical and financial perspective:

- i. Institutional strengthening including coordination between the NMHS, the MMS and the National Air Traffic Agency (Albcontrol), and NCPA;
- ii. Enhancement of the service delivery system including the introduction of a National Framework for Climate Services;
- iii. Modernization of the observation and telecommunication infrastructures. However, insufficient coordination among different national and international institutions as well as the lack of follow up and resources to improve the policy framework hindered the implementation of the proposed action plan. This project aims to reverse this situation.

IGEO is organized in seven main departments, each of them containing up to three research units. The departments are:

- Department of Climate and Environment;
- Department of Geology;
- Department of Seismology;
- Department of Water Economy.

The Institute is managed by a board, a director and department heads. The mission of IGEO is to improve scientific research in the field of geoinformation in Albania through:

- carrying out scientific and applied research;
- educating students and young researchers;
- undertaking third-party services in the fields of seismology, natural resources, georisks, geoenvironment and geoinformation technology.

A 2018 assessment confirms the above information (Skøien et al., 2018): IGEO seems understaffed, with eight staff members who serve as meteorologists and 12 as hydrologists for observation, data management, operational service, and modelling.

For the purpose of the inventory (see Annex 2f) only hydrological and meteorological stations were visited, and datasheets recorded respectively: as per the findings of the visit-based inventory, Albania has 100 meteorological stations and 111 hydrological stations. As an immediate result of this assignment, the number of the hydrometeorological stations inventoried differs from the number of stations IGEO has on paper. The reasons for this discordance vary from the dysfunctionality of a station, to its vandalization, deterioration of the station, migration of the observer and stations left with no monitoring etc. Besides IGEO, other hydrometeorological monitoring stations are operated by the MMS

(nine stations for military air force purposes) and the National Air Traffic Agency (one station at Tirana airport).

The quality control of meteorological and hydrological variables is limited. Some procedures are automated, but IGEO does not have the capacity for manual quality control. Rating curves have only been sparsely updated since 2008 but have been supported by GIZ in recent years. Observations from networks from different projects are currently stored in different databases, but GIZ has offered support to create a joint database. Forecasting is mainly done by experts by analysing meteorological forecasts and hydro- meteorological observations through the systems Flood-PROOFS (small and medium-sized catchments) and Integrated system for real-time monitoring, prediction and prevention of natural disasters worldwide (DEWETRA) (national scale).

No rainfall-runoff models are currently operational, although the Panta Rhei / Drin-Drim-Buna- Bojana Flood Forecast System (DDBB-FFS) model, implemented by the University of Braunschweig, Germany, with German-funded support through GIZ, is planned to become operational soon for the Drin-basin in all riparian countries. IGEO prepares bulletins for natural hazards, whereas the NCPA gives alerts to the public.

There is differing information on the number of meteorological and hydrological stations, which “is regarded as sufficient” by the 2018 assessment. But recent reports by GIZ have shown that this is not the case. Without a doubt, however, more automatic stations with telemetric data transfer are necessary. As mentioned above, staff limitations are an issue affecting the service, and particularly station maintenance. External funding has been given for new stations, but rarely for their maintenance. Many stations are therefore out of service relatively shortly after installation. Standardization of procedures, data management, cooperation and information exchange with neighbours and access to ECMWF data are all deemed as necessary. Better models are needed for the larger watersheds; for the smaller catchments, it might be better to focus on training of the staff than to rely on models where the reliability of the data input will be an issue (Skøien et al., 2018).

Based on a questionnaire filled out for the purpose of this project in 2021, IGEO describes its priorities as follows:

- Continuous monitoring of meteorological and hydrological phenomena in the context of climate change;
- Increasing the number of automatic stations in hydrological and meteorological monitoring networks.
- Maintenance of existing stations and their modernization;
- Receiving real-time data and entering data into archives according to WMO standards;
- Quality-controlled data;
- A modelling tool for the meteorological forecast.

IGEO does provide warnings for different hydrometeorological and climatic hazards and extreme events. These include forecasting and warning bulletins for floods and wildfires. A 2015 assessment by the Austrian Zentralanstalt für Meteorologie und Geodynamik (ZAMG, as part of a WB programme) listed the gaps in infrastructure, capacity and overall service delivery, including (ZAMG, 2015, p. 11):

- Data delivery needs to be reliable;
- Ground observation, satellite and radar data are needed in good resolution;
- Need of data portals/tools for visualisation;
- MoU needs to be signed data and information users;
- Forecasters need training;
- Strong wish for regular meetings between IGEO, other weather services and/or users in order to exchange information;
- New stations are desired, but functionality of existing ones is even more important;
- Feedback is important to initiate a cycle of mutual improvements (detailed feedback is provided by Civil Protection Department in form of their daily bulletin of weather-related damages, less detailed feedback by Albanian Hydro-Power Corporation (KESH) in form of publishing Drin River water levels);

- Knowledge of available data and products is incomplete among users.

A general observation is that the conditions of the hydrological and meteorological stations fall short of the WMO standards for functional stations. For all manual and automatic meteorological stations calibration and replacement or repair of the sensors is needed. The same holds true for the hydrological sensors. For the last 10 years IGEO did not undertake regular field visits, monitoring trips and maintenance of the stations due to the lack of funds from the institute. Calibration of sensors and of each station was also not performed during the last decade.

The barriers displayed in Section 5.3 combined with the aforementioned challenges, lead to a gap between the weather and Climate Information currently available and the services required to effectively consider weather and climate risk in different sectors. Moreover, government officials, entrepreneurs and the general public are neither aware of, nor sufficiently informed about, the climate challenges their activities will be facing, nor about possible adaptation options as well as information services for decision making, including warning systems that could be made available and tailored to their needs. At the same time, the innovative potential of the private sector as an important player in the climate services value chain remains almost entirely untapped in Albania.

5. CIEWS Context

5.1 Project Context

The monetary and social costs of the impacts of extreme climate events in Albania are rising. Decisions about how and what to build are being made every day, often based on out-dated assumptions about the climate but with high associated costs. The cost of climate data and coordinating efforts to produce good quality, credible and useable CIS needs to be set against the costs – and consequences – of uninformed decision-making. The GoA needs to create enabling conditions to enhance the resilience to climate change of its citizens by ensuring the provision and access to scientifically sound and credible information together with subject matter expertise. These are prerequisites for good decision making to implement locally relevant adaptation measures. This is valid for several timescales ranging from early warning of extreme events to long-term investment decisions in different sectors, including infrastructure.

Both the public and the private sector need to have access to the information they need to adapt. As such, governments have a key role to play not only in: (i) collecting and making available raw and processed data in an efficient way but to also in (ii) establishing the necessary mechanisms to produce useable CI, as well as (iii) providing rules, frameworks and regulations for ensuring climate-resilient - and low-emission - development.

“Climate services provide Climate Information to help individuals and organizations make climate-smart decisions” (GFCS). Generating user-oriented climate services and useable CI products requires dialogue and coordination between a variety of actors (Allis et al., 2019). Tangible CI products range from global and regional climate model outputs to local impact and vulnerability assessment results. Generating these products requires data and information from various fields of research. CI can describe historical, current and future climate conditions. They can entail future predictions and projections on monthly, seasonal or decadal timescales and their impact on natural and human systems. Climate services encompass the generation and provision of this information to a wide range of users in order to support climate resilient development. The scope, detail and form of climate services need to be defined in close collaboration with users.

Climate services are of relevance to private and public actors. They are relevant for design standards and building codes for everything from private houses, public buildings, city planning, commercial buildings to public infrastructure such as roads and bridges as well as agricultural irrigation and flood protection. Seasonal forecasts can benefit agricultural production and help farmers; effective early warning for floods can save lives and protect assets.

Decision-makers in both the private and the public sector, typically, want CIS that cover their local area in ‘language’ and formats they can easily understand and incorporate into their planning frameworks or business plans. In most cases, however, there is a gap between what is currently available and what they need, or they do not know what is available.

The decentralisation process in Albania has shifted governing power to municipalities, which are the institutions that have to directly deal with current and future climate change impacts. Enabling an environment that will reduce the CIS cost and develop fit-for-purpose tools and services is essential to ensure a climate resilient path for Albania.

5.2 Climate Problem

The Albanian climate is changing. Temperatures are rising and the frequency and intensity of heat waves are increasing. Precipitation in summer will decrease, while winter months are projected to see an increase in precipitation, including increased frequency and intensity of torrential rain. Sea levels are rising. Albania already ranks highest in terms of overall disaster risk amongst all European countries, due to very high exposure to extreme natural events – a situation that is further exacerbated by climate change.

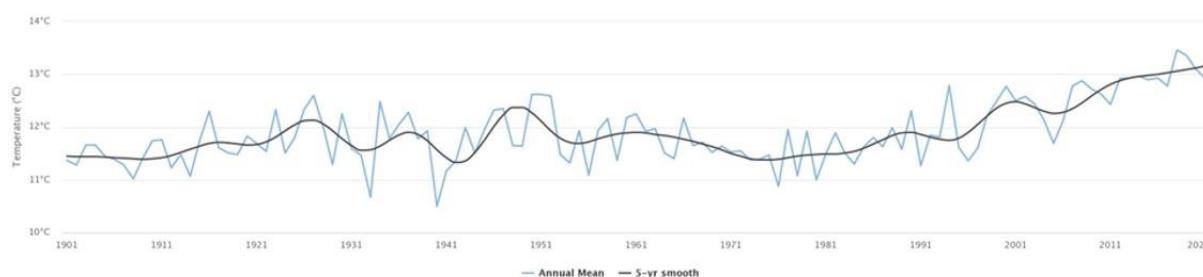
In the low-lying coastal area in particular, all three factors – hazard, exposure and vulnerability – combine to form a significant risk from climate change. Climate related hazards will affect the coastal zone in multiple ways, including through impacts on the key sectors of agriculture and tourism (Sutton et al., 2013). Already today, climate-related hazards are hitting many individuals and communities

unprepared – a future increase in their frequency and intensity will not only cause loss and damage to infrastructure but heighten the risk of injury and preventable death among population, especially among vulnerable groups. In addition to direct anthropogenic pressure, coastal ecosystems as well as their livelihood and protective services are increasingly affected by climate change.

5.2.1 Historical Trend And Climate Projections

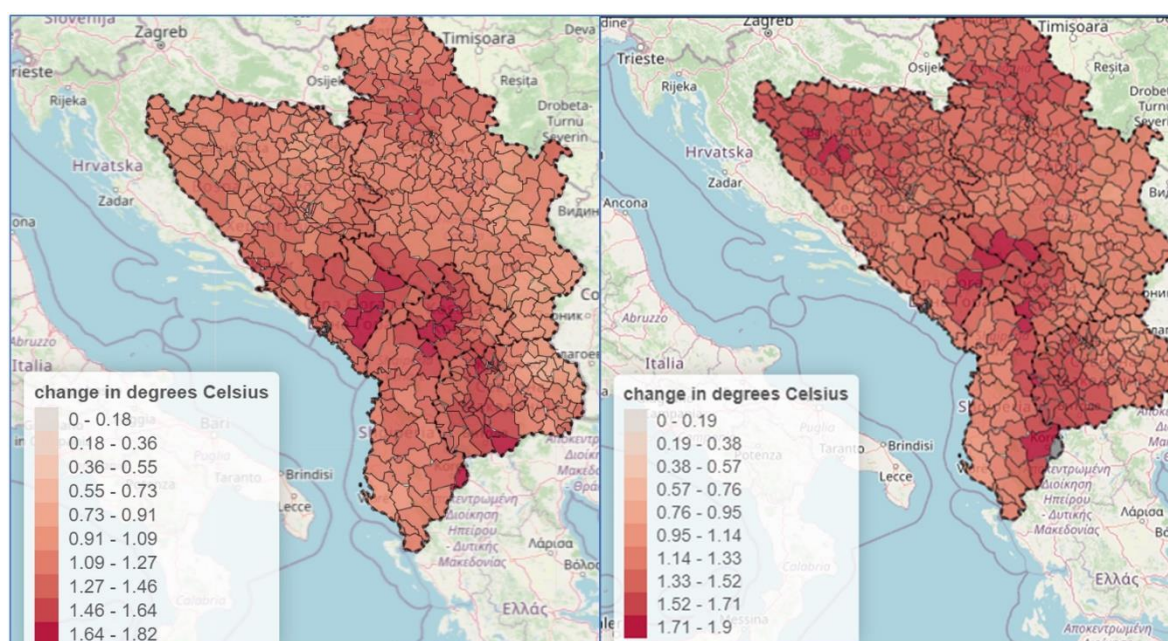
Temperatures are rising. For most of the 20th Century, Albania's average annual temperature ranged between 11 and 12°C. However, observational data clearly reveals a steady increase in the average annual temperature over the past 40 years (Figure 9). The average annual temperature (harmonized) was 11.9°C in 1990, 12.7°C in 2010 and 13.2°C in 2021. Nine of the ten years with the highest annual temperatures since 1850 have occurred since 2011 (Müller and Hofmann, 2022). All areas of the country have experienced warming temperatures, with the greatest increases observed in the western part of the country, with stronger changes observed in the north-western part of Albania (1.64°C-1.82°C; see Figure 10). Modelled climate projections from Coupled Model Intercomparison Project phase 5 (CMIP5) multiple-model ensembles under the high emissions scenario (Representative Concentration Pathway RCP8.5) predict an increase in average annual temperature of 1.0-1.3°C between 2020 and 2039 and 1.2-4.4°C by 2100 relative to a 1986-2005 baseline (Vukovic and Vujadinovic, 2018). Under a more moderate emissions scenario (RCP4.5), the expected temperature increase – ranging between 0.3-1.78°C (2020-2039) and 1.4-2.6°C by 2100 – is lower but nonetheless significant (Ministry of Tourism and Environment, 2022).

Figure 9: Harmonized annual average temperature for Albania, 1901-2021



Source: World Bank Climate Knowledge Portal, 2023

Figure 10: Change in mean temperature between 1992-2020, April-October (left) and October-July (right)



Source: Müller and Hofmann, 2022

Seasonal temperatures are also increasing, with the most significant increases projected to take place in summer periods (June to August each year) – up to +6.4°C by 2100 under RCP8.5 and 2.5°C under RCP4.5 (FAO, 2018b). The Albanian coastal areas are projected to experience an increase in minimum and maximum temperature in all seasons. The maximum coastal temperatures in summer are projected to increase by between 1.5 and 6.4°C; winter minimum temperatures are projected to rise by between 0.9 and 3.8°C. The average summer temperature in coastal areas could, therefore, be (RCP8.5) above 28°C by 2050 and above 32°C by 2100 or, under RCP4.5, 25°C by 2050 and around 30°C by 2100 (Republic of Albania, 2021) (World Bank Climate Knowledge Portal, 2023), Figure 11 presents the projected changes for different time horizons.

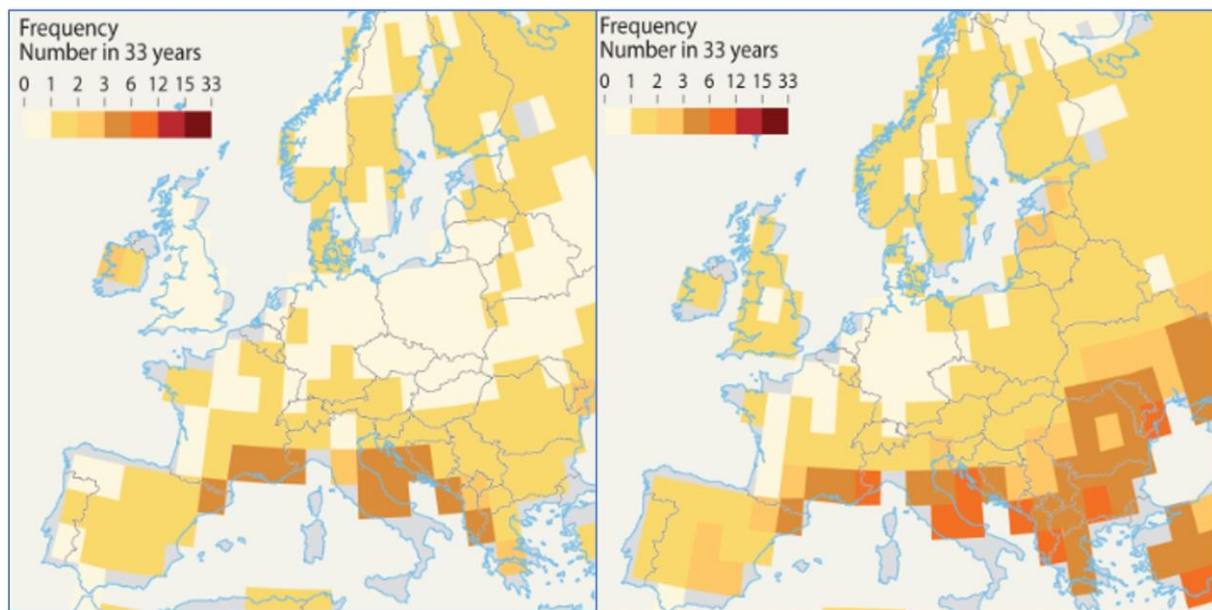
Table 7: Annual temperature change under different scenarios (baseline period: 1985-2005)

	Scenarios	2050	2100
Entire Year	RCP2.6	1.1 (0.7 – 1.5)	1.0 (0.7-1.3)
	RCP4.5	1.5 (1.0 – 1.9)	1.9 (1.4-2.6)
	RCP8.5	2.0 (1.4-2.8)	4.7 (3.4-6.7)

Source: Republic of Albania, 2022a

In addition, heat waves are becoming more severe, and the number of hot days is projected to increase (Figure 11). An increase in frequency (inter- and intra-annual) and intensity (duration) of heat waves (daily air temperature exceeded the long-term average temperature by 5°C for more than five consecutive days) has been observed (Porja, 2013). Albania and the Republic of North Macedonia are expected to be the most impacted countries in Europe (Santillán et al., 2019). Climate models project a decrease in the return period for extremely high temperatures from 100 years to 9.2 years (low-emission scenario RCP2.6) and 3.6 years (high emission scenario RCP8.5) by 2100. The number of tropical-temperature nights (minimum temperature >20°C) in Albania is expected to increase from 1 to 10 (RCP2.6) and 70 nights (RCP8.5) per year by 2100. The number of hot days (maximum temperature > 35°C) is projected to increase from two to seven days between 2020 and 2039 and a significant increase is projected until the end of the century (World Bank Climate Knowledge Portal, 2023). The duration of heat waves in Albania is projected to increase to between 17.5 and 38.5 days per year by 2050 (Ministry of Health of Albania, 2019).

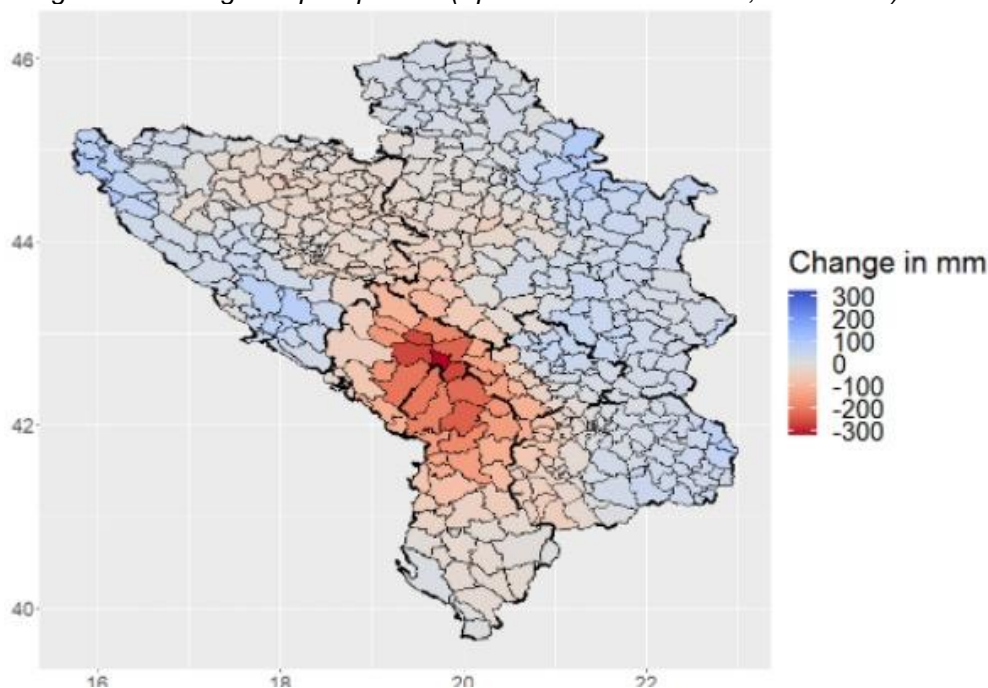
Figure 11: Frequency of hot days 2017-2050 under RCP4.5 (left) and RCP8.5 (right)



Source: European Environment Agency, 2017

Precipitation will decrease overall and will exhibit greater seasonality. Albania is already experiencing a reduction in total annual precipitation, with the largest decreases observed in coastal areas (up to 20%; Figure 12) (Hodnebrog, 2019). All future scenarios considered in the Fourth National Communication to the UNFCCC (2022) and the Albanian Revised NDC (2021) indicate that further reductions in seasonal and annual precipitation are expected for all time horizons. The projected reduction in annual precipitation for the Albanian coastal area ranges from -1.6 to -7.1% by 2100 (Republic of Albania, 2021b). However, the overall reduction in precipitation masks increased seasonality: precipitation will primarily decrease in the months with lower rainfall (USAID, 2016). Summer months are projected to experience a reduction of up to 40% in precipitation, as well as a substantial increase in the duration of dry spells (Doko et al., 2020). The most impacted areas will experience between 13-26 additional dry days. Winter months, in contrast, will experience an increase in monthly average precipitation of between 1.8 and 7.8% (World Bank, 2019c).

Figure 12: Changes in precipitation (April-October Each Year, 1992-2020)



Source: Republic of Albania, 2022

In parallel, hazardous rainfall – i.e. intensive rain events with precipitation higher than the threshold that could cause social and economic damage (more than 182 mm/24h) – is expected to increase for the northern part (one to two days by 2030, two to three days by 2050, three to four days by 2080 and four to five days by 2100) and central and southern parts of the coastal areas (one day by 2030, two days by 2050, three days by 2080 and four days by 2100) (RCP8.5) (World Bank, 2021a). Tirana, for instance, is projected to see a shortening of the return period of heavy rainfall events from 100 years to 60-75 years. For the coastal area, the recurrence of extreme precipitation events is also expected to become more frequent (Knez et al., 2022).

Sea level is rising. In the Adriatic and Ionian Seas, sea level rise in the range of 0.5-1.1 mm/year has been recorded over the past 50 years (Vilibić et al., 2017) and (Rizzi et al., 2017). Over the past century, total sea level rise of about 15 cm has been recorded in the Adriatic Sea and Albania is likely to confront sea level rise of approximately 40 cm (central estimate) by 2100 (Republic of Albania, 2022a). For the Vjosa Delta, in southern Albania, sea level rise of between 25 and 105 cm by 2100 is projected; projections for the Drini-Mati River Delta suggest an increase of 45-60cm by 2100 (Republic of Albania, 2021). A 10 cm sea level rise typically causes the frequency of flooding to a given height to increase by about a factor of three (European Environment Agency, 2017). Furthermore, sea level rise in Albania is likely to be compounded by local uplift or subsidence, as the area on the Adriatic coast is tectonically active (Biermanns et al., 2019).

5.2.2 Impacts of Climate Change in Albania

Albania already ranks highest in terms of overall disaster risk amongst European countries, due to very high exposure to extreme weather and climate-related events – a situation that is being further exacerbated by climate change (USAID, 2016). Albania is ranked 82 (out of 191 countries) – and number 1 in Europe – on the World Risk Index of natural disasters and climate change (Bündnis Entwicklung Hilft, 2022), and 80 (out of 181 countries) on the ND-GAIN Index of climate vulnerability, making it the most climate-vulnerable country in Europe (University of Notre Dame, 2020). Between 1980 and 2021, 35 natural disasters are estimated to have caused approximately US\$ 800 million of damage, with each natural disaster causing average damage of 1.3% of GDP, double the EU average (IMF, 2022a). It is estimated that, on average, 50,000 Albanians are affected by floods every year (World Bank, 2017). All climate scenarios project a future increase in frequency and severity of riverine floods, due to an intensification of heavy precipitation in winter months and ensuing snow melt in spring (Republic of Albania, 2021), (Zaimi and Jaupaj, 2020) and (Abazaj, 2019). The increase in flooding risk will, in parallel

and seemingly paradoxically, be accompanied by an increase in drought risk (Roudier et al., 2015) and (Rama, 2016). Albania already has the highest level of total drought severity per decade in Europe (European Environment Agency, 2017). The probability of droughts is projected to increase by 20%, potentially leading to 23 more drought days/year in the north and 14 more drought days/year in the south of Albania (Republic of Albania, 2022a). More severe heat waves and droughts will, in turn, provide more favourable conditions for wildfires during the hot and dry summer months, as observed in 2017 (FAO, 2018b), (Hysa and Teqja, 2020) and (Caton et al., 2019). Such a hot summer or heat wave would have been very rare a century ago. Nowadays, with about a 10% chance of it occurring every year, it is common (Kew, 2018). Wildfires are already the second largest driver of forest loss in Albania (after managed forestry operations) (Global Forest Watch) and projections of fire risk in the period 2030-2060 relative to 1961-1990 suggest that Albania will be one of the world's most wildfire-affected countries, with at least one additional month of fire risk expected (NCPA, 2022a).

5.2.3 Sectoral impact of Climate Change

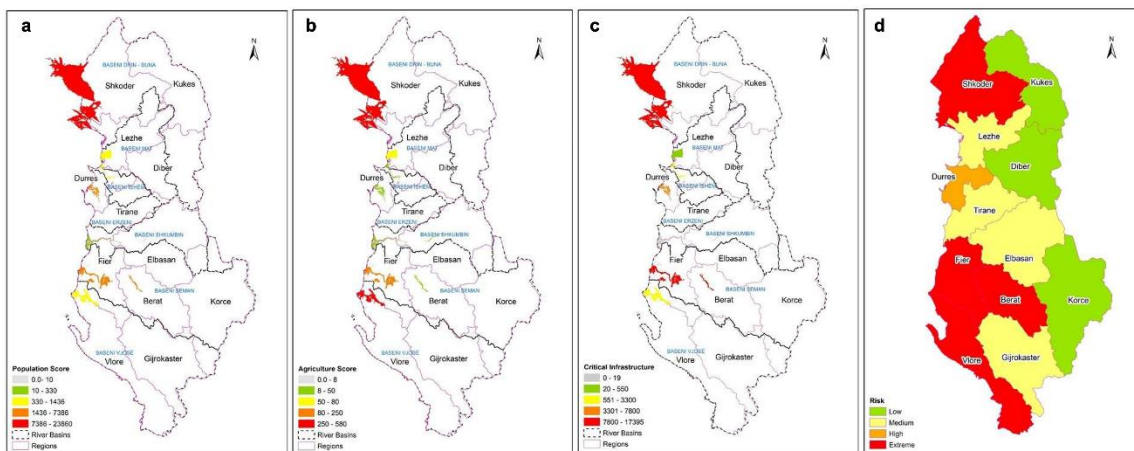
The coastal zone is particularly vulnerable to climate change. Temperature increases and precipitation reductions are projected to be of greater magnitude in the north-western part of the coastal zone than in the rest of the country, and heatwave recurrence is expected to increase six to eight times (Resource Environmental Centre, 2022). The greatest fire hazard is faced by the coastal county of Fier (Jaupaj et al., 2023). While flash floods occur most frequently in the Eastern mountainous areas, these tend to have short-lived, localised impacts; in contrast, fluvial flooding events on the Western plain are large-scale (often more than 100 km²) and long-duration (often lasting several weeks) due to the presence of extensive reclaimed wetland (Rustja, 2020). Moreover, the coastal zone is uniquely vulnerable to storm surges and coastal floods (De Leo et al., 2019). Most of the dykes and hydraulic structural measures in the coastal zone were designed on the basis of expected 50-year return periods; they are increasingly unable to evacuate the required water volumes as flood events become more frequent (NCPA, 2022b). Approximately 300 km of the country's 850 km of river and marine embankments are in need of repair, rehabilitation or re-dimensioning because of climate change (Republic of Albania, 2022b).

- **Agriculture:** The agricultural sector provides employment for ~60% of Albania's labour force and accounts for approximately one-fifth of GDP (World Bank Open Data, 2023). Climate change is expected to negatively impact crop yields through changes of temperature, precipitation, hydrological systems (including irrigation), enhanced soil erosion and damage from extreme events (Zupanić et al., 2021) and (Teqja et al., 2017). The agricultural sector is dominated by family farms – 86% of farms are smaller than 2 ha in size – that are vulnerable to climate shocks (Zhllima, 2022). Climate change has already negatively affected wheat, maize, potato and grape yields for many regions, including Shkodra, Korça, Lezha, Lushnja, Fieri and Vlora (Maho et al., 2019). Several periods of rapid food and cereal price increases following climate extremes in key producing regions indicate a sensitivity of current markets to climate shocks (Republic of Albania, 2021c). For most crops, it is projected that rainfall during the growing season (spring and summer) will become insufficient without supplemental investment in irrigation (World Bank, 2022b). Lowland sheep, goats and cattle will be affected by heat stress, water availability, pests and impacts on forage production (Koluman et al., 2018) and (Gilbert, 2021).
- **Energy:** The large share of hydropower in Albania – more than 99% of electricity is produced by hydro-power stations, of which 60% are state-owned – makes the country vulnerable to hydrological changes (Gebremedhin and Zhuri, 2020). Electricity production can vary from almost 6,000 GWh to less than half that amount in very dry years (Gjika et al., 2022). In good years, Albania is able to export electricity and the sector contributes one percentage point to GDP growth; in adverse years, when electricity imports are necessary, the sector can reduce GDP growth by one percentage point (IMF, 2022b). A drought in 2017 resulted in an additional US\$ 240 million of electricity imports and placed the power sector in severe financial difficulty (IRENA, 2021). Climate change will likely have an adverse effect on hydropower production: by 2050, annual average electricity output from Albania's large hydropower plants could be reduced by about 15% and from small hydropower plants by around 20% (Republic of Albania, 2021). Moreover, reductions in hydro-power availability will likely coincide with temperature-driven spikes in space cooling demand, thereby exacerbating power deficits (ERE, 2020). In response to these mounting climate challenges, the Albanian Power Corporation (KESH) has been obliged to adopt a Climate Risk Management Plan (KESH, 2018). Albania's increasing

adoption of utility-scale wind energy (~220 MW of generation capacity auctioned by mid-2023) and solar energy (~240 MW) will expose the country to additional climate variability (EBRD, 2023).

- **Tourism:** as a sector heavily reliant upon the climate, Albanian tourism is considered to be sensitive to climate change (Vrana, 2023). This applies to mainstream tourism – ‘sun, sea and sand’ in coastal resorts – as well as to rapidly-growing sub-sectors, including skiing, eco-tourism and agrotourism (Pojani and Grabova, 2022) and (Korsita and Cania, 2019). The precise impacts of changes in precipitation, temperature and other climatic variables on tourist numbers are difficult to predict, partly because of the complex causal chains involved (a decline in summer rainfall may, for instance, serve to attract more tourists, but only up to the point that drought does not disfigure landscapes or result in water shortages (Dogru et al., 2019) and partly because the tourist industry is young (dating from the early 2000s) and still rapidly evolving (Domi et al., 2019). Nonetheless, it is clear that climate change will impact the sector, with the result that current investment (such as hotels and other infrastructure) may prove to be maladapted, and uncertainty may suppress future investment (Steiger et al., 2023).

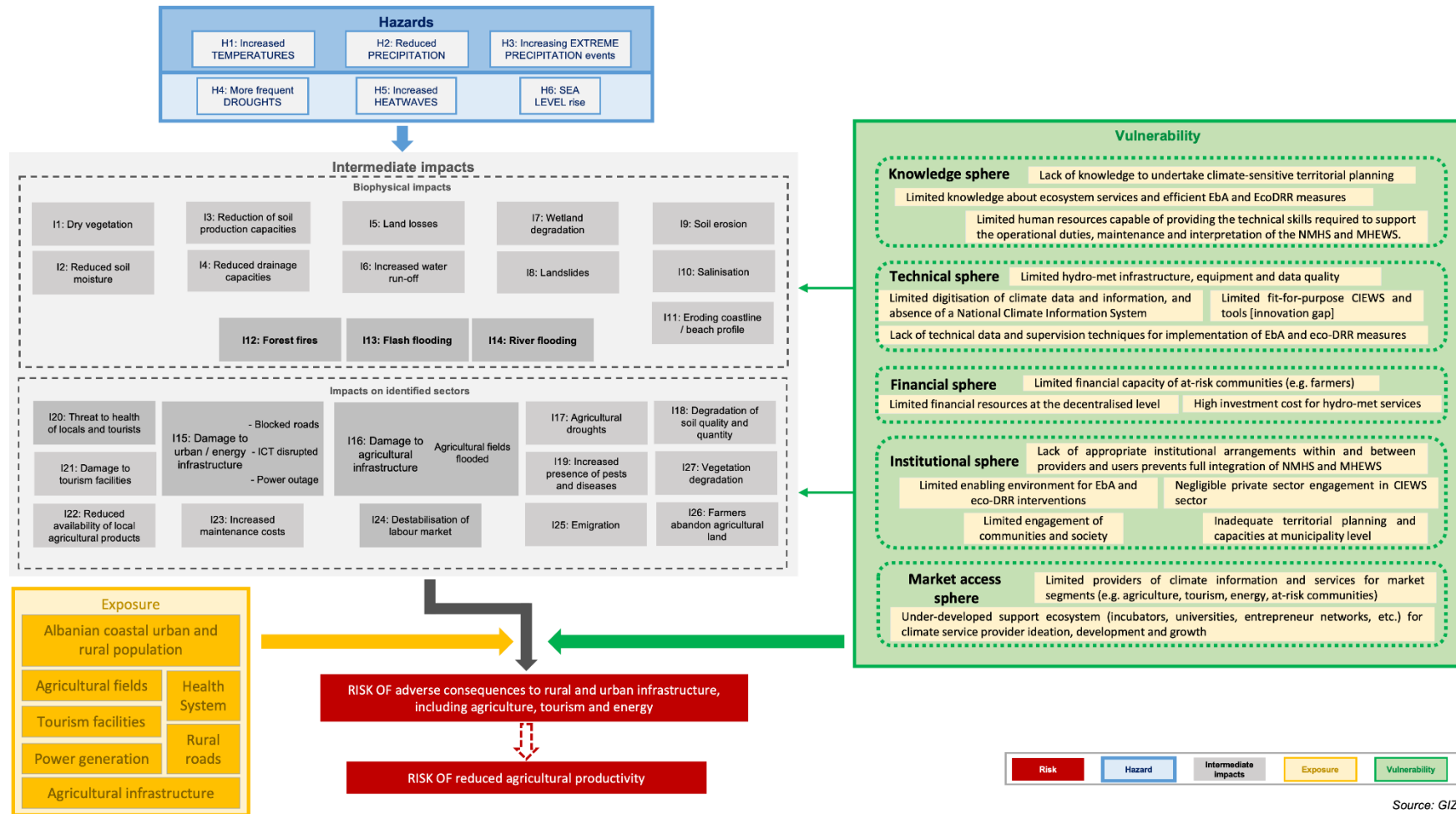
Figure 13: Flood risk impact scores: (a) social development, (b) economic, (c) critical infrastructure, (d) overall



Source: NCPA, 2022b

Climate impact chains, as a conceptual model for analysing climate risks, present the cause-effect relationship of the climate processes (Zebisch et al., 2022) in the coastal zone, leading to the climate risks confronting two relevant sectors – agriculture and tourism. As shown in Figure 14 below, the processes are assigned to the risk components' hazard (in blue), vulnerability (in green) and exposure (in yellow), while cascading effects are considered as intermediate impacts of hazards (in grey boxes) that affect Albania's economy and infrastructure. In combination with different aspects of Albania's vulnerability, as well as the exposed assets, it can be concluded that Albania's rural and urban infrastructure, as well as its agricultural productivity, are at risk due to climate change.

Figure 14: Climate impact chains in the coastal zone



Source: GIZ

Source: Own elaboration

5.3 Barriers

Despite the commitments and climate change policies developed by the Albanian Government, a range of barriers prevent the climate problem from being fully addressed. The institutional and technical capability to produce science-based information and to translate it into comprehensive climate risk management in high-risk areas is very limited, and communities in the coastal lowlands remain vulnerable to the adverse short- and long-term effects of extreme events and a changing climate. Albania is at increasing risk from floods, droughts and heat waves due to climate change. While everyone is at risk, climate impacts are most acute for people living in the coastal zone, where agriculture and tourism, in particular, are highly vulnerable. Albania's ability to cope with these climate impacts is hampered by the government's inability to produce high-quality, science-based information and to translate this information into warnings and decision support tools to reduce climate risks facing vulnerable communities and sectors. There is neither a formal nor a functioning national framework for climate services that engages all stakeholders and provides the space for co-production and facilitation of better climate risk-informed decisions. This has resulted in difficulties sustaining and upscaling climate change adaptation measures, including ecosystem-based adaptation, and the provision of climate services – by both the public and private sectors – for different sectors, including agriculture, tourism, health, infrastructure, water and environmental management. The NMHS faces institutional, capacity, infrastructure and financial constraints that inhibit the effective delivery of weather and climate services.

5.3.1 Institutional Barriers

Albania is the only country in Europe that does not have a dedicated 24/7 National Meteorological and Hydrological Service (NMHS). The NMHS currently resides in an academic institution – IGEO – that is part of the Polytechnic University of Tirana (UPT). IGEO is primarily a research organization, not an operations-oriented entity: ~70% of IGEO's resources are dedicated to teaching and research. IGEO has a Strategic Plan, covering the period 2020-2024, but this is research-oriented; there is no operational or action plan. Despite its best efforts, IGEO is struggling to meet the expectations placed on a modern NMHS (WMO, 2015a).

Moreover, although IGEO serves in theory as 'the' NMHS, hydro-met functions are, in fact, dispersed across additional institutions, namely Albcontrol and MMS. Currently, there is considerable overlap but little coordination among these institutions, resulting in multiple independent observation networks and different publicly available weather outlooks. IGEO has memoranda of understanding (MOUs) in place with a number of institutions (including Albcontrol and MMS) to facilitate data-sharing, but there are no standard operating procedures (SOPs) stipulated and, as a result, data flow is, in practice, limited, unsystematic and insufficient to serve user demand.

As a result of these limitations, some institutions have taken steps to develop their own data collection and processing systems – AMBU's work on flood mapping is a notable example, as is the Albanian Power Corporation's (KESH) parallel work on flood modelling – resulting in further fragmentation and blurring of responsibilities. The information bottlenecks are two-way. KESH, for example, frequently fails to inform IGEO of dam releases on the River Drin, which undermines the accuracy of downstream flood forecasts.

Albania lacks a distinct legal framework governing the operations of the NMHS (Annex 2h provides a detailed overview of the current legal context). This, in turn, serves to hinder accountability, as well as the level and quality of service provision. An appropriate legal framework – whether formulated as a new law or as amendments to existing laws – would address foundational issues such as (inter alia): the mandates, roles and responsibilities of named institutions; specification of basic hydro-meteorological public services; the criteria governing provision of free and paid-for services; the NMHS funding model; technical requirements for observations and forecasts; protection and maintenance of facilities and equipment; the use of radio frequencies; the role of research and development; and linkages between the NMHS and the early warning system(s), notably roles, responsibilities and technical requirements for issuing warnings and alerts.

As noted in the context of the Western Balkans, "the earlier warnings are codified between the NMHS and civil protection actors, the more efficient the activation of the civil protection system will be." (Italian Civil Protection Department, 2023). However, in Albania links between the NMHS and the early warning system are currently administratively and operationally weak. IGEO operates a warning service during

working hours, which can be upgraded to 24-hour coverage at times of emergency. The operations room has basic equipment to enable IGEO staff to monitor the current synoptic situation and more detailed information relating to hydro-meteorological risks. Warnings are issued manually for each of the 12 counties based on internal guidelines and a traffic light system (no risk, low risk, moderate risk and high risk), and only for floods and forest fires. No systematic scoring of warning quality (timeliness, false alarms, etc.) is undertaken, but IGEO itself reports that its warnings have weak predictive capability. IGEO provides its warnings to NCPA for dissemination – but NCPA also issues its own warnings (independent of IGEO's), and IGEO and NCPA do not currently integrate their expertise to provide multi-hazard early warnings that consider all weather and climate-related threats in a systematic and consistent manner. Effectively, there is no single MHEWS and the partial, fragmented system that currently operates is not sufficiently 'joined up' with the NMHS.

Albania's emergency preparedness and response system is considered to be weak: of the 360 attributes associated with a mature system, 204 of Albania's are deficient or completely absent. The system can address everyday response needs, but it lacks the effective and coordinated inter-agency collaboration required for larger-scale events. As noted in a recent World Bank report, the Albanian emergency preparedness and response system "should seek to move away from an ad hoc, reactive approach and instead work in a systematic, consistent and integrated way, building on a long-term strategic vision." (World Bank, 2021)

Since 2015, prefects and mayors have had primary responsibility for disaster risk reduction. However, the funding to carry out this responsibility is limited, institutional capacities are generally low, community engagement is weak and central provision of tools and information – the hydro-met system and the early warning system being prominent examples – is fragmented and insufficient (GFDRR, 2022b) and (World Bank, 2021). Only 38% of municipalities have a local emergency plan developed after 2017 (Association for Local Autonomy, 2020) and most struggle to properly collect, manage and use disaster-related data (GFDRR, 2022b). Furthermore, the majority of plans focus on: (i) hazard *avoidance* measures (such as urban planning, the construction of river embankments, etc.) and/or (ii) post-hazard *response* (i.e. actions to be taken after an incident has occurred). A neglected area is *early* or *anticipatory* action: i.e. short-term measures to be taken in the period – typically, days or hours – between issuance of a warning and the onset of the hazard event (IFRC, 2022). Similar omissions are seen in other countries' hazard management systems (Perez et al., 2022a) and (Perez et al., 2022b), but in Albania the gap is particularly marked because of historical deficiencies in the country's forecasting and early warning capabilities (World Bank, 2021b); capacity limitations within municipalities (Association for Local Autonomy, 2020); and because of a traditional planning focus on hazard magnitude rather than *impact* (see below), with the result that municipal authorities often have a limited understanding of who and what will be most affected by a particular hazard event (UK Meteorological Office and IFRC, 2020).

Since 2015, several assessments, including by the World Meteorological Organization (WMO), the World Bank, the Austrian Meteorological Service (ZAMG) and, most recently, the Swiss Federal Office for Meteorology and Climatology (MeteoSwiss) as part of the ALBAdapt project preparation process, have identified the need for structural reform of the NMHS (Zentralanstalt für Meteorologie und Geodynamik (ZAMG), 2016), (World Bank and WMO, 2019) and (MeteoSwiss, 2023). The assessments come to similar conclusions regarding the modernization of Albania's NMHS to align it with global and European good practice and to achieve a modern service-focused organization, including the need for: (i) institutional strengthening, including – at a minimum – improved coordination between IGEO, Albcontrol, MMS and NCPA, and potentially the creation of an autonomous NMHS institution capable of making its own strategic and financial decisions; (ii) modernisation of the observation and telecommunication infrastructures; (iii) enhancement of the service delivery system, including the introduction of a National Framework for Climate Services (NFCS) to facilitate the supply of weather and climate information to a greatly expanded user-base (including, for example, municipalities, tourist resorts and farmers); and (iv) a strengthened MHEWS that is appropriately coupled to the NMHS.

Private sector enterprises are, in principle, well placed to play a complementary role to the NMHS by supplying specific climate services to corporate clients and individual consumers (USAID, 2020) and (EU Commission, 2015). Such climate services typically rely, at least partially, on data generated by national hydro-met services and provide additional value through modelling, analysis, visualization or advisory support (Soares et al., 2019). The Outcome Statement of the Third Multi-Hazard Early Warning

Conference, held in February 2023, explicitly highlights the value of public-private engagement in the context of early warning systems (UNDRR, 2023).

Partly because of the nascent and fast-evolving nature of the climate services sector (Warner et al., 2022) and partly because of the sector's segmented nature (different products serving different users and user needs in different national contexts) (Guentchev et al., 2023), a substantial fraction of climate service providers tend to be micro, small and medium-size enterprises (MSMEs) (Hoedjes et al., 2018). In the European Union, for example, MSMEs account for 23% of climate service providers, behind universities and academic research groups (40%) but well ahead of large companies (7%) and industry bodies (1%) (Cortekar et al., 2020). In Albania, MSMEs account for 99.8% of all enterprises and employ 82% of the working population (OECD, 2022), and they represent a promising means of overcoming the "inertia of 'what we've always done'" (Gelobter, 2015): they can, at limited or no cost to the government, demonstrate the feasibility of innovative ideas, which can then either be developed further and/or be adopted by established market participants (OECD, 2018).

Albania certainly offers significant *potential* from an innovation and business creation perspective:

- The population is young, with a median age of 38 years (compared to 45 years in Germany, for example) (Worldometer, 2023);
- Albania has a high ratio of university-educated citizens, producing ~10,000 graduates per year. Because only 4,000 jobs are created annually, there is a significant pool of talent available and currently under-utilized (Republic of Albanian, 201);
- Albania is a low-cost environment on the periphery of the European Union;
- Its small domestic market does represent a constraint on business growth, but other small countries – notably, Israel, Estonia and Slovenia – have successfully established vibrant innovation ecosystems;
- Albania's economy is disproportionately reliant upon climate-sensitive industries (European Central Bank, 2019)– notably, energy generation (hydropower and, increasingly, wind and solar power), tourism and agriculture – which presents a significant business opportunity and innovation incentive for enterprises offering climate services and tools if and when an effective NFCS is put in place.

Nonetheless, generating user-oriented climate services and usable climate information products, requires dialogue and coordination between a variety of actors, which is currently absent on any meaningful scale in Albania (Allis et al., 2019). Albania lacks a National Framework for Climate Services (NFCS) that could facilitate such objectives (Hewitt and Stone, 2021). Moreover, the general business and innovation environment in Albania can be challenging: Albania ranks 63rd in the World Bank Ease of Doing Business Index, higher than Bosnia and Herzegovina but significantly lower than (for example) North Macedonia, Moldova or Montenegro (World Bank, 2019d) and (IFC, 2022), and Albania is the lowest-ranked country in Europe, and the lowest-ranked upper middle-income country globally, in the Global Innovation Index (GII) (WIPO, 2022). The current market for private sector climate services is extremely under-developed (only one enterprise is currently active in the sector), offering few case-studies, role models or lessons-learned for enterprises or the institutions – incubators, universities, government agencies, etc. – that support them. Currently, at the regional and municipal levels there are some projects that incorporate risk reduction efforts into plans and activities (see, for example, the ongoing baseline projects in Table 5). However, in general, a lack of cross-sectoral cooperation across multiple ministries hampers upscaling and broadening of these activities. The roles and responsibilities of all actors need to be clarified.

5.3.2 Infrastructure, Technical and Service Barriers

IGEO is responsible for 83 synoptic surface meteorological stations, of which 63 are manually operated. This results in a horizontal resolution that, in principle, is compliant with the Global Basic Observing Network (GBON) regulations, given Albania's surface area (WMO Wigos, 2023). However, it is generally the case that the majority – and occasionally all – of the automatic stations do not transmit data. All of the stations – automatic and manual – are in a poor state, and the diversity of different station technologies in use (SEBA, ETG, Davis) presents IGEO with maintenance and data storage difficulties. Manual observations are carried out by residents with no formal training as observers, and there is no routine quality control of this data. IGEO does not provide nowcasting services. MMO does provide information that could, in principle, be used for nowcasting, although transmission of this information is

performed manually by telephone on a 3-hourly basis (and an hourly basis for military air traffic control). Only the 13 manual stations operated by MMS currently supply data to the WMO Integrated Global Observing System (WIGOS) (WMO Wigos, 2023). Of the 104 stations in IGEO's hydrological network, 82 are manually operated. The manual stations supply data only once a month. In theory, the automatic stations transmit every two hours, but a significant fraction are, at any one time, typically non-operational (European Commission, 2018a). There is a pressing need to upgrade existing stations, re-activate previously functioning stations and install new stations (Table 8).

Table 8: Profile of IGEO hydro-meteorological stations

Type of Stations	Number of Stations	Operational Status	Operational Context
Meteorological stations	<ul style="list-style-type: none"> 63 manual 5 automatic 15 both 	<p>Manual: 25% need to be replaced; 70% need to be repaired / recalibrated</p> <p>Automatic: 100% need to be repaired / recalibrated</p>	<ul style="list-style-type: none"> 60% are fenced 8% are located on state land, 92% on privately-owned land 75% are located in areas served by 2 mobile operators and 24% by one operator; 1% have no network coverage
Hydrological stations	<ul style="list-style-type: none"> 82 manual 3 automatic 19 both 	<p>Manual: 23% need to be replaced; 72% need to be repaired / recalibrated</p> <p>Automatic: 100% need to be repaired / recalibrated</p>	<ul style="list-style-type: none"> 91% are located on state land, 8% on privately-owned land 67% are located in areas served by 2 Albanian mobile operators and 28% by one Albanian operator; 4% have only Montenegro network coverage and 1% have no network coverage

Only ten years of meteorological data, and 20 years of hydrological data, have been digitised; the digitized data has not been quality-controlled or integrated into a single, usable database. Meanwhile, the paper-based archive continues to grow each day (UNDP, 2022a). Rating curves have only sparsely been updated (some with the support of GIZ), with many still dating to before 2008 (European Commission, 2018b). Measurements have been undertaken by a variety of projects, using different equipment and methodologies: most are not compliant with the standards established by WMO for their intended application. Not all rating curves have been digitised: some exist only as hard copies on millimetric paper. Uncertainties associated with the rating curves lead to uncertainty for the flood hazard maps that have been developed – which, themselves, have been created by a range of institutions at different times using different methodologies. With the exception of the Drin basin flood forecast system (supported by GIZ), no rainfall-run-off models are currently operational. The potential impacts of climate change are rarely incorporated into river modelling or flood mapping (GIZ, 2018a).

Despite investment in the meteorological and hydrological networks, there is no comprehensive national policy for the observational networks – for example, in the context of ownership, full life-cycle operations and maintenance costs, and replacing observational stations. The affordability of the network is a major barrier to its successful operation – and also stands in stark contrast to the mandate imposed on the NMHS by the Law on Climate Change. The mind-set of IGEO remains one of a research institution: interaction with external users is not considered a core task and there is, therefore, no formal system or platform to engage with users. The institution responds only to specific requirements upon official (government) request. Due to this 'passive' stance towards users, no climate product co-design or co-development is undertaken with users or user-groups. Furthermore, it is not evident from its official mandate as the NMHS that IGEO is even expected to serve a broad user-base.

NCPA issues serious warnings through the National Emergency Broadcast System (NEBS), which disseminates messages through radio and television. The broadcasters are obliged to interrupt programmes in case of an emergency; NCPA has good working relations with the broadcasters and the system works reasonably well. Use of other communication platforms offering direct channels to the general public, notably websites and social media (such as Facebook, X (Formerly Twitter and Threads), is less systematic and more ad hoc; instead, it is still common practice for warning messages to be passed from the national level to municipalities (often by means of manual phone calls), and then from municipalities to individuals. Church bells and mosque sound systems are often activated locally in these circumstances.

Despite having a high rate of mobile phone ownership – 122% penetration, meaning an average of 1.22 mobile phones per capita (Dateportal, 2023) – and a simple network architecture consisting of only 2 operators (Vodafone and One Albania), Albania does not have a warning system that operates via mobile phones. Such systems – which typically send a Short Message Service (SMS) text warning (Location-Based SMS (LB-SMS) or Cell Broadcast (CB)) or which use Automatic Voice Calling (AVC) to deliver recorded messages (EENA, 2019) – have proved effective in other countries at reaching target populations in localized areas at risk (Hauri et al., 2022), (Kim et al., 2019), (Budimir et al., 2021). Since 2022, the European Union has required all Member States to operate an early warning system capable of sending alerts to all mobile phone users located in an at-risk area (The requirement was introduced in Article 110 of the European Electronic Communications Code (EECC) in 2018 and entered into force in June 2022). The EU does not stipulate a particular technology for mobile-based early warnings, but it does stipulate that such warnings should be easily received and not require a log-in, that warnings should be free of charge to the user and that the system should be in compliance with privacy laws. Mobile systems can be particularly useful for alerting otherwise hard-to-reach groups, including youth and individuals who work outdoors (e.g. in agriculture and construction) (National Academy of Sciences, 2018). The technology underlying mobile alert systems is well established and governed by recognized international standards (The Cell Broadcast (CB) approach, for example, is defined in 3rd Generation Partnership Project (3GPP) Technical Specification (TS) 23.041 for Global System for Mobile Communications (GSM), Universal Mobile Telecommunication System (UMTS), Long-Term Evolution (LTE) and 5G. Use of Cell Broadcast (CB) in the EU is specified in European Telecommunications Standards Institute (ETSI) TS 102 900).

Albania's early warning system is not truly multi-platform, is inefficient and offers little certainty that all individuals, particularly vulnerable individuals, will be reached in a timely manner (if at all) (World Bank, 2021b). Extending the warning system to incorporate the Web, social media and mobile offers considerable potential, especially given Albania's high rates of internet, social media and mobile phone penetration, with accompanying high bandwidths (Albania has 80% internet penetration and 56% social media penetration. The median fixed internet download speed is 44.6 megabits per second (Mbps) and the median mobile internet download speed is 39.3 Mbps. Datareportal (2023), Digital 2023: Albania: <https://datareportal.com/reports/digital-2023-albania>).

Forecasts and warnings issued by the NMHS and NCPA are weather- or hazard-related, not impact-related: they focus on what the weather will be, rather than what the weather will do (UK Meteorological Office and IFRC, 2020). Impact-based forecasting typically requires more data (notably, data about communities' exposure and vulnerabilities to different hazards), analytical sophistication and expert judgement than 'standard' forecasts (AghaKouchak et al 2023) and (Boult et al (2022), and the early warning systems in even the most advanced countries are only slowly developing impact-oriented capabilities (Potter et al., 2021) and (AAAA, 2022). But the provision of actionable information to communities – and especially vulnerable or marginalized communities – offers significant effectiveness and efficiency benefits for an EWS, particularly in the context of enhanced preparedness and hazard mitigation (Meléndez-Landaverde and Sempere-Torres2022), and commensurately reduced post-hazard response and recovery needs (WMO, 2021a). Furthermore, anticipatory action ('forecast-based action', FbA) and the release of emergency funding ('forecast-based financing', FbF) can be coupled to impact-based forecasts (Anand, 2022), (InsuResilience Global Partnership, 2023) and (Uprety, 2022).

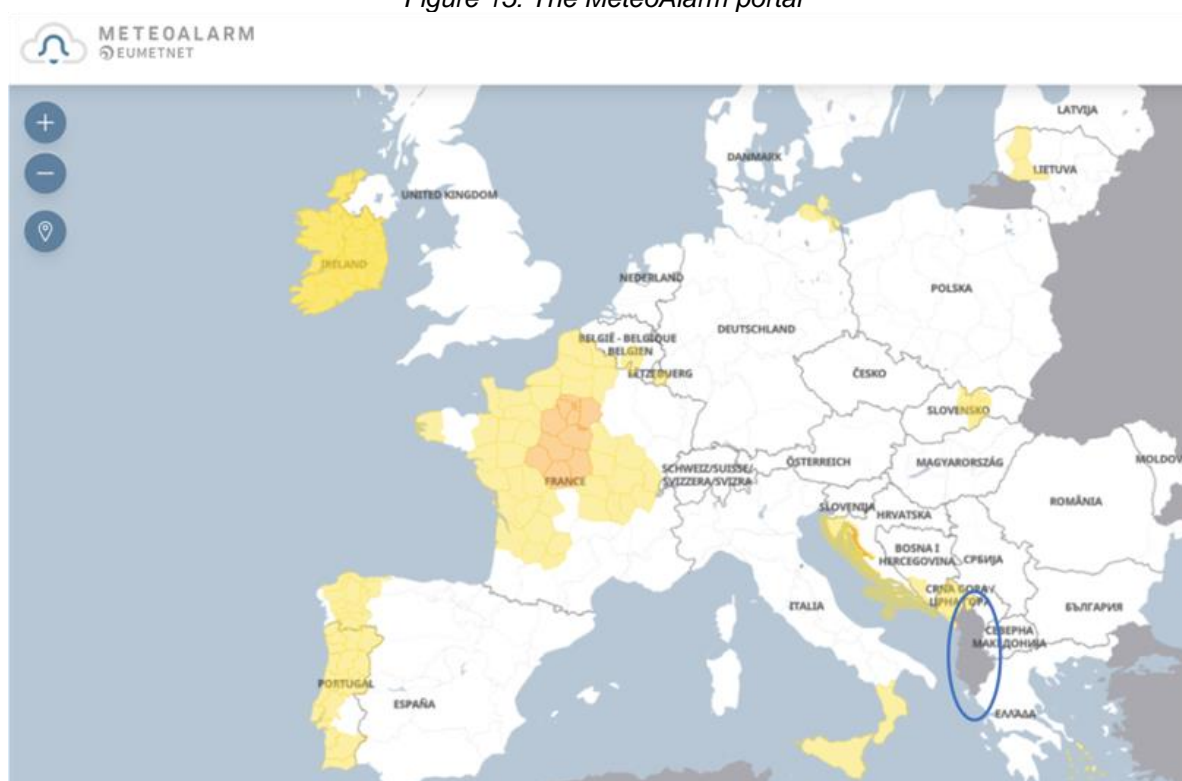
Regional and international data-sharing form core elements of a successful national hydro-met system (Alliance for Hydromet Development, 2021). Albania is already a member of the South-East European Climate Outlook Forum (SEECOF), one of the worldwide network of WMO Regional Climate Outlook Forums (RCOFs), as well as the South-East European Consortium for Operational Weather Prediction (SEECOP), but its participation in both organizations has been limited, and mainly passive, to date. Furthermore, neither the NMHS nor NCPA make full use of external European resources – collectively known as the European meteorological infrastructure (EMI) (EUMETSAT.int, 2023) – that would help improve forecasts and warnings, including impact-related forecasts and warnings, of weather, hydrological and climate-related hazards. The ECMWF, for example, provides a range of weather and climate products that Albania, as a member of WMO, could use more effectively to support its weather and climate services and to enhance its flood forecasting system. In addition, licensing of ECMWF products would provide greater access to data that could be used to improve the initialization of local hydrological models. On behalf of the European Commission, ECMWF also implements the Copernicus Climate Change Service (C3S), which provides authoritative climate change information to support countries' adaptation strategies. ECMWF also supports the South-East European Multi-Hazard Early

Warning Advisory System (SEE-MHEWS-A), which aims to strengthen existing early warning capacity in the region, including Albania. The system aims to improve numerical weather prediction, nowcasting, flood forecasting and marine / oceanographic capabilities using local information and multiple models. However, to take full advantage of this capability, Albania needs to improve and share its observations in line with the SEE-MHEWS-A data policy.

Other EMI-related initiatives include:

- EUMETNET, a network of 31 NMHSs in Europe that share data and forecasts;
- the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), which operates five meteorological satellites;
- the European Weather Cloud, which provides cloud-based processing capabilities for national meteorological services; and
- MeteoAlarm, which compiles and processes warning information from 37 European NMHSs, covering 12 hazard-types Figure 15.

Figure 15: The MeteoAlarm portal



Source: MeteoAlarm

Albania is one of only 2 European countries that does not share warnings internationally; it is, therefore, displayed in grey. The absence of a national MHEWS to guide early action and response to a cascade of climate and related weather, hydrological and climate threats prevent Albania from fully implementing its recent Law on Climate Change and Law on Civil Protection. It also hampers the use of weather and climate information for humanitarian decision-making because early warnings are neither communicated using all available digital technologies nor include sufficient data and information to enable people to make informed decisions and take early action to reduce risks. Instead, the current system is primarily oriented around post-disaster response rather than monitoring and pre-emptive action.

Software-based decision support tools (DSTs) can play a valuable role in MHEWS operations through (inter alia): incorporating expert knowledge – including specialised scientific knowledge that is not readily available locally – into decision-making; establishing analytical frameworks (typically with a probabilistic dimension) for assessing climate hazards in a consistent, comprehensive manner; relating individual hazard assessments to broader, pre-established response scenarios; and providing recommendations

for pre-emptive, real-time and post-hazard response actions (issuance of alerts, release of emergency funding, triggering emergency plans, etc.) (Komendantova, 2014). Artificial intelligence (AI) will increasingly enable DSTs to 'learn' and improve over time (Sun et al., 2020), and new data sources – social media data, geo-located data, etc. – offer significant potential to augment traditional hydro-met data (Wu and Cui, 2018). However, even basic DSTs are not currently employed in Albania. This limited technical sophistication is particularly notable because, in other respects, Albania has established itself as a regional leader in digitising government and delivering digital government services (OECD, 2022), (Satka et al., 2023). Lack of site-specific information on the potential impact of climate change on planned interventions increases the uncertainty in the long-term effectiveness of climate measures, including EbA / eco-DRR. In this regard, recent efforts to introduce EbA in Albania (Ministry of Tourism and Environment, 2020) highlight the need to improve planning and management of interventions to ensure that they are technically feasible.

5.3.3 Human Resource Barriers

Insufficient human resources in the NMHS are a significant barrier to the provision of improved climate information services. IGEO currently employs 58 employees, all of whom work in the headquarters in Tirana (as IGEO does not operate regional centres). IGEO is organised across operational departments, including Seismology, Meteorology, Hydrology and Geology. Of the total staff, ten work in the Department of Meteorology and 12 in the Department of Hydrology, with a further three in information communications and technology (ICT). As the academic staff allocate only 30% of their time to operational duties, the NMHS is, in effect, run by fewer than ten full-time-equivalent staff. There is limited university education and other training for the NMHS staff to support their operational duties – there is, for example, no specific study programme for meteorology or climatology in Albania – and few, if any, technicians to support the operations and maintenance of observational networks.

NCPA has a larger cadre of staff. Nonetheless, the institution was established recently – in 2019 – and only in 2020 did its staff numbers increase from nine to ~60. The institution is still evolving and undergoing structural reform: staff training, hazard forecasting, vulnerability assessment, a functional early warning system, improved inter-institutional coordination and strengthened support to municipalities remain urgent needs, as identified by (inter alia) the Post-Disaster Needs Assessment (PDNA) after the 2019 earthquake (World Bank, 2020a).

The Law on Civil Protection (2019) calls on municipalities to organise civil protection training activities for employees and residents in their territories; however, there are no such training initiatives besides ad hoc support provided by the Albanian Red Cross. Community engagement initiatives are currently weak: as a result, community awareness of climate hazards and appropriate response measures – both immediate and longer-term – is generally low. Most municipalities do not have resiliency plans, disaster risk reduction plans or emergency response plans in place, despite this being a legal requirement. Those that do exist are often not up to date. Municipalities “need guidance, hands-on assistance and knowledge-building” to draft such plans (World Bank, 2021b).

While EbA interventions have to date been implemented on a small scale, many of these interventions require adequate structure and human resources at local and regional levels. Greater awareness and training are required to reorient EbA away from its historical focus on shoreline protection towards wetlands, lagoons and rivers, which account for the majority of climate-related disasters (Ministry of Tourism and Environment), (Feld et al., 2018). To increase the effectiveness of EbA interventions, particularly with a view to more efficient upscaling and replication, there needs to be a dedicated communication and knowledge transfer framework in place, in order for the derived information to be better shared. In addition to the need for a central database of EbA experts, earlier baseline projects have also identified the necessity of the government to build up its own institutional capacities to support EbA Implementation.

5.3.4 Gender-Related Barriers

Women tend to be disproportionately affected by climate shocks (UN Women and UNICEF, 2019), (Kreutzer et al., 2023). But women tend also to be under-represented in decision-making and sub-optimally served by climate information and early warning systems (UNDRR, 2022). Involving women in designing, implementing and raising awareness of early warning has been shown to make a significant contribution to the effectiveness of a national MHEWS (Pudmenzky et al 2022), (GCF, 2022).

Surveys conducted for the Fourth National Communication to the UNFCCC reveal that there are significant differences in Albanian men's and women's ability to react to climate change, and that men are more able to address climate change issues (Republic of Albania, 2022a). Moreover, the Fourth National Communication finds that women are more exposed to climate risk than men due to greater engagement in farming. When considering a catastrophic event, it is observed that women are affected differently by climate impacts. As an example, during flood events, Albanian women face increased domestic violence (Axxhemi, 2019), (Poni, 2022) and see their domestic workloads increase, their incomes fall and they suffer from disruptions in services (Musabelliu, 2020). Natural disasters also more significantly affect women's health, especially among pregnant women (Cërmjani et al., 2020).

UN Women, in collaboration with the World Bank, UNDP, the EU Delegation and FAO, carried out a rapid gender assessment of the impact of floods in 2015 (UN Women, 2015). The assessment underlined: damage to crops and land was a major concern to women, as they clearly suffered significant losses of products for both personal consumption and sale, including loss of livestock and animal feed (animal care and milking traditionally being women's work), as well as damage to barns, which further exacerbated the situation. Damage to homes, furniture and household equipment, as well as persistent dampness, were also cited as major concerns for women because of societal expectations that 'domestic' affairs were their responsibility. According to 64% of respondents, domestic violence increased after the floods. Women reported having been treated differently than men in relation to the distribution of aid by municipality officials, where men had easier access to municipality staff and benefited more from state support. Law No. 9970 (2008), 'On Gender Equality in Society', regulates the fundamental issues of gender equality in public life, of equal treatment of women and men, and equal opportunities for the enjoyment of rights. It stipulates the mandatory collection of gender statistics by all state bodies, as well as the establishment of institutional structures and mechanisms for advancing gender equality. According to the Law, gender equality implementation and monitoring are the responsibility of the Ministry of Health and Social Planning (MoHSP) and are operationalized through a network of gender equality employees (GEEs) in central and local government institutions. The Law mandates central and local government institutions to collect and analyse sex-disaggregated data, and the Institute of Statistics (INSTAT) to compile and report sex-disaggregated data. However, Albania does not currently produce climate-relevant sex-disaggregated data on any meaningful scale. For example, INSTAT's flagship annual statistics bulletin on gender issues, 'Women and Men in Albania', does not provide any gender-disaggregated data on natural disasters, emergencies, relief or the climate sector (INSTAT, 2021).

During preparation of the ALBAdapt project, IGEO confirmed its firm commitment from senior management to mainstream gender equality in planning and programming. Women are well represented among the staff of IGEO, and two out of five heads of departments are women. According to questionnaire survey responses, staff have been trained to have the necessary knowledge and skills to mainstream gender in their work. However, IGEO does not have a dedicated GEE, a written gender policy, an anti-discrimination policy or a sexual harassment policy.

In NCPA, there is political and managerial will to integrate gender aspects into planning, programming and services. Upper management is mostly dominated by men, but the working environment has improved for women and men over the past two to three years. However, NCPA does not have a full-time GEE. Staff have been trained to some extent on gender issues, but there is a significant technical gap with regard to specific capacities for gender mainstreaming, gender impact assessment, use of gender statistics and indicators, gender budgeting in programming, etc. Technical capacities – including skills, knowledge and expertise – and resources need to be enhanced for NCPA to effectively carry out gender mainstreaming. NCPA does have internal policies on gender, discrimination and sexual harassment, but they are rudimentary, and they lag far behind the institution's vision.

At the municipality level, gender mainstreaming is not yet routine practice due to, inter alia, a lack of well-diffused awareness on gender issues, insufficient training and education of staff, limited funding for gender-related initiatives, and resistance to change from male-dominated emergency response services. Multiple studies concur that women-led companies tend to be disadvantaged in terms of access to capital and social discrimination, but, when these constraints are statistically controlled for, women-led enterprises are nonetheless found on average to be more profitable, more robust (i.e. less likely to fail) and more successful at reaching hitherto-untapped market segments (World Bank, 2014). Women also tend to develop more mission-driven businesses, such as green or inclusive ventures (2X Climate Finance Taskforce, 2021). It is not clear how far such findings can be generalized, but, at the

very least, they point to the need to take gender into account in the design of entrepreneur support measures (Gabarret and D'Andria, 2021).

In the case of Albania, a particular need for business competitions and networking platforms for women has been identified (Kruja and Kalluci, 2021). But the role of women in Albania's business environment has shrunk in recent years: the number of women-owned enterprises peaked in 2017 and has fallen by ~10% in the intervening years. Currently, ~26% of enterprises are managed by women (OECD, 2022). Albanian women entrepreneurs report greater difficulties (than men) accessing sources of finance and accessing new markets, particularly for women entrepreneurs located outside Tirana (Gjoka and Duka, 2020), (Laudano, 2018). There is also a considerable gender pay gap: on average, Albanian men tend to earn 18% more than women for equivalent work (Ahmetaj, 2023).

5.3.5 Vulnerable Groups

The National DRR Strategy identifies the most vulnerable groups as: financially disadvantaged families; marginalised and socially excluded communities, including minorities and LGBTQ community members; women; children; the elderly; and people with disabilities. To be effective, a truly people-centred MHEWS must be:

- i. Inclusive of the needs, perspectives and priorities of vulnerable groups in society;
- ii. Accessible to all, ensuring that information can reach vulnerable groups and in a way that is easily understood; and
- iii. Actionable, providing information that includes potential impacts and recommended actions to avoid or minimise those impacts (UNDRR, 2022).

To achieve these objectives, a MHEWS must, inter alia, include vulnerable groups as valued stakeholders, help address barriers to their participation and collect suitably disaggregated data (GFDRR, 2022a). Under the Law on Civil Protection (2019), vulnerable groups are supposed to receive particular attention – differentiated according to needs – in municipal emergency plans. However, only approximately half of municipalities have set up community engagement structures to assess such needs and, as noted above, barely one-third have an up-to-date emergency plan in place (Association for Local Autonomy, 2020).

5.3.6 Financial Barriers

In 2022, IGEO had a budget of Euro 1.1 million, approximately half of which was allocated to meteorology and hydrology. There has been little change in the budget in recent years. The Country Hydro-Meteorological Draft Diagnostic Report developed by MeteoSwiss during ALBAdapt project preparation concludes that “the resources available to IGEO are not in line with the duties the NMHS is mandated to fulfil.” ZAMG comes to a similar conclusion: “it is very unlikely that the existing strategy of [IGEO] can be implemented under current and future economic and financial conditions.” These financial constraints have significant implications for any upgrades to the meteorological and hydrological observation networks, since the total cost of ownership should not exceed the potentially available budget for the network to be sustainable.

Similarly, commitments are needed to increase funding to sustain a functional MHEWS and to prepare the ground to upscale EbA, which plays a prominent role in Albania's NDC, as well as to reach ‘last mile’ (i.e. final) users and beneficiaries. With regard to civil protection, the World Bank notes that “financial preparedness is relatively strong, but this does not completely reflect reality. Financial regulations are very well established, but actual implementation is not currently up to par, and the lack of structural funding affects the sustainability of emergency preparedness and response investments.” NCPA's budget from the state – approximately Euro 28 million in 2022 – has increased significantly since NCPA's establishment in 2019, but the majority of its cash inflow is from donor funding rather than the state budget (BDO, 2023) (GFDRR, 2020).

Under the Law on Civil Protection (2019), municipalities are obliged to allocate at least 4% of their budgets to disaster risk reduction and civil protection. But few municipalities meet this threshold and most ultimately rely upon central government assistance in case of an emergency (GFDRR, 2022c). The portfolio of financial resources available to municipalities has progressively expanded since 2015, with municipalities now able – subject to limitations outlined in the Law on Local Self-Government Finance (2017) – to impose local taxes and user fees, and to borrow. Municipalities currently raise

approximately 29% of their financial resources locally, with the remaining 71% provided by central government (GFDRR, 2022c). However, the roles and responsibilities of local government have also expanded, with the result that one-third of municipalities are in debt (Association of Albanian Municipalities, 2020). The Ministry of Finance and Economy has issued guidance that municipalities must not increase their current debt levels (Albanian Daily News, 2022).

5.3.7 Policy barriers and capacity gaps

Albania's DRR system is a system in transition: recent legislation provides a solid framework for DRR, but institutions are now challenged to revise outdated strategies and plans while building capacity for implementation.

In July 2019, GoA approved the new 'Law on Civil Protection' (45/2019), which replaced Law 8756/2001 'On Civil Emergencies'. There is currently no National Strategy in place on Civil Protection and DRR. The new law establishes the NCPA, under the Ministry of Defense (MoD). This function was previously handled by the General Directorate of Civil Emergencies under the Ministry of Interior (Mol) until 2017, and then under MoD. Whereas extreme hydro-meteorological events were previously dealt with only in actual emergency situations, in the form of post-disaster response, the new law provides a bold framework for a paradigm shift promoting DRR. This includes a requirement for disaster risk assessments at both the national and local levels to be completed within two years of its approval. It also requires the preparation and adoption of national and municipal DRR strategies, with special attention given to gender as well as to marginalized and vulnerable groups. As most disasters in Albania are weather- and climate-related events, the institutional developments mandated by the new law need to be accompanied by a comprehensive climate risk management approach. The NCPA exercises coordinating, technical supervisory, leading, and serves as a controlling national authority in the field of DRR and civil protection. It regulates the functioning of the civil protection system and defines their structure, rights and obligations for civil protection in case of disaster within the territory of the Republic of Albania endorsed by DCM No 747 (2019) "On the organization and functioning of the NCPA". The institution is in charge of developing and implementing three strategic documents, i.e. 'The National Strategy for Disaster Risk Reduction', 'The Document for Risk Assessment' and the "National Plan for Civil Emergencies".

In January 2020, the Government approved the establishment of the NCPA with 106 staff members. The law establishes the good practice that line ministries set aside a budget line for DRR and civil protection activities, allocating 2-4% of their annual budget, while municipalities should budget no less than 4%. However, the municipalities, which – in accordance with Albania's ongoing decentralization process – play an increasingly important role in DRR, still lack the resources and know-how to implement their new mandates. By-laws, concrete DRM strategies, plans and activities at national, regional and municipal levels still need to be harmonized with the risk reduction paradigm stipulated in the Law on Civil Protection and recent institutional and organizational changes. Roles and responsibilities of all actors, including the NCPA and municipalities, still need to be clarified and harmonized. This includes the role of IGEO in monitoring hazards. As noted earlier, there is currently no policy to create a national framework for climate services within which the climate information service, early warning and early action could be embedded. This must be addressed to implement a comprehensive climate service value chain. The respective roles of NCPA as the entity responsible for risk reduction and the NMHS as the source of hazard information are poorly defined and need to be developed within a national MHEWS policy.

Enacting the Law on Climate Change (2020) was a significant step. The balanced focus of the Revised NDC on both mitigation and adaptation signals increasing government awareness of, and commitment to, climate adaptation. The incorporation of adaptation priorities into Albanian sector plans has started. However, there is not yet a comprehensive, multi-sectoral and practical approach to addressing climate vulnerabilities throughout the country, and policies are lacking in different sectors to steer the mainstreaming of climate risk and adaptation, including for planning, implementation and budgeting. Nature-based solutions are accorded high priority in the list of adaptation interventions in the Revised NDC but there is little experience of implementing these approaches at scale. The current climate risk governance regime also inhibits the effective generation and utilisation of climate information and services (UNDP, 2016a). The stated goal of reducing disaster risk outlined in the Law on Civil Protection

(2019) is an opportunity to address those aspects of climate risk that can be reduced through early warning and early action. This would also align with the National Disaster Risk Reduction Strategy.

As noted above, there is currently no policy to create a national framework for climate services within which the climate information service, early warning and early action can be embedded. This must be addressed to implement a comprehensive climate service value chain (GIZ and DWD, 2019). The respective roles of NCPA as the entity responsible for risk reduction and the NMHS as the source of hazard information are poorly defined and need to be developed within a national MHEWS policy that encompasses all relevant stakeholders. Absent such a policy, the capacity of each of the actors – public, private, civil society and academic – to provide the best possible climate services to the citizens of Albania will remain limited.

There is no policy framework to harmonize the complex ecological, social, legal, institutional and political considerations needed to mainstream EbA / NbS across sectors (Temali, 2021) (GIZ and DWD, 2019). For example, there is no agricultural policy that encourages farmers to support EbA and many potential EbA interventions within the coastal zone are limited by existing mandates and administrative boundaries (Schwarz et al., 2018). While climate risk and adaptation are being increasingly integrated at the legislative and policy levels, actual adaptation and climate risk management is hindered by a lack of know-how, regulations and funding at all levels. Enacting the recent 'Law on Climate Change' (2020) was a powerful step. The balanced focus of the NDC on both mitigation and adaptation signals increasing awareness of, and commitment to, adaptation. The incorporation of adaptation priorities into Albanian sector plans has started. However, there is not yet a comprehensive, multi-sectoral and practical approach to addressing climate vulnerabilities throughout the country. This institutional weakness goes hand in hand with a lack of capacities in different sectors to steer the mainstreaming of climate risk and adaptation, including for planning, implementation and budgeting.

Constraints in the Albanian climate service value chain led to a significant discrepancy between the weather and CI currently (or potentially) available and the services required to effectively consider weather and climate risk in different sectors. In Albania, there are very few systematic investments in the value chain for climate services, either by the private sector (to generate products and services) or by the public sector (by demanding and paying for such products and services) (Ministry of Infrastructure, 2019). Uptake of CI by government or private users is limited since the information – even when it is generated and made available – is currently not corresponding to user needs. A rare exception is Meteoalb. As a small private company, it provides consultancy services (such as research, training and technical assistance) in the fields of meteorology, climate, hydrology, renewable energy, agriculture and environment. It provides short- and medium-range weather forecasts of up to ten days for the media; for air, sea and road transport companies; for telecommunication companies; and for weather-sensitive industries and activities. It also generates long-range weather forecasts of up to one month and dedicated forecasts for power generation companies.

In most cases, however, CI is generated on an ad hoc basis, as part of donor-funded projects or for larger companies, such as KESH. Existing information products are often not contextualized and are, therefore, not processable or even understandable. This is primarily attributable to the fact that it is often not clear or transparent what data and information exist, what it can be used for and why. This happens in a context where awareness about climate change impacts and solutions is only just developing in Albania.

This also has to be seen in light of the constraints on the general business environment and innovation potential in Albania: the innovation system in Albania is highly fragmented, with few linkages between science and the private sector, and with weak innovation support infrastructure. Universities are only slowly reorienting to not only providing employees for traditional industries but also to helping students to set up their own businesses. The government is slowly appreciating the potential of start-ups for Albania's economic growth and a legal framework for start-ups is currently being developed. Initiatives to set up business incubators / accelerators exist in Tirana but are in their infancy outside of the capital. On the positive side, Albania's population is very young, with a median age of 36.2, possesses strong foreign language skills, and features a high proportion of university graduates. Additionally, there is a large diaspora (1.4m Albanians live abroad) that could support domestic development through funds and knowledge (Tabak and Borkovic, 2019).

6. Additional Remarks for the Technical Assessment

The project design should take into consideration a series of technical aspects, prior to its implementation (Section 8 provides a detailed approach on the Project Design) which are here structured into seven major groups:

- i. Institutional strengthening;
- ii. Modernization of the hydro meteorological system;
- iii. An IB-MHEWS;
- iv. Decision support System;
- v. EcoDRR and NbS investments;
- vi. Climate advisory services;
- vii. Investing in CIEWS: a grant mechanism.

6.1 Institutional Strengthening

6.1.1 CIEWS Legal and Regulatory framework

The project would support in:

- strengthening the legal and regulatory framework of all agencies involved in developing the climate services value chain;
- improve the NMHS's institutional performance as the main provider of weather, climate, and hydrological information; improve NCPA's institutional performance as the main provider of impact-based warnings to users;
- build the capacity of the personnel and management; d) ensure the operability of future networks and systems.

The project could potentially focus on:

Legal and policy arrangements. This could include a) formulation of a law on weather, climate and hydrological services that is aligned with the Law on Climate Change, the Law on Disaster Risk Reduction and Civil Protection, National Strategy for Disaster Risk Reduction, Disaster Risk Assessment Document, National Plan for Civil Emergencies and MHEWS policy and which regulates and mandates, tasks, funding, open data, cooperation, and collaboration among the NMHS, MMS, and Albcontrol MET, and between the NMHS and NCPA; b) regulations and agreements needed to operationalize the legal framework and implement policies; and c) a National Framework for Climate Services policy.

Road mapping. This would include a) mapping all of the relevant paths that can be taken to meet end-users' needs; b) workshops with major stakeholders and users of the NMHS's products and services to develop the appropriate services; c) mapping the pathways to enhance and sustain the observational networks and improve the forecasting system; and d) utilizing regional cooperation more effectively, including Albania joining ECMWF, the European Meteorological network (EUMETNET), and the European Flood Awareness System (EFAS). EUMETNET operates Meteoalarm that integrates all office National public weather services across many European countries. Albania is the only coastal European state that is not part of this system.

Strategic planning. This would allow for engagement with a) major users of the NMHS's; b) internal staff; and c) writing the strategic plan. This includes business planning to develop a sound financial plan for the institutions' future operation. The strategic plan addresses how the elements in the roadmap will be achieved.

Business modelling. This would involve assessing the applicability of different business models to achieve strategic objectives, which would feed into the development of the Concept of Operations. This may include engagement with the private sector within the value chain. It will also consider potential commercial activities consistent with improving the performance of the NMHS and diversifying revenue streams informed by a business model's feasibility study.

Development of a Concept of Operations (CONOPS). This could include a) holding workshops with development partners to incorporate their activities; b) conducting a review of institutions' operations

and management (including observation and forecast systems' requirements); and c) drafting of a CONOPS to guide the design of the modernized systems.

Capacity building. Would allow for a) supporting the professional orientation of senior management; b) staff training, retraining and professional development; c) providing educational support for staff; d) offering training for key users and stakeholders; and e) strengthening the national training and educational institutions.

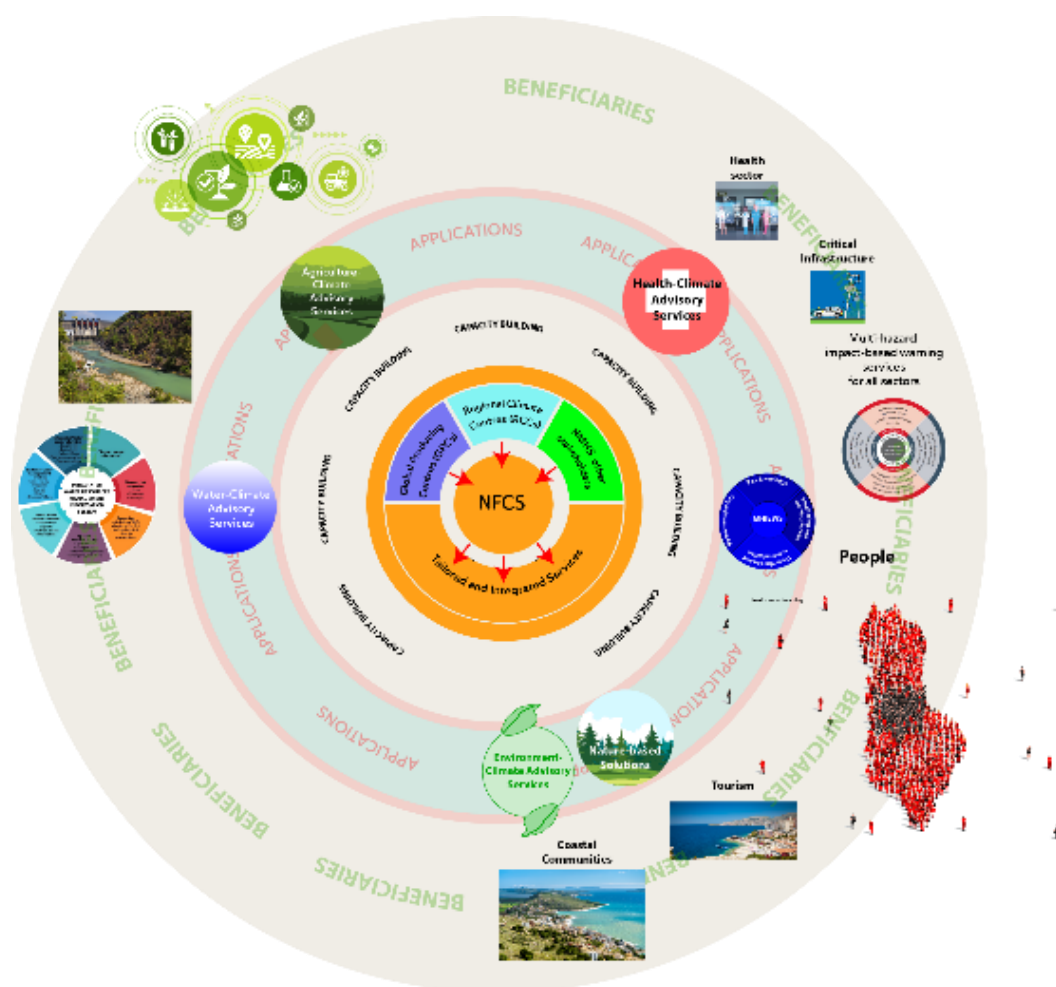
Upscaling of Climate advisory services. Such services have become increasingly common and contribute to improvements in productivity and reduced asset losses. Water-climate advisory services are also increasingly common to manage risks across the hydrological spectrum and reap the benefits of informed governance. Environment-climate advisory services can provide guidance on climate impacts on a range of critical ecosystems.

Additionally, based on the long-term vision of establishing a National Meteorological and Hydrological Service combined with the operationalization of such Climate Information for the purpose of operationalizing the Early Warning System, there are certain steps that ALBAdapt considers as imperative for the successful implementation of the project. On this regard, the project will focus on:

Strengthening the public weather services. This covers services related to disaster risk management, agriculture, the media, civil aviation (Albcontrol MET), health, energy, water resources, environment, and tourism. This includes a) developing a service delivery strategy – the principal interface between weather, climate and hydrological information producers and NCPA as part of disaster risk management and service quality management; b) the developing a PWS platform with NCPA to provide impact-based forecast and warning services – within the MHEWS c) creating broadcast quality bulletins and interviews in support of education and public outreach; and d) installing computer visualisation systems in user-defined locations, tailored to the stakeholder's specific requirements.

Creating a national framework for climate services (NFCS). This framework is intended to transform the traditional climatological role of the NMHS and other climate service providers in Albania to a full user-oriented service and to increase opportunities for the NMHS to provide relevant climate information to government decision-makers and WMO. This includes a) application of a digital library of all climate-relevant information from all sectors; and b) application of a national framework by engaging all climate-sensitive sectors. The first component of the ALBAdapt project will highlight the relationships between the global, regional, and national climate information production centres and the delivery of climate services in Albania. The MHEWS connects the NFCS with the ability to respond to an emergency, and for all sectors, including tourism, to take early action in response to tailored impact-based warnings. Similarly, the project connects the NFCS with economic and resource sectors including the environment, agriculture, tourism, and water resource management via climate advisory services developed with those beneficiaries (See Figure 16).

Figure 16: Scheme of the proposed national framework for climate services of Albania.



Source: Own elaboration

The NFCS links global, regional, and national climate information producers with beneficiary sectors and with disaster risk management through the MHEWS. In Europe, WMO region VI has established a consortium of regional climate centres (RCCs) to provide guidance to national services. There are several global producing centres (GPCs) of which ECMWF is one. Tailored services are often provided exclusively by the NMHS; integrated services, for example agriculture-climate advisory services, combine climate information with sectoral data usually within the application sector and may be coproduced by several stakeholders including, but not exclusively, the NMHS.

The NFCS, with the inclusion of the Ministry of Tourism and Environment (MoTE) and NCPA (Directorate of Education, Trainings, and Information Technology Systems), could allow for the project to develop and implement a public, effective and target oriented communications strategy for different actors, and design and implement a multi-media outreach and awareness-raising campaign about climate change impacts and adaptation solutions considering the specific social, economic, and cultural background of different actors and stakeholders, to effectively address them.

The NFCS would support capacity development for the elaboration, improvement, implementation, replication, and uptake of climate services and Ecosystem-based Adaptation (EbA), building and strengthening capacities of individuals, organizations, and institutions at different levels, cooperating with Universities, Government and NGOs. In collaboration with Albanian universities, such as Polis University and Tirana University, and with a view to long-term integration of climate change adaptation into academic teaching and research, the project will support curriculum development for topics related to the use of Climate Information with the goal in mind of adhering to the human resource constraints that have to be addressed prior to the establishment of the NMHS.

The NFCS could also provide guidance for the establishment of an incubator to turn innovative ideas into usable and marketable products and services. The NFCS (Through a user interface platform, namely the National Climate Information Service) will be a source of technical advice, facilitate access to information, build capacities, support alliances, and promote public-private partnerships among start-ups, researchers, SMEs and consulting firms to transform climate data and services into customized applications and tools needed by end-users, including municipalities, sector departments, the private sector (e.g., agricultural and tourism enterprises) and individuals (such as farmers).

6.1.2 Developing a MHEWS Policy Framework

In addition to the regulatory and institutional strengthening of the NFCS, the project should also produce a MHEWS policy that defines the roles and responsibilities of all stakeholders to improve decision-making and early action in response to a range of hazard risks.

Warning services originally intended for meteorological and hydrological hazards are transitioning to a more inclusive all hazards – natural and human-caused – approach. which places greater emphasis on the central role of disaster management. While each hazard may have some unique characteristics, the aim must be to provide information that helps people make decisions that reduce or eliminate harm. Warnings are needed to help societies, which include individuals, families, communities, local authorities, humanitarian agencies, commercial enterprises, civil contingency agencies, government departments and politicians, make appropriate and timely decisions when faced with the threat of the impact of any hazard.

At each level from the individual to the politician, there is a cadre of different cooperating bodies that contribute to decision-making, taking early actions to mitigate the threats, producing information on the evolution of the threats, and ultimately taking responsibility for the outcomes. The MHEWS policy is needed to address the institutional and operational functionality of the system addressing the complex multi-level governance arrangements, and the roles, and responsibilities of all actors. It guides the development and revision of legislation and regulations, national development policy and disaster risk management programming. The policy is also intended to harness human resources as well as public and private investments. The policy advocates for practical measures that the whole of society can take to improve the MHEWS, ensuring that the four pillars of the early warning system are captured, creating the required enabling environment and establishing guiding principles (Figure 17).

The policy could enable NCPA to incorporate MHEWS into a new National Plan for Civil Emergencies as well as the National Strategy for Disaster Risk Reduction. The policy will also align with the development of DRR guidelines for emergency plans at the municipal level and will aid unifying the structure and themes of DRR plans to reflect the specific needs of local areas. MHEWS is ultimately a multi-stakeholder effort involving all levels of government, public and private sectors. key stakeholders will include the NMHS, NCPA, county and municipal administrations and their Emergency Operations Centres, community representatives, national and local media outlets, private sector representatives from the tourism industry (such as hotels and recreational parks) and the agricultural sector (such as farmer associations), and emergency services. Under the leadership of municipal administrations and the NCPA (including its local centres), the project will engage with all the above stakeholders to revisit existing, and develop new, standard operating procedures (SOPs) that define each actor's responsibility and action in line with the specificities of different hazards (such as the differences in lead time associated with rapid and slow onset events), as well as people and locations at risk.

Figure 17: MHEWS policy framework comprising the four pillars of the early warning system, the key components of the enabling environment and the guiding principles for the successful implementation and operation of a MHEWS



Source: Final Model National Multi-Hazard Early Warning Systems (MHEWS) Policy (Prepared for Caribbean disaster management agency). Available from UNDP Latin America and Caribbean.

6.2 Modernization of the Hydrological and Meteorological system

In order to make available quality data, the project should a) modernize the observational networks, communication systems and ICT of the NMHS and other agencies based on a sustainable business model and Concept of Operations (see above); and b) improve the meteorological and hydrological forecasting system in the NMHS and the ability to provide impact-based forecasts in collaboration with NCPA and other agencies. The main suggested activities are:

Technical modernization of the observation networks. This includes a) rehabilitation and reequipping meteorological and hydrological networks including expanding automation of meteorological stations and upper air stations to comply with the WMO GBON requirements; b) refurbishing and expanding ground-based remote sensing systems for nowcasting and very short-range forecasting (radar and lightning detection); c) recalibration and regular updating of rating curves for key rivers; and d) strengthening quality control (calibration facilities) and quality management (QMS with ISO certification). The configuration of the network (number of automatic weather stations, hydrological stations, radar, and lightning detection) depends on the affordability of the network and ability to operate and maintain it in line with the business model. Every effort will be made to ensure the sustainability of the system through long term financing and engagement with local communities, the private sector, and other meteorological services in Albania.

Access to Geographical Information System (GIS) data. This includes a) digital elevation data with sufficient resolution for hydraulic and hydrological modelling; b) the NMHS and NCPA to access demographic data for vulnerability mapping; and c) exposure data for critical infrastructure. This will require coordination among several agencies responsible for these data.

Modernization of the communication and ICT systems. This includes a) creating a data centre at the NMHS that includes archiving, data base management and digitizing capabilities (to digitize the NMHS' historical meteorological and hydrological data for climate applications); b) computers and software to access and use numerical weather predictions and climate models; c) ensure sufficient Internet bandwidth to access global and regional data and products from ECMWF and other centres; d) upgrade of satellite communications to match Meteosat third generation requirements and to utilize EUMETSAT's data communication system for real-time access to automatic weather station data from

the national network; and e) ensure that all communications equipment meets the WMO information system (WIS) standards.

Improvement of meteorological and hydrological forecasting system. This includes a) upgrading computing equipment for real-time processing observational data from in situ surface and remote sensing networks and satellites; b) upgrade forecaster workstations with software to integrate observations and numerical weather prediction guidance for nowcasting, forecasts and warnings – this would include an expansion of the DEWETRA platform, which has been deployed to the NMHS and NCPA for risk management, and introduction of a nowcasting platform; c) greater use of ECMWF ensemble prediction system and related products; d) full participation in the Southeast European Consortium for Operational Weather Prediction (SEECOP); e) full participation in South East Europe-Multi-hazard Early Warning System (SEE-MHEWS-A) project, which would link to Output 2 of the GCF project; f) full implementation of a flood forecasting system for the major rivers building on the ongoing development of the Panta Rhei model (supported by GIZ); and coordination and cooperation with JICA to incorporate their planned forest fire early warning system

6.3 MHEWS

The project should ensure that all the four pillars of a warning system are properly developed and implemented operationally.

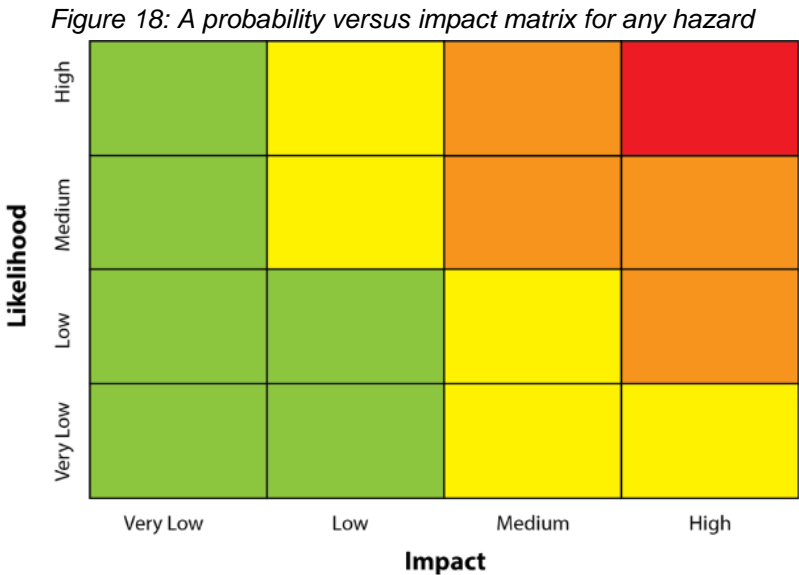
Some of aspects of the four pillars of the early warning system have been developed in Albania. However, the approach has not been systematic and attempts must be made to properly reconcile different approaches into a single MHEWS. This is an essential step that will support the National Plan for Civil emergencies. It will build on progress made by the EU-funded ProNEWS project and the regional projects of GIZ (CCAWB) and UNDP (Integrated Climate-Resilient Transboundary Flood Risk Management in the Drin River Basin in the Western Balkans) (GIZ, 2019b). JICA is currently through the phases of project proposal development for replicating its North Macedonian and Kosovo Forest fire early warning experience in Albania. The envisaged project may include risk assessments and fire hot spot mapping, installation of monitoring sensors in forests and capacity building for emergency and warning services. These would be integrated into the proposed MHEWS in collaboration with JICA. The following pillars provide the foundation for MHEWS:

Risk knowledge: The identification of all events and the primary and secondary hazards impacting Albania is required ideally. Primary hazards are directly caused by the event in nature and cannot be mitigated to any significant extent (for example, rain will fall). Secondary hazards are a consequence or impact of the primary hazard and can often be partially mitigated (for example, structural works can reduce the possibility of a surface flood in an urban area, or hospital equipment can be stockpiled). Tertiary hazards may be caused by the primary and secondary phenomena or may be a consequence of human failure and will have substantial societal impacts. Tertiary hazards may also evolve from efforts to mitigate the primary (natural) and secondary hazards. The societal impacts have the greatest scope for mitigation by either structural or social measures to reduce exposure and vulnerability and build capacity and capability. In the case of secondary and tertiary hazards, the hazard and the impact of the hazard may be closely related and interconnected. Each of the hazards leads to further impacts, but not all impacts are associated with further natural hazards. For example, economic disruption can be caused by social behaviour, which spreads disease, and the consequence of the economic disruption can have a significant impact on productivity and public financing, which in turn is a hazard with long-term impacts on poverty and the well-being of society.

Collecting hazard impact data is challenging and the data are currently recorded in a very general way—for example, the number of affected people, which is not useful for creating impact-based warnings. Understanding who is at risk depends on gathering information on vulnerability and exposure. This involves many different entities, including social and behavioural scientists, disaster managers, nongovernmental organizations, civil and structural engineers, risk finance and risk transfer specialists, government agencies, and, of course, those at risk. These data are an important layer of information within any decision support system. The responsibility for compiling and updating this information will likely be the responsibility of NCPA and nongovernmental organizations, which work with mostly disadvantaged communities. However, these data are not currently compiled in a single operational database, are incomplete and not of very high quality. Social and behavioural scientists will be required to help understand how differently abled people access, comprehend, and use warning and forecast

information. Data will need to be collected at the level of the individual and updated regularly. In the first instance this will focus on the coastal region. The vulnerability of infrastructure systems and services in Albania must also be quantified. For example, the vulnerability of bridges and roads to inundation or destruction due to flooding, or the likely requirements for specialized medical equipment, should be estimated. Understanding sectoral interdependencies is also necessary to determine vulnerabilities and therefore to develop the appropriate impact-based forecasts and warnings. Addressing these vulnerabilities is a way to increase resilience and reduce the risk of disaster stemming from a failure to cope adequately with the primary and secondary hazards (Rogers et al., 2018).

Monitoring and warning service: A probability versus impact matrix is required for every hazard and each sector likely to be affected. Their development requires knowledge of the hazard and expert knowledge of the likely impact on a specific sector. This may or may not be informed by a formal vulnerability assessment. At its most basic, it would rely on expert knowledge rather than quantitative data. However, the range of expert knowledge required is broad, and is given not exclusively by those with knowledge of the primary hazard but also by experts in other fields that may be affected by the secondary and tertiary hazards. The actions to be taken will depend on the likelihood and severity of the scenario, with a colour assigned based on an assessment of the risk (Figure 18). Consequently, a flood, which is highly likely to occur with severe impacts, is color-coded red for high risk. The designation of the colours is subjective and depends on a combination of sector-specific knowledge. Historical or climatology-based regional- and/or seasonal-specific thresholds (in the case of meteorology or hydrology) can provide a valuable starting point for discussions in estimating the severity and the impact of an event.



The colours are assigned based on an assessment of the risk, which typically has four categories – very low (<20% green), low (20-40% yellow), medium (40-60% orange) and high (>60% red). In practice, only the right half of the matrix is considered, i.e., when the impact is medium or above.

In the case of flood risk, this process may involve water resource managers, irrigation experts, and dam operators as well as NCPA's disaster managers and the NMHS' staff responsible for the MHEWS. The level of risk can be assigned to a specific geographical location—a grid box within the warning map—thereby building a dynamic risk map that highlights the areas that may require specific interventions to mitigate the risk— house-to-house notifications, cell broadcasts, evacuation to shelters, and so on. This risk map will help NCPA deploy their resources more effectively. Since the system is dynamic, it is a way to progressively express changing expectations of risk as a function of varying exposure, vulnerability, and hydrometeorological likelihood. In the case of a severe storm, for example, the flood risk would be identified based on the trajectory and intensity of the rainfall hazard within the event, among other factors. The risk matrix combines the flood and vulnerability information for each identified geographical section. As the storm evolves, the severity of the risk will change, enabling an adaptive response to the event. Each of the risks associated with the secondary and tertiary hazards would also be estimated.

For the primary and secondary hazards of meteorological and hydrological origin, ensemble probabilistic forecasts are the most useful. By connecting this project with the SEE-MHEWS-A, Albania will have access to ECMWF products and guidance and may obtainable additional products through a licensing agreement with ECMWF. This will be linked to the overall improvement in the forecasting system.

Dissemination and communication. Warning advisories and action matrices are the final stage in the production process. These relate warnings and actions to the probability of an impact based on the impact-risk matrix, addressing cultural, gender, social, and economic characteristics of each group of actors to be addressed. Effective standard operating procedures are a critical component of the successful management of risk. Key elements are good and effective communication among all the relevant stakeholders and timely action. Having a common impact framework is also very useful for complex disasters and can make it easier for the Albanian authorities to take early preparatory action to focus their resources, and to provide more targeted warning services.

It is important that each advisory and message contains the same information and detail across all media—no matter what format is applied. This is fundamental to ensuring community members confidence in the authority, authenticity, and security of the messages they get. The Common Alerting Protocol (CAP) provides a format designed for all media to communicate information about any kind of hazard situation. It was developed to standardize the technical format of an alerting message, regardless of content, in a manner such that the alert message is both human-readable and machine-readable. The message can be targeted to the public at large, to certain designated groups such as disaster managers or first responders, or to specific individuals as needed.

A message formatted with the Common Alerting Protocol (CAP) standard could be carried over or displayed by television, radio, mobile telephone, fax, highway signs, e-mail, the Web, and so on. The message can communicate about weather, fires, earthquakes, volcanoes, landslides, child abductions, disease outbreaks, air quality warnings, transportation problems, power outages, and so on, and can be fully integrated with the Meteoalarm system. While the technical specifications of CAP follow an international standard, CAP messaging can be modified and adapted to suit national requirements. Dissemination and communication will build on the technologies used by the German Federal Office of Civil Protection and Disaster Assistance and the German weather service (DWD).

Response capability. Disaster response links the products of MHEWS with the emergency preparedness and response (EP&R) system. Although most of the components of the EP&R system are beyond the scope of the GCF project, it is important to identify the linkages since the whole system depends on the capability to respond to a warning. The EP&R system has five thematic areas: legal and institutional framework; information; facilities; equipment; and personnel. A tool, titled Ready to Respond (R2R) (GFDRR, 2017) has been developed by the World Bank/GFDRR, which is used extensively to assess emergency preparedness. The GCF project will ensure that the NCPA links its EP&R and MHEWS activity successfully.

An important aspect of the effectiveness of MHEWS is the ability of people to understand risks. Recent experience suggests that much more effort needs to be placed on public education, exercises, and drills. This will be developed during the project in collaboration with organizations including the Albanian Red Cross. These activities will be developed with a gender-specific perspective and taking full account of social determinants of vulnerability in the population. The response capability will be reinforced through the National Plan for Civil Emergencies that includes plans for nationwide capacity building and training and the curricula of a planned national training centre at NCPA. The project will support target municipalities in integrating MHEWS into their local development, risk management and emergency plans. Actions will include:

- Provision of technical advice and training (including trainer-of-trainer programmes) for technical personnel at central and local levels on climate risk assessments (including gender elements), GIS, remote sensing, and other specialist topics;
- Development and implementation of public outreach and awareness-raising campaigns, together with NCPA staff and municipal administrations, that aim at creating an understanding of the risk posed by extreme events and trust in the warning system;
- Contingency planning, including evacuation planning and signposting;
- Simulation exercises involving central- and local-level actors (and, in the case of floods and wildfires, with representatives from neighbouring countries).

6.4 Decision Support System

The project would ensure that the climate information, tools, analytic and other services including the MHEWS are used effectively and incorporated into appropriate decision support systems.

MHEWS are necessary, but not sufficient, tools in making effective decisions. Disaster management for all types of hazards would have to cover three broadly overlapping areas: (i) action in real time to an immediate emergency situation, recovery, and rehabilitation planning, and implementation; (ii) early action planning and activation, triggered by impact-based warnings for a threat with as much lead time as possible, to effectively reduce or eliminate the risk to life, livelihoods, and property, and to prepare for effective response; and (3) long-term planning and action to permanently eliminate or significantly reduce climate and other risks and to enhance effective preparedness.

Each of these three areas has a distinct and unique focus. Emergency response requires situational awareness and the tools to make real-time decisions, which reduce the exposure of those at risk through evacuation, sheltering, rescue, self-rescue, or the elimination of the threat if it is technological in origin. Anticipatory action implies advanced notification of a hazard (including climate risks associated with the longer-term impacts of climate change) and awareness of its potential impact. Lead-time, understanding, acceptance of the threat, and the ability and willingness to act are all among the factors that play a role in the effective reaction to a warning where the aim is to reduce the potential for a full-scale emergency and need for a disaster response. One of the key partners here is Red Cross and its capacity to utilize hazard information to implement forecast-based financing to reduce or eliminate disaster risk (IFRC, 2018). Long-term emergency planning must have the primary goal of building resilience, capability, and capacity to respond to emergency management authorities and at-risk communities and societies. This planning involves establishing robust protocols between disaster management at all levels and the relevant technical, societal, and community welfare agencies and authorities to enable the reception of warnings related to hazards, facilitate processes to communicate these warnings effectively to at-risk communities, and organize routine exercises to ensure the smooth operation of the warning system. Underlying each of these areas, is the knowledge of hazards, vulnerability, and exposure, which also contribute to long-term planning to reduce vulnerability and thereby reduce the risk of an adverse impact.

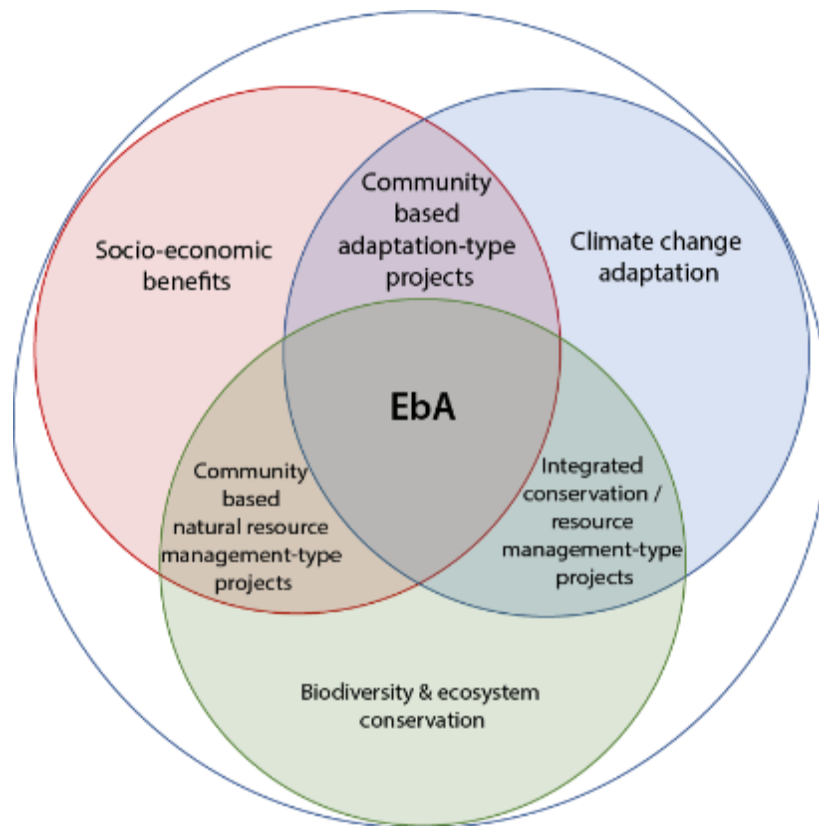
Understanding the differentiated responsibilities of each of the actors involved in all three areas is essential for supporting the safety of lives and promoting the economic security of any country. Decision support systems (DSSs) would provide guidance to all three areas. Information exchange and sharing among agencies is critical to the utility of a DSS and clear operating procedures are needed to ensure information flows unimpeded and enabling hazard, vulnerability, and exposure data to be combined with other guidance to promote timely action. The United Nations Office for Disaster Risk Reduction (UNDRR) provides guidance at national and regional levels on how government agencies from different sectors should work together to cover early warning, disaster response and recovery and long-term planning to mitigate the impact of disasters (UNDRR, 2020a). A key module of a disaster management DSS is the resources for response at various levels. In many instances, the information on resources required to respond to many emergencies are not collected and included in such databases.

6.5 Eco-DRR and NbS

The project could promote the linkages between CIEWS and the implementation of eco-DRR and NbS to accelerate the implementation of climate informed decision.

The analysis of ecosystem-based adaptation measures would focus initially on small- to medium- scale NbS defined as actions to protect, sustainably manage, and restore natural or modified ecosystems to address societal challenges, providing human well-being and biodiversity benefits – which are crucial for sustainable development (IUCN, 2020). The sustainability, cost-effectiveness, and scalability of NbS make them one of the best approaches available to ensure the necessary transformative change to adapt and mitigate climate change. As an umbrella term, NbS encompasses different approaches of working with nature, such as ecosystem-based adaptation (EbA) (Figure 19) and ecosystem-based mitigation (EbM).

Figure 19: Ecosystem-based Adaptation (EbA)



Source: Adapted from Midgley et al., 2012

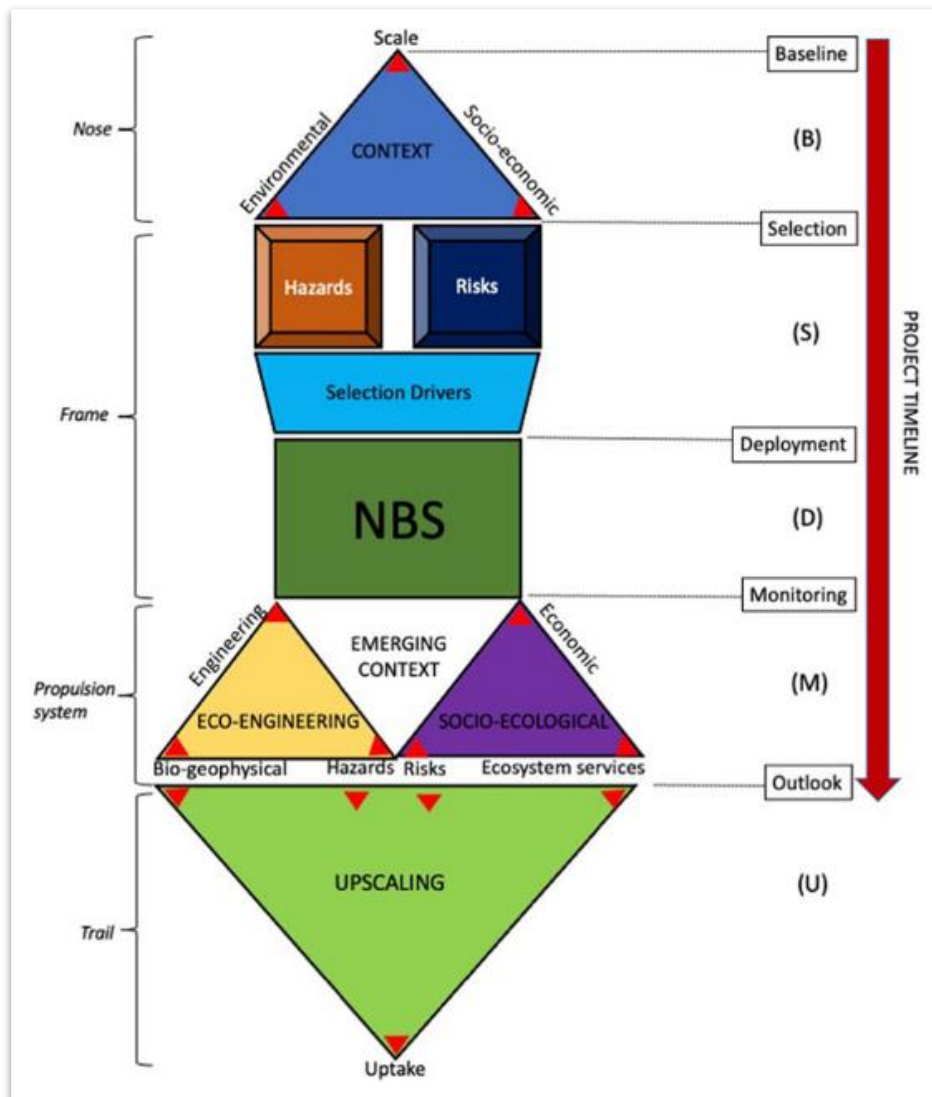
NbS are strongly connected to socio-ecological issues such as ecosystem-based management approaches, Eco DRR as well as with the concepts of green infrastructure and ecological engineering (Eggermont et al., 2015); (Fernandes and Guiomar, 2018). NbS for climate change adaptation are sought to manage meteorological and hydrological hazards, especially when an intervention and modification of the hazard-prone ecosystems is required to address these climate change risks and impacts (Schiechl and Stern, 1996). Effectiveness of NbS to enhance resilience will be addressed by considering biophysical, socioeconomic, and cultural characteristics of the specific socioecological and socioeconomic context of the coastal belt, integrating the local knowledge in the design of specific NbS measures and activities, which will provide, throughout Phase 1 of the project, piloting measures through the involvement of territorial stakeholders. In a Phase 2, after detailed data analysis, interpretation and mapping of the adequate measures and proximity, a full deployment will be addressed to provide the needed resilience through the operational digitalized NCIS.

The design and analysis of NbS interventions for adaptation could seek to reduce the impacts of climate change at the coastal belt such as floods, heatwaves, droughts, and landslides, to protect and prolong the sustainability and lifetime of built ('grey') public infrastructure, improving and building green infrastructure, through restoration and conservation of ecosystems at place, ensuring key ecosystem services for adaptation. This could be done through the appropriate management, piloting and use of ecosystems to ensure the delivery of their benefits to people in a fair and equitable manner, addressing their needs, especially from those who directly depend on or use natural resources and who are particularly vulnerable to climate change impacts. Other possible NbS interventions would be proven through vulnerability assessments for the preparation of the funding proposal and with the provision of the 1st Phase of the project, analysing climate hazards and risks to people, as well as benefits derived from key ecosystem services for adaptation such as climate and water regulation, soil formation, flood protection, provision of raw material and food. A combination of climate information (based on the best available scientific data, models, and local knowledge) and vulnerability assessments could form the basis for piloting in the 1st Phase, followed by full implementation in the 2nd Phase, reducing climate vulnerability for people at scale.

NbS for EbA in Albania are a high priority, given their integration in the upcoming revised country NDC. They also play a major role by the National Adaptation Plan (NAP 2017) as well as the Third National Communication (TNC), being considered also an integral part of the Upscaling Strategy Framework for NbS on Albanian's Lagoons and Coastal Ecosystems (2020).

Considering its overarching goal to address global societal challenges, as noted above, NbS for climate change adaptation have the potential to substantially contribute to the 2030 Agenda for Sustainable Development's targets and to help achieve the full range of Sustainable Development Goals (SDGs). Specifically, NbS are directly relevant to SDG 2 (food security), 3 (health and well-being), 6 (clean water and sanitation), 11 (sustainable cities and communities), 13 (climate change), 14 (conservation and sustainable use of oceans, seas, and marine resources), and 15 (protection, restoration, and promotion of sustainable use of terrestrial ecosystems). The main elements of the Rocket Framework (Gonzalez et al., 2021) that facilitates the operationalization of NbS actions against risks and hazards by uplifting the effectiveness, acceptance, and reproduction of NbS actions through evidence measured against key performance indicators (KPI) is to be considered. The basic steps are outlined in Figure 20.

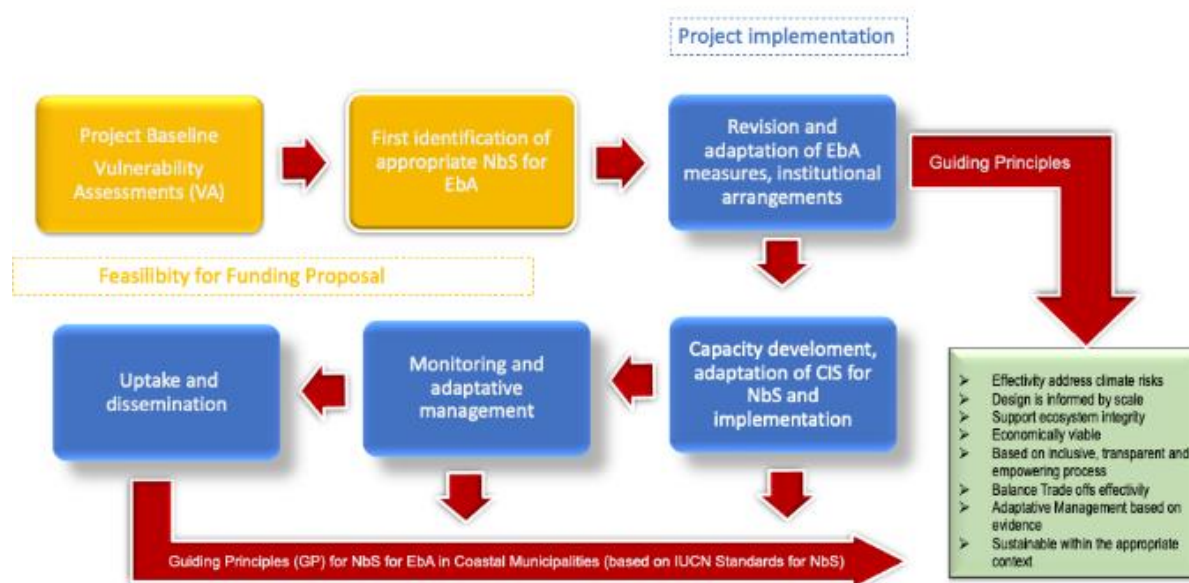
Figure 20: Steps in the development of NbS



Step 1 (B): build baseline: collect and analyse different type of information about the context in which a given hazard and its related risks take place. Step 2 (S): The selection involves the characterisation of the hazard and its associated risks, using metrics belonging to the environmental/geo-physical and socio-economic dimensions. Step 3 (D): Strategic deployment of NbS actions at spatial locations, promoting knowledge co creation and building capacity within research and local actors. Step 4 (M): Monitoring of the NbS performance regarding climate hazards and risks.

The selection, implementation and monitoring of NbS for climate change adaptation, guided by the "Rocket Framework", could ensure the effectiveness of the approach. These would be tailored to the specific context in Albania, for their selection, adaptation, implementation, monitoring, upscaling and/or replication (Figure 21).

Figure 21: Processes to select, implement, monitor, and mainstream NbS for EbA in coastal communities



Upscaling potential and lessons learned from previous NbS for EbA approaches

The project could consider the work done by the technical working group and information generated by the GEF SCCF Project “Building the Resilience of Kune Vaini Lagoon through Ecosystem based Adaptation (EbA)” to be upscaled at the coastal belt of Albania to sustain and replicate climate resilient development across the country. The Upscaling Strategy Framework proposed includes an approach and subsequent structure, that might be followed by different institutions and actors from different sectors. This project could also consider the recommendations and guidance tools of the GEF Project to develop a sustainable “route-map” for upscaling NbS for CCA, to help Municipalities and National planners to identify, design and implement appropriate specific coastal interventions. Besides working directly with the National Territorial Planning Agency (NTPA), The Ministry of Tourism and Environment, The Ministry of Agriculture and Municipal Administrations as well as organization from the Civil Society (such as CSO URI), the project could encourage public-private cooperation, ensuring that stakeholders in the key sectors of tourism and agriculture, participate in the development of solutions and joint measures.

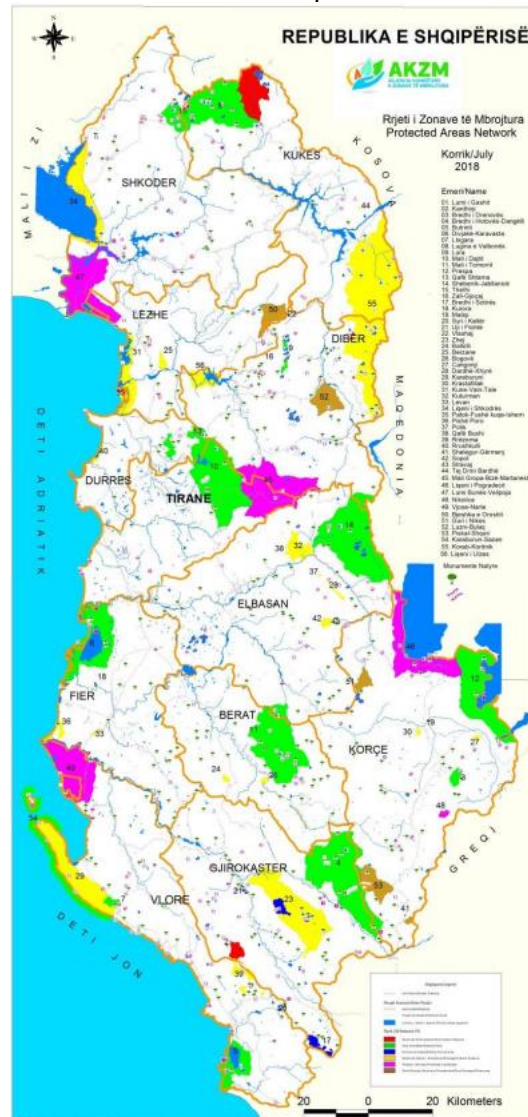
Great emphasis for the upscaling potential has been placed on the tidal channels to take into account throughout future interventions, that there is no downshift impact on the transported sediments. Furthermore, it has been requested that hydrodynamic models ought to be used in the identified areas. Well-known approaches such as tree planting is always considered as a safe and positive impact alternative in the tidal channels (Figure 22).

To increase the efficiency of the upscaling approaches, there needs to be a dedicated communication and knowledge transfer framework in place, in order for the derived information to be better shared. This considers the needs for improved cross-sectoral consultations with the line ministries to provide their knowledge and support in identifying funding sources designed for EbA replication. In order for a stable communication channel to be put in place, the members of the Environment Working Group of the SAA between Albania and the EU, could be trained on EbA interventions. This would ensure the improvement of the outreach of the interventions to the general public and stakeholders. Previous interventions have identified the needs of the government of Albania to build up their institutional capacities to further enhance the work of the Technical Working groups focusing on Climate Change and EbA implementation. For EbA interventions in the coastal area of Lezha, there is potential for adaptation of the ISO 13009 which is a framework for beach management.

The Albania National Forest Policy (2019- 2030) could be considered as a valid entry point for future EbA approaches. However, there is still a long path in mainstreaming EbA in the political agenda of local

decision makers while the needs for training and understanding on the EbA importance is imperative to the successful placement of the topic in the political agenda of the decisionmakers. To better understand the complexity of these interventions, Albania needs to demonstrate the value of operationalizing NbS as a way to address social challenges respectively. The whole coastal area of Albania needs continuous monitoring in order for endangered areas to be identified, erosion and flooding to be avoided, consequently directly affecting the standard of living.

Figure 22: Identified intervention areas and protected areas identified in Albania



Source: National Agency for Protected Areas (NAPA), 2019

The GEF report of the EbAs in Albania sees as imperative the development of a Management Plan for the area of Kune-Vain. Such monitoring should tackle:

- Urbanization;
- Tourism;
- Pollution;
- Harmful algae;
- Lagoon tides;
- Drini revitalization;
- Reforestation;

- Fishing etc.

These monitoring variables should be observed in the upcoming years for the areas of:

- Kune-Vaini Velipoja (Buna delta);
- Patoku-Fushe Kuqe (Ishmi and Mati deltas);
- Divjaka-Karavasta (Shkumbini delta);
- Darezeza;
- Soda-Narta-Zverneci (Vjosa delta).

The management plan that is required, could help Albania and also the MoTE to create a EbA Expert database. This platform would facilitate information exchange and derive the areas in urgent need for support, identify the local experts with the necessary capabilities to support the interventions. Key criteria for the selection of NbS interventions could be informed by the NFCS and include, inter alia, their effectiveness in reducing climate risks, facing agriculture, tourism, and the most vulnerable groups in the target municipalities, socio-economic and GHG mitigation co-benefits, sustainability and alignment with government strategies and plans such as the NAP, the Cross Sectorial Strategy for Climate Change, and the Law on Climate Change. Furthermore, potentials NbS will be considered regarding co-financing possibilities from public (e.g., government conditional and unconditional grants, State Secretary for Economic Affairs (SECO) and GEF-small Grant resources as well as private sources.

The recommended NbS from the GEF SSCF Project on Kune Vaini, Narta and Karavasta Lagoons, combined with results of the vulnerability assessment will be broadly discussed, consulted and if needed adapted to context needs. Institutional arrangements among different GoA institutions and NGOs, including representatives of the civil society, municipalities and other key actors for the implementation and co-financing of the different adaptation measures will be established. Some examples of concrete measures could be:

- Protection and restoration of existing forest through reforestation of riparian forest buffers;
- Management and restoration of coastal marshes and/or dunes to dissipate wave energy;
- Maintenance and restoration of urban green spaces to improve rainwater infiltration and run off;
- Support agroforestry – planting trees on farmland – to improve shelter for livestock and crops; prevent soil erosion and improve water infiltration, improve quality of streams and rivers and preventing flooding, creating habitats for wildlife, a source of nutrition for livestock and a sustainable source of wood;
- Green and blue measures to manage and restore riverbeds, embankments, and natural flood plains to ease water flow and increase water retention;
- Other small- to medium-scale green and hybrid solutions include ponds, swales, rain gardens, green roofs linked to storage cisterns, permeable paving of footpath and car-parking areas, infiltration basins, retention ponds, constructed wetlands and vertical greening.

6.6 Climate Advisory Services

The project could also support the development of specific services for a range of beneficiaries, for selected sectors.

The most effective climate advisory services are co-produced by the staff of the NMHS and sectoral experts. Four examples are described here – environment-climate advisory services, agriculture-climate advisory services, health-climate advisory services, and water-climate advisory services. In each, beneficiary engagement is essential to create an effective service. More bespoke climate advisory services can be added in response to demand from beneficiaries through consultation among stakeholders within the NFCS. While each service provides unique advice to a core sector, each also benefits for coordination and cross-sectoral knowledge exchange ensuring that each sector is fully informed of the interconnected impacts of climate change. Gender differentiation in the provision of climate services is recognised as critical component in the effective use of knowledge. Each of the advisory services will ensure the information is appropriately gender-differentiated to ensure equitable access by all beneficiaries.

Environment-Climate Advisory Service. The environment-climate advisory service (ECAS) is set up specifically to support the design, implementation, and operation for EbA. The ECAS could promote proven climate-smart approaches, methodologies, guidelines, including key performance indicators for the selection, design and monitoring of NbS for adaptation, applying them in the agriculture and tourism sectors including urban areas in target coastal municipalities. The purpose is to elaborate (where needed), adapt and disseminate robust NbS for adaptation, considering local knowledge and practices, appropriate to the socioeconomic and cultural context in the coastal belt and that can be implemented by others, including municipalities, (Civil Society Organization) CSOs, central government and individuals.

The ECAS would support the NTPA to integrate risk assessment and climate-proofing procedures that consider NbS for adaptation into official standards and by-laws developed by the Agency. Training could be provided to NTPA staff, the design of planning guidelines that inform mandatory local plans will be supported, and the NTPA would be assisted in disseminating standards and guidelines to other authorities in central government and at municipality-level.

Agriculture-Climate Advisory Service. An agriculture-climate advisory service (ACAS) is an integral system in which the NMHS and the agricultural community (including the Regional Centres for Agriculture Extension at the coastal belt) will work together to produce and disseminate climate and weather information relevant to agriculture productivity and food security. An ACAS will provide data and information and deliver products and services to farmers to better manage weather and climate risks. It will bridge the gap between the NMHS and the men and women in the farming communities by creating weather and climate products that cater to the specific needs of the farming community taking advantage of the network of national, regional, district and local government agricultural offices and farmer organizations to help disseminate this information. A single, easily accessible source is needed for seasonal outlooks and daily weather bulletins, climate-weather risk maps and drought reference indices. These meteorological data would be supplied by the NMHS, integrated with agricultural information, and interpreted and developed into agro-weather and agro-climate decision tools that can be used by the farming community, either directly by men and women farmers or through agriculture and climate extension workers. The emphasis could be on understanding and communicating the impact of the weather and climate on agricultural activities, rather than providing climate and weather data and information alone. Training and education of extension workers in the use of climate information will be required through the Regional Agencies of Agricultural Extension (RAAE), local municipalities, and private advisory services. At present, extension workers receive no training in the application of climate information (Selami and Gjolla, 2021).

Delivering ACAS requires sufficient IT and computing facilities within the NMHS and within the regional agency providing agricultural extension services to farming communities. The potential “products” to be included in an ACAS could be based on consultations with farmers, regional agencies, and other national agricultural experts. Climate resilient agricultural systems need to consider two main categories of information products: i) Climate information products that are based on the understanding of the climatology of the region, the drivers of climate variability and change, and seasonal climate outlooks; and ii) Weather information products that are based on current conditions and short-term (three to five days) forecasts. Agrometeorological observations that characterize the conditions affecting each farming community are essential. Much of this information is available from satellite s through the EU Copernicus programme and private companies specializing in farm data aggregation from drones and in situ measurements.

The selection of optimal planting dates, based on expected climate conditions, could be generated but requires expertise in crop modelling and the availability of data including weather, soils, and crop management practices. Where this capacity does not exist, it needs to be developed as a priority. In most instances this should involve local communities since adaptation may be required to better manage crops.

Seasonal outlooks delivered by the ACAS would highlight the expected climate for the season and potential impacts on crops. These outlooks should be a joint production of meteorological and agricultural experts familiar with the regions where the outlooks could be used. They should be delivered in accordance with the agricultural calendar providing farmers and agricultural input dealers with enough lead-time to adjust their management and input procurement practices. Weather based products are used for operational decisions such as planting when adequate soil moisture is present or forecast, harvesting before damaging rainfall or hail, crop protection measures when risk of pests is elevated.

They may also be used for planning transportation of perishable goods to markets, avoiding rainfall, for example, which could damage the produce or make roads impassable. The ACAS can also support a financial risk transfer mechanism to protect farm income.

A key step in developing an effective ACAS is ensuring that the agricultural community understands how to use the weather and climate information that is provided to them. An equally important step in this process is introducing a feedback mechanism so that farmers can communicate their agricultural weather data requirements to government agencies. Direct interactions between farmers and agricultural weather information providers can help educate both groups about each other's services and requirements.

Health-Climate Advisory Service. Human health is profoundly affected by weather and climate. The MHEWS considers the requirements for early warning of immediate health threats (GFDRR and World Bank, 2020), while the health-climate advisory service (HCAS) provides beneficiaries with the most relevant information available on the diverse connections between climate and health. The aim is using climate services to strengthen the climate resilience of the health system and support proactive decision making to protect public health and achieve better health outcomes from emerging environmental challenges (WHO, 2012).

Three main areas of health risks related to climate change have been identified in the Albanian context: extreme weather events such as heatwaves, threatening cardiovascular and respiratory health and flooding, bringing injury and death, infectious diseases and mental health problems; air quality, which already causes a high burden of disease in Albanian cities (Albania's annual mean concentration of PM_{2.5} is 18 µg/m³, which exceeds the World Health Organization recommended maximum of ten µg/m³) and not only will worsen, but the air pollution also contributes to further climate change; and communicable diseases that can emerge and increase as a consequence of ecosystem and habitat changes for vectors increasing the risk of foodborne diseases such as salmonella, and waterborne diseases due to impaired water quality. These impacts are further exacerbated by the growing numbers of elderly people (The total population over 65 years was 14.7% in 2020 compared with 5.5% in 1990 (source World Bank), who are at higher risk than the general population. Older people living in cities are most at risk from higher summer temperatures and worsening air pollution. Basic meteorological and air pollution monitoring will help the health sector adapt health protection services in response to demographic and climate changes (WHO, 2013). These activities will align with and build on the Albanian Strategy for Health System Adaption to Climate Change adopted in 2011.

The strategy includes strengthening health services to improve their response to climate change impacts; public awareness of the effects of climate change on health; adapting the information system to detect the risks of climate change, to assess their effects on health in time; encouraging scientific research on health and climate change; strengthening of air pollution monitoring systems with special focus on particulate matter and ozone; increasing the capacity to cope with health problems expected to be caused by heat waves and extreme cold weather; Improving the cooperation and integration of the health system into national emergency structures responsible for floods and fires, landslides and other natural disasters under the influence of climate change; adapting and integrating surveillance and control systems for contagious diseases; strengthen services for the prevention and management of health problems caused by increased exposure to pollen; strengthening monitoring and prevention of health problems arising from ultraviolet radiation (Hoxha, 2018).

Water-Climate Advisory Service. A Water-Climate Advisory Service (WCAS) is primarily focused on supporting hydro-climatic risk management by providing meteorological and hydrological information that is the foundation for all forms of water-related planning, water infrastructure design and operation, and water management (Browder et al., 2021). The WCAS helps to delineate floodplains to better enable floodplain management. Monitoring and forecasting of floods drive emergency management responses. Drought forecasting enables drought managers to zero in on potentially affected areas to better assess impacts and identify vulnerable populations. The WCAS would also serve to inform flood and drought recovery programs. WCAS will support the Integrated Water Resources Management Information System developed by Albania's water resources management agency (AMBU). An important role of the NFCS will be to ensure that all high-quality water data are available and accessible to all users, ideally through a single water data platform embedded in the NFCS or the IWRMIS or both. The WCAS could be responsible for the delivery of drought monitoring and impact assessment services co-produced by the NMHS, AMBU, Agriculture and NCPA. Similarly, the WCAS will be responsible for the delivery of

impact-based flood forecast and warning services co-produced by the NMHS, NCPA and AMBU. This might also include services to the energy sector given the high dependence on hydropower in Albania.

6.7 Investing In CIEWS: A Grant Mechanism

In order to ensure its sustainability, the project could strive to mobilise, coordinate and administer financial resources from multiple sources.

Financing large-scale construction of infrastructure is beyond the scope of the project. However, through grant financing, the project could engage in the planning and implementation of NbS to protect vulnerable infrastructure. Primarily, the project's contribution to making infrastructure more resilient is the development of demand-oriented and useable climate services and products for planned government and/or private sector infrastructure projects, as well as the institutional and regulatory anchoring of relevant procedures.

With regard to risk and adaptation assessments for infrastructure, the project will emphasize the importance of green (i.e., nature-based) and hybrid (green, blue and grey) solutions. It would also integrate, promote and align with post-Covid-19 green recovery.

The project could consider the design and implement a grant-making facility, to be anchored at the ADF. ADF's mandate is to administer and coordinate financial resources from different sources (government, private sector, and donors) through a multi-level approach, in the framework of projects and investments for sustainable development. Specifically, the ADF and the ongoing EU4 Innovation project of the GLZ would provide their experience and support in channelling ideas, mobilizing resources, coordinate, and administer public and private finances to link climate analytics and technologies. Under such assumptions, the main funding windows that could be taken into account, are:

- **Start-up Finance Window**, through the experience of the EU4 Innovation: It would support intermediaries (such as private consultancies, NGOs and research institutions) to develop usable products for end-users. Public-private partnerships with companies such as telecoms providers will be promoted for the development of specific products. Vodafone has expressed interest in participating (see the stakeholder letters of support provided in Annex 5). Furthermore, investment opportunities will be established to leverage resources and support business development with services developers and providers.
- **NbS for Adaptation Window**: through different calls for proposals, target municipalities could be able to elaborate proposals to implement NbS measures in a small scale. Eligible beneficiary municipalities will be asked to contribute 30% of the total investment cost, with additional finance supplied by the GCF, public funds, the private sector and donors including JICA and the Swiss State Secretariat for Economic Affairs (SECO).

7. Comprehensive Analysis of the Current Meteorological And Hydrological Infrastructure in Albania

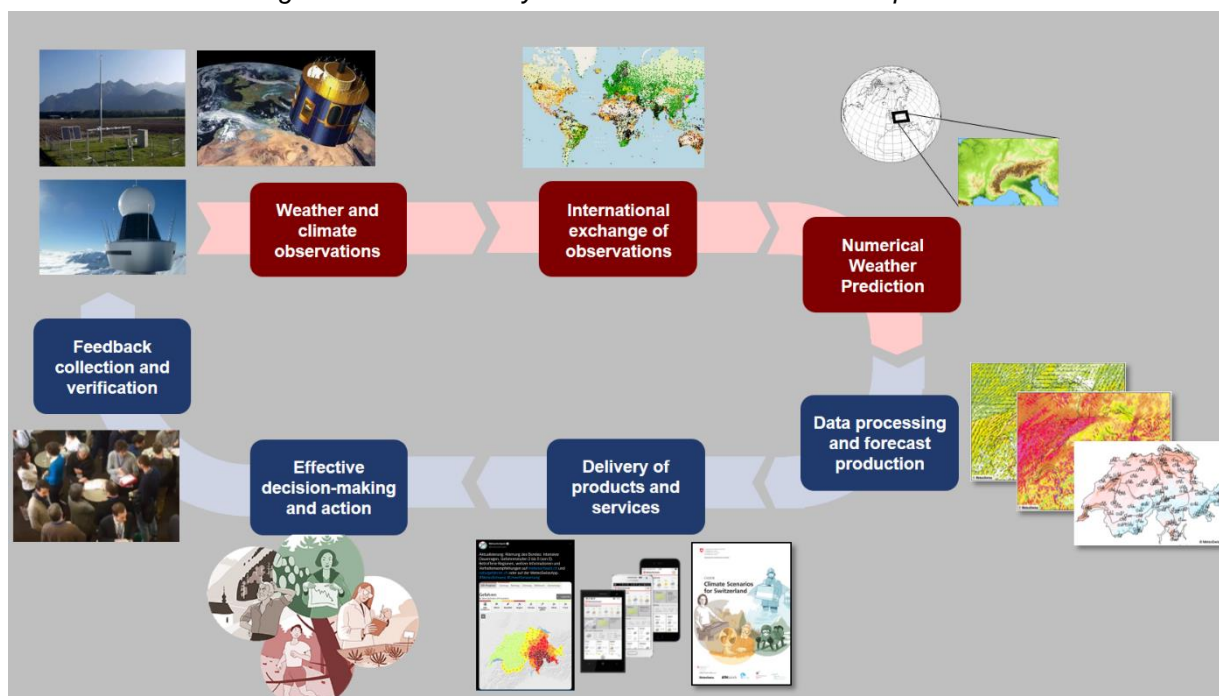
ALBAdapt is an ambitious project aimed at significantly modernizing the hydrometeorological services in Albania. The project framework envisions implementing state-of-the-art approaches in weather, hydrological, and climatological services, aiming to leapfrog Albania's delivery to European standards. To maximize impact within the project's limited timeframe, an approach following the most minimal requirements is proposed, focusing on the end-to-end delivery of services instead of investing too heavily in technology (see proposed tasks with cost-estimates). The proximity to experienced NMHS and the European networks is an advantage to achieve the proposed goals and the project will benefit from the rising European Meteorological Infrastructure.

7.1 Value Cycle of the NMHS

National Meteorological and Hydrological Services (NMHS) own and operate most of the infrastructure that is needed for providing the weather, climate and hydrological services for the protection of life and property. The role and operation of a NMHS are defined in a statement by the World Meteorological Organization (WMO, 2015b) as well as in the WMO Strategy for Service Delivery (WMO, 2014b).

The first three elements in the value cycle (shown in red) constitute the infrastructure necessary to provide weather, hydrological and climate data which is internationally exchanged and therefore a global public good. Although operated by the NMHS in its territory, these elements must be designed and coordinated globally based on standards defined by WMO. The last four elements (in blue) are typically implemented nationally or locally in larger countries. For this part of the value chain, there is a need for close collaboration with other public and private institutions. It further requires the integration of additional socio-economic and non-meteorological data in order to produce impact-oriented products or co-designed services (See Figure 23).

Figure 23: The value cycle under which most NMHS operate



Source: Adapted by MeteoSwiss from WMO, 2014

7.2 Considerations and remarks for the Feasibility of the Value Cycle for the Albanian NMHS

The project aims at a holistic modernization across the entire value cycle of the NMHS. This approach aligns with growing evidence that partial modernization, like focusing solely on the observational network, yields limited improvements in service delivery (Rogers and Tsirkunov, 2013). Past international investments in the Albanian NMHS (IGEO) support this argument, necessitating the large-scale investment envisioned by the ALBAdapt project. A broader perspective allows us to consider neglected elements of the value cycle, such as sustainable maintenance procedures, staff training and career opportunities.

Presently, IGEO faces challenges in implementing a comprehensive modernization project, indicating the need for institutional reform as the top priority. Operating NMHS as a department within an academic institution has proven unsuitable for operational duties, leading to perceived burdens.

Achieving an institutional reform requires the involvement of the Government of Albania as the driving stakeholder and long-term investor. Core operations, such as investing in a national observational network, are natural monopolies, and worldwide models suggest that these functions are best covered by a government as a public good. However, the current available funding dedicated to this activity, even if implemented by a different institution, is insufficient to meet the minimal requirements. Therefore, it is essential to enhance the responsibility of the Government of Albania for sustainable funding of the long-term operation of the NMHS (beyond a horizon of ten years). Aligning this commitment with EU accession candidacy and the development of crucial sectors like tourism and infrastructure (e.g., hydropower) would strengthen the case for the investment.

MeteoSwiss has recommended to adopt a “minimal requirements” approach and progressing step by step, focusing on addressing the most critical needs of stakeholders benefiting from the services. Meeting these minimal requirements does not necessarily require significant investments in technical solutions but rather ensuring that the NMHS's relevant information reaches stakeholders in a comprehensible manner. Climate change and digitalization have immensely transformed the sector and many NMHS world-wide face large obstacles to keep up with this transformation due to the legacy of institutional structures and systems that are resistant to innovation. A reformed NMHS would greatly benefit from modern technical solutions, the integration into the European Meteorological Infrastructure (EMI) and into the climate change agenda, which gives the NMHS political support on a long-term basis.

The project is highly ambitious, particularly considering the necessary initial institutional reform. Even with a long-term perspective until 2030, achieving the outputs outlined in the logical framework appears challenging due to the transformative structural changes that must precede. However, a multi-stakeholder engagement as part of the institutional reform could prove valuable in narrowing down critical activities that the Government of Albania and other stakeholders prioritize and support. Notably, impact-based forecasts and forecast-based actions are areas where even the most advanced countries are still in their early stages of development. These cutting-edge aspects of the project require careful attention to ensure successful implementation.

Many elements of the project are interconnected, given the nature of the NMHS's value cycle. To mitigate the risk of bottlenecks, the project should devise a strategy, as considerable time might pass until the required information is available. This particularly applies to components 2 and 3, which rely on data developed in component 1, a process likely to take the entire project's duration due to underlying structural challenges. In the meantime, investing in continuous stakeholder consultations and co-development of services would ensure continuous implementation of all components.

7.3 Current Inventory of the Albanian Meteorological and Hydrological Infrastructure

IGEO is entrusted with a multifaceted mission that encompasses scientific research, comprehensive education for students and emerging scientists, and the dissemination of knowledge and technology. Operating on a national scale, IGEO specializes in a diverse range of fields, including seismology, hydrometeorology, natural resource management, georisk assessment, geoengineering, geoinformation systems, climate studies, and environmental research. Its overarching mission is to advance knowledge through rigorous research, provide extensive educational opportunities, and contribute significantly to the nation's understanding and effective management of critical issues within

the realms of geosciences and environmental sciences. Besides teaching and research, IGEO encompasses the examination and ongoing surveillance of hydrometeorological occurrences, the timely communication of natural risk information to state agencies responsible for civil emergencies and the general public. IGEO holds official endorsement from the World Meteorological Organization (WMO) as Albania's National Meteorological and Hydrometeorological Service (NMHS) (DCM No. 94, dated 22.02.2023 "For the approval of National Strategy for Risk Mitigation from Disasters 2023-2030 and Action Plan) and its director is the permanent representative of Albania in WMO.

In order to have a clear picture and status quo of the national monitoring network, in the frame of ALBAdapt Pre-feasibility study preparation, IGEO undertook an Inventory of all hydrometeorological stations, including the wells monitoring the underground water monitoring, looking at the physical and functional condition of the equipment of network. With the support of GIZ, for about three months IGEO staff visited 211 stations and documented the actual situation of the stations (The document compiling datasheets/station is available upon request) using a unified data sheet specifically prepared for the inventory.

7.3.1 Overview and Methodology of the Inventory of the Meteorological and Hydrological Stations

The objective of the inventory study was aimed at creating an updated and accurate overview of the number of the Hydrological and Meteorological stations in the country, the location along with the updated contact details for the observers and well as their conditions. Namely, the inventory strived to:

- To do a full inventory and the respective operating condition of the hydrometeorological stations;
- To develop the updated map of monitoring points for the existing hydro and meteorological stations;
- To provide recommendations to the ALBAdapt team for the improvement of hydro and meteorological stations and monitoring network.

The methodology of the inventory was a mix of desk work compromising the development of the data sheet template, digitalisation of the filled data sheets for each visited station, production of maps for hydrological and meteorological stations with verified georeferenced and stations ID, the interpretation of the results along with field trips to all 211 existing stations all over the country (Table 9).

Table 9: Group of 9 IGEO staff for field assignment

Project collaborators	Staff of Meteorological and Hydrological Departments
Working group 1 (composed of three IGEO staff)	Two research staff/ agrometeorologists + one hydrologist working on: Preparation of the assignment aims and methodology, station sheets, itinerary of the field monitoring.
Working group 2 (composed of three IGEO staff)	One hydrologist + one IT + one research staff/ agrometeorologists working on: filling in station sheets, field visits, recommendations and proposal for the investments needed in the network as well as contributing to this summary report.
Working group 3 (composed of three IGEO staff)	One research staff/ agrometeorologists + two hydrologist working on filling in station sheets, field visits, recommendations and proposal for the investments needed in the network as well as contributing to this summary report.

Source: Own elaboration

Through the field visits were assessed the condition of the station as a whole in terms of the condition of the instruments, sensors, meteorological cages, their physical condition for continuity of the data measurement process, the surrounding of the station, the constructions in its vicinity. Special attention was paid to assess the measurements performed by the observer, the testing of the alternative observer, the recording of the notes kept by the observer in the diary and annual register, keeping track of data for quick communication (telephone/e-mail, etc.), problems encounter by observers, material-based supply, etc. the supply of material basis (observation diaries, annual register, etc.), how was the mail service after there were problems in receiving diaries from certain locations, etc.

For each station it was measured and verified the coordinates with GPS as well as has been taken photos and videos of the station. The working groups identified problems, difficulties, shortcomings, and

opportunities to improve the work by preparing a station sheet with photos and with the relevant coordinates of the measurement site which was used to design the respective maps with geolocations.

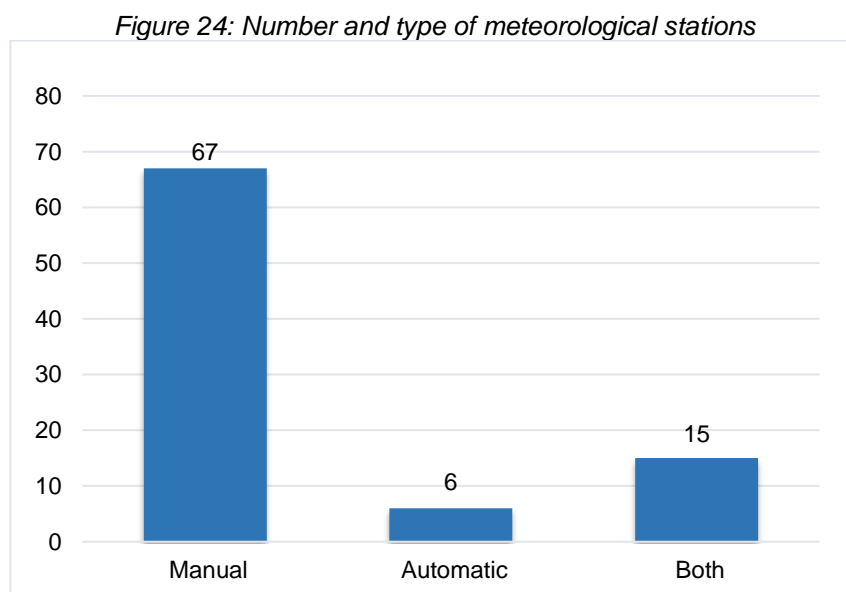
The station sheet is designed to provide an overall picture of the status quo of the station, updated information that could help the improvement of the communication with the observers, as well as the need for improvement/ investment/ repair or relocation of the station. The first part of the data sheet is digitalised and analysed for the purpose of the Pre-feasibility Study, while the second part is used by the project team to better inform the planned investment in the Project Proposal. There were also other aspects considered and assessed such as:

- Verifying the status of the land/ area/ protected area in which the station is situated;
- Checking the accuracy of the measurements performed by the observer, through a direct test, after verifying the recorded data;
- Verifying the annual register, its condition as well as the consistency of the data recorded in the diaries that are sent to the respective IGEO departments.

7.3.2 Meteorological Stations – Interpretation of the Inventory outcomes

From 100 reported stations from the institute only 88 meteorological stations were found in terrain and therefore 88 data sheet records are part of this inventory. From a typology point of view 80% of the stations (or in 82 locations) manual stations are observed and inventoried, while 20% of them (or in 21 location) automatic stations are inventoried.

Figure 24 represents the distribution of the meteorological stations according to the typology. With a closer look six stations are only automatic, 15 locations have both automatic and manual stations while 67 of them are only manual.



Source: IGEO

As reported in the station data sheets, existing sensors (mostly three to five sensors/ each *automatic* station) need calibration and repair. Out of 67 manual stations (all of them have one to three sensors mostly temperature thermometers and rain gauges), 24% of them need refurbishment/ total replacement of the sensors, while 76% of them need calibration and reparation.

Almost the same situation stands also for the joint typology of the stations. The automatic ones need calibration and repair, while for the b ones 27% need total replacement and 73% need calibration and reparation.

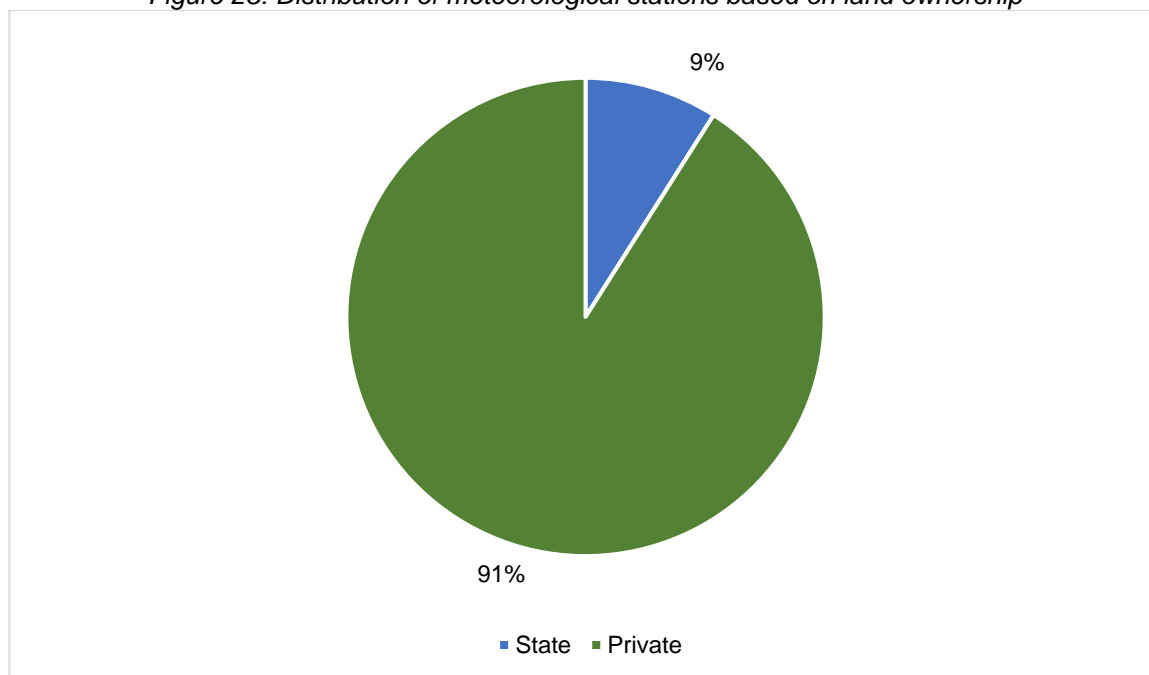
For all 88 stations, contact details of observers were updated (List of contact details of the observers for meteo stations updated and available through IGEO and GIZ project staff) and willingness to continue performing the observation tasks was evaluated. Out of 88 locations, only in five locations or 6% of the observers did not want to continue performing this obligation. The other 94% were keen and willing to

continue performing this task and most of them considered it as a service for the community and family tradition, even though the compensation they get from the state is minimal. Nonetheless, all of them recommended to:

- replace and modernise the sensors;
- regular maintenance and inspection of manual and automatic stations form IGEO technicians;
- supply with basic materials for data recording, like register, diary, and other stationaries and training on how to use of new instruments data recording from the stations, training for alternate observers (usually another family member).

Another element checked and analysed is the land property status. 91% of the inventoried meteorological stations are located in private land (mostly on the garden of the observer), while only 8% of the stations are located in a state-owned land. It should be acknowledged that in both cases the ground situation is characterized of extensive vegetation, shrubs, and trees nearby (Figure 25).

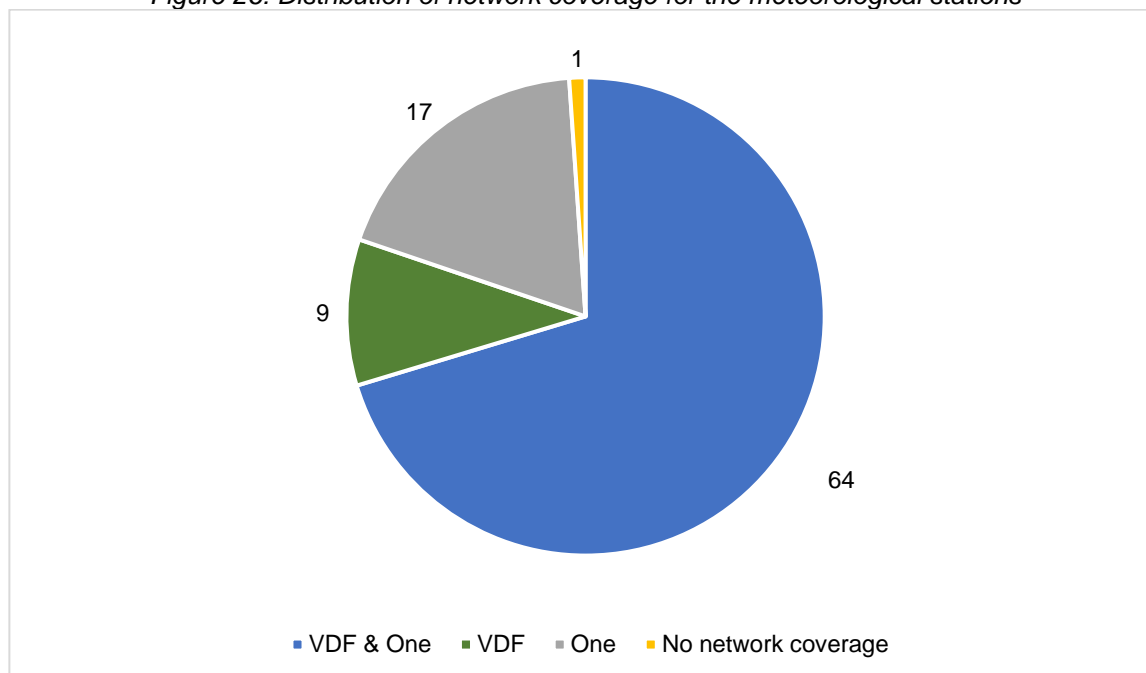
Figure 25: Distribution of meteorological stations based on land ownership



Source: IGEO

Mobile network coverage of the station's location was also recorded for all 88 locations regardless of the type of station. This is an information valuable for the potential modernisation and upgrade of the station from manual to automatic one. There are 2 mobile operators available in the country, Vodafone (VDF) and One. Most of the existing locations (64) are covered with telecommunication means by both companies, while one location is not covered by any of the existing mobile networks in the country (Figure 26).

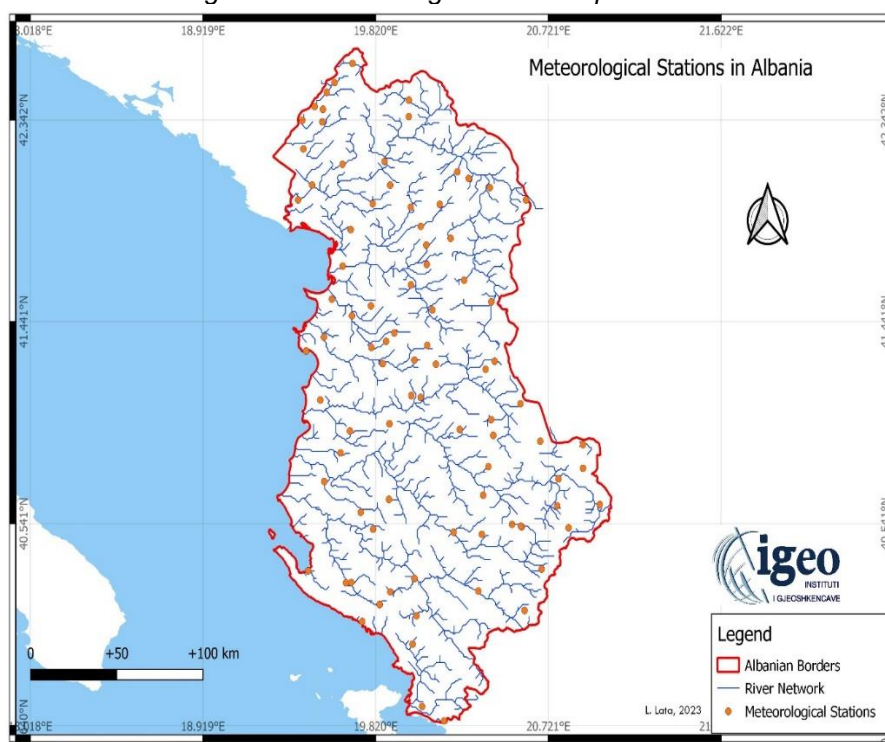
Figure 26: Distribution of network coverage for the meteorological stations



Source: IGEO

Additional information regarding access to road, access to power, history of data recording/ station, existing of fencing of stations, protection status of the land where station is situated etc., are collected as part of inventory and can be used either by IGEO or by ALBAdapt project staff during the implementation of the project. Based on the stations georeference collected during the inventory assignment, a map with location of the meteorological stations is prepared as below (See Figure 27).

Figure 27: Meteorological stations' proximities

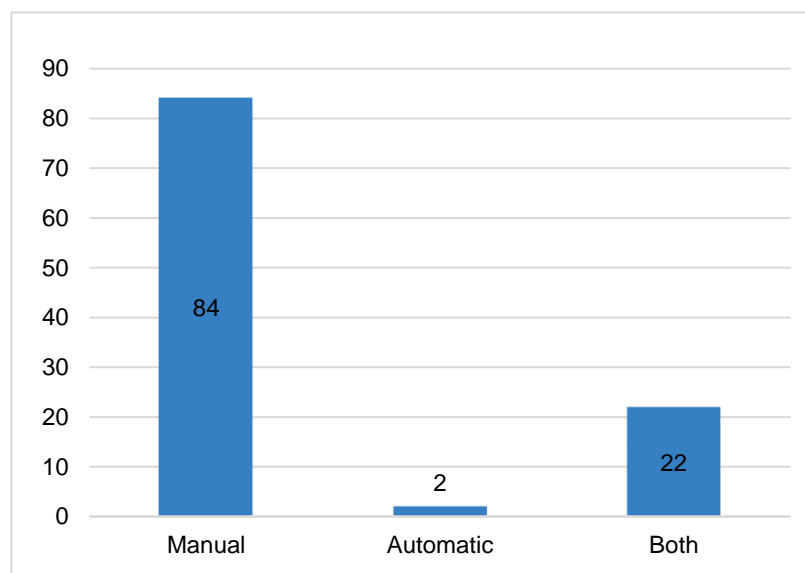


Source: IGEO

7.3.3 Hydrological Stations – Interpretation of the Inventory outcomes

108 hydro stations resulted existing from the field expedition out of 111 stations visited from IGEO and as such 108 station sheets were filled, part of this inventory. The **Error! Reference source not found.** 28 below, shows that 81.5% of the stations (or identified in 106 locations) are manual stations, whereas 18.5% (or identified in 24 locations) are automatic ones. Besides the stations above, there were identified 22 ones (in respective locations) that have both manual and automatic stations as seen on the chart.

Figure 28: Number and type of hydrological stations

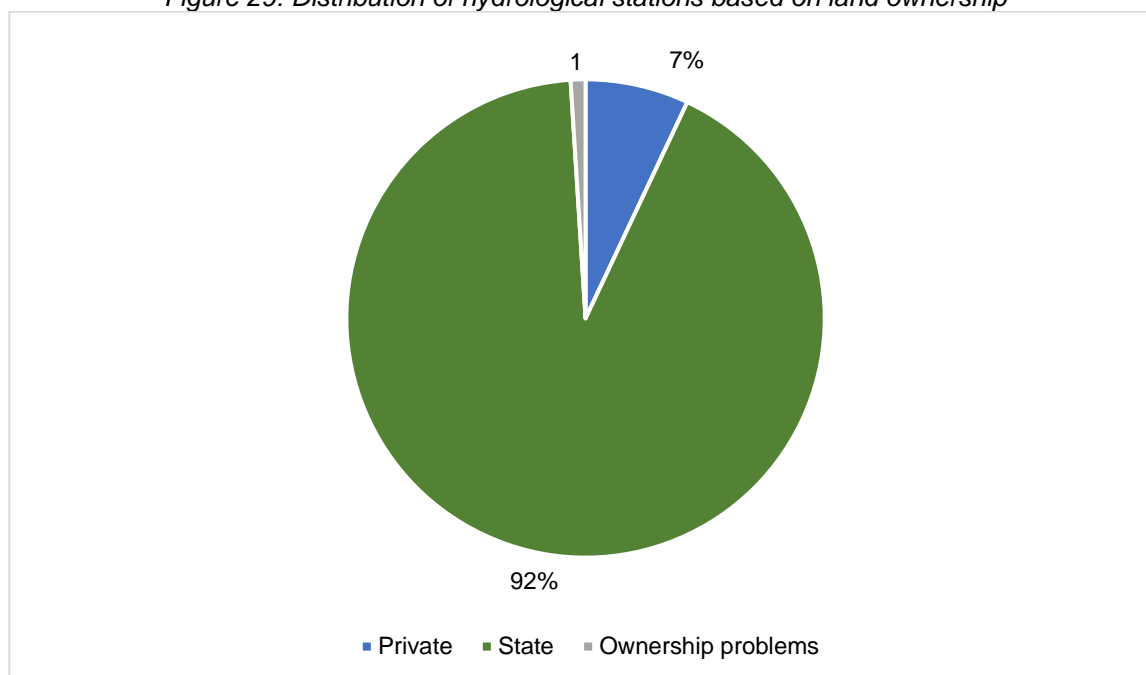


Source: IGEO

Technical staff of IGEO assessed the existing sensors per each station and it resulted either automatic, manual or the category both of stations, all need calibration and repair of the sensors. Only three stations need to be totally changed. More specifically out of 59 of manual station (all of them have one sensor that measure level of water), 73% need calibration, whereas 23 % need to be replaced. The automatic ones need calibration and repair, while for the both category 5% need total replacement, 9% change of the station and 86% need calibration and reparation.

Another important part of the inventory was discussion with the observers and an estimation of the work done, difficulties encountered and needs for improving the work. For all 108 locations, contact details of observers (List of Contact details of the observers for hydro stations updated and available through IGEO and GIZ project staff) were updated. Out of 108 locations, only in seven locations or 6.5% of the observers did not want to continue performing this obligation. The other 93.5% would like to keep working, recording and transmitting data from the hydro stations as a family tradition, even though the compensation they get from the state is minimal. Other key elements were assessed through field inspections such land property status and mobile network coverage. For the first one it resulted that 92% of hydro stations are located a state land, while in a private land are placed only 7 % of the hydro stations as shown in the Figure 29 below.

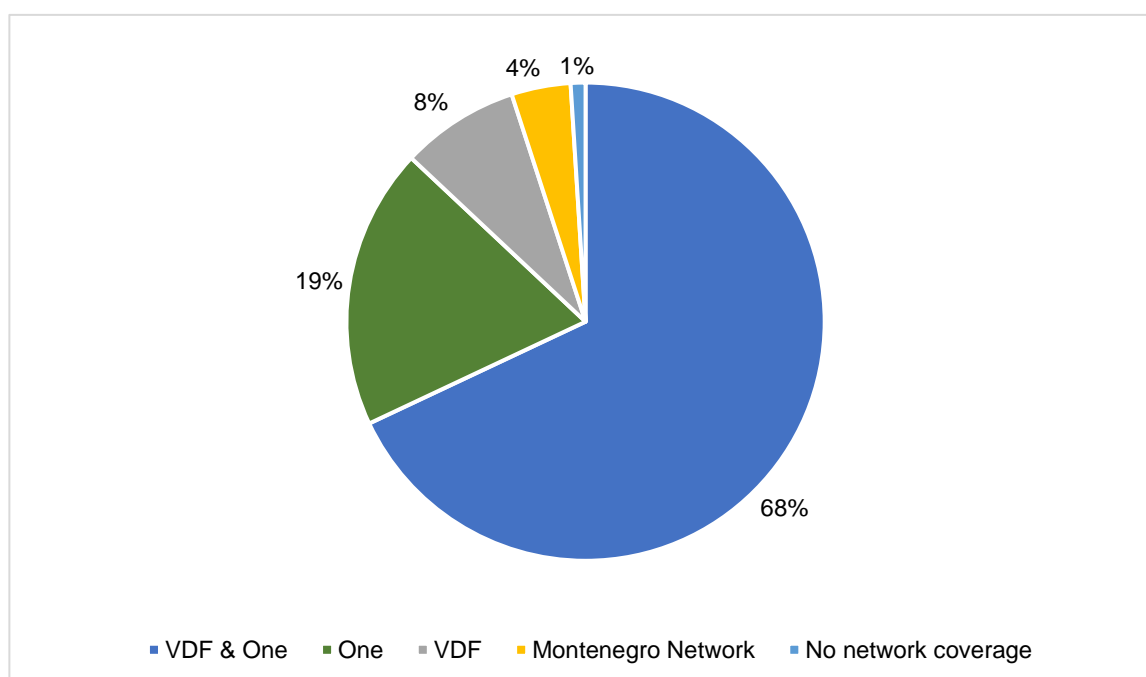
Figure 29: Distribution of hydrological stations based on land ownership



Source: IGEO

For the second element, knowing the fact that data recorded are important to be transmitted, the technical staff assessed also the Mobile network coverage for all 108 locations regardless of the type of station. As mentioned before this information is valuable for the potential modernisation and upgrade of the station from manual to automatic ones. According to the graph 8, it is noticed that 68 % of the locations where stations are placed/installed, it is covered by both operators Vodafone Albania and One. Besides, there also areas, in 19% of the locations, which are reached only by ONE operator and other 8% of the areas are reached by Vodafone (See Figure 30 below).

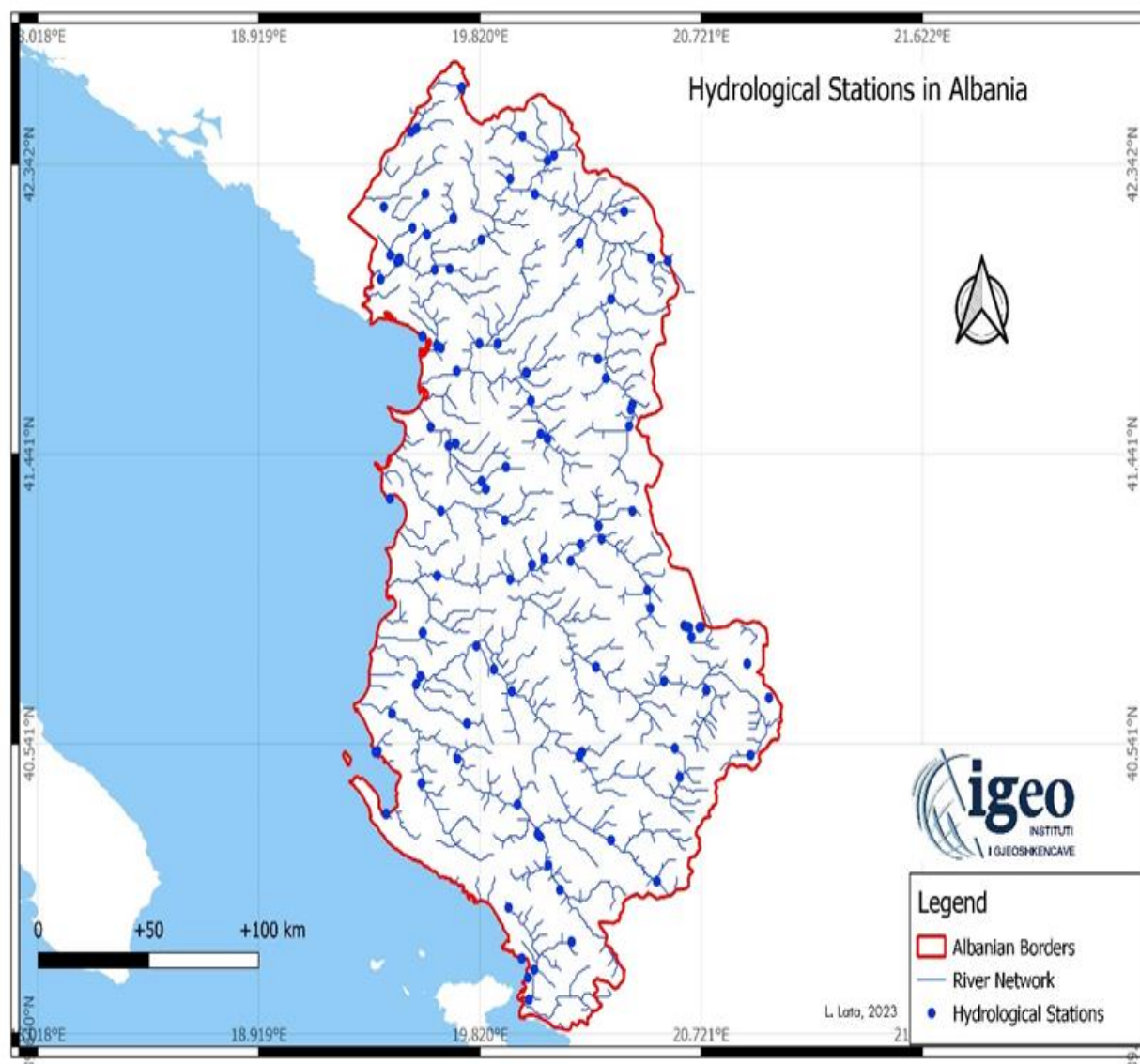
Figure 30: Distribution of network coverage for the hydrological stations



Source: IGEO

As also in the case of meteorological stations the data sheets per each individual station, contain information regarding access to road, access to power, history of data recording/ station, existing of fencing of stations, protection status of the land where station is situated etc. All the information recorded in data sheets as part of inventory and can be used either by IGEO or by ALBAadapt project staff during the implementation of the project. Based on the stations georeferences collected during the inventory assignment, a map with location of the hydrological stations is prepared founded below (Figure 31):

Figure 31: Hydrological stations' proximities



Source: IGEO

7.4 Recommendations

7.4.1 General Recommendations from MeteoSwiss

We share reflections that are considered important for this process as a whole. These inputs arose from discussions among the authors of this document and colleagues from Geospheres, who previously undertook an NMHS assessment in Albania in 2015. While the accompaniment of an experienced NMHS is highly advised for this process, we recommend acquiring additional state building expertise to drive this public reform, given the deep transformational nature, which is not a regular duty of other NMHSs.

→ Development of core NMHS operations and services

We provide more detailed descriptions of the tasks that the project needs to undertake in order to achieve the minimal requirement of fulfilling these operations (See Section 7 of the Pre-feasibility Study). It is also important to note that the cost estimates describe the development of the operations but not the running costs, which need to be sustained by the Government of Albania. A more detailed assessment of the operational costs will be required as part of the institutional reform of the NMHS, depending on the decisions taken on the authority and service provision of the future Albanian NMHS.

- Peer-to-peer support from experienced NMHSs is strongly advised for ALBAdapt.

Operating a NMHS is a specialized task that is not well-provided by the private sector, given its natural monopoly for various operations. The experience of running these operations is essential for the sustainability of international cooperation projects, which often fall short in factoring in operating costs. Sharing lessons learned and supporting project implementation is therefore critical, especially for a large-scale modernization project. The WMO strongly advocates for peer-to-peer support from its member states, which have proven to be a role model for strengthening weather, hydrological, and climate services worldwide.

- Fund the project personnel at the advising NMHS to support ALBAdapt implementation.

This is because the necessary know-how is not readily available on the job market and dedicated scientific staff from the NMHS need to streamline the know-how for implementation. Ideally, these project staff should undertake frequent missions to the benefiting country or even consider long-stays to effectively build relationships. Based on the foreseen tasks of the project, MeteoSwiss estimates an approximate 2 full-time equivalent (FTE) for the NMHS advisory service.

- Sharing the know-how from multiple peer-advisors

It would be strategically tangible, given the project size. While an experienced and state-of-the-art NMHS in the European context is an asset, it is also important to consider peer-advisory and collaboration from regional NMHS in the south-eastern Europe region. This is because the proximity of these service providers could provide more direct communication in the long-term, and because many of the planned activities of ALBAdapt are already being implemented in neighbouring countries in the same local context.

7.4.2 Recommendations from the Inventory Study

The number of hydrometeorological stations in the country has been decreasing over the last 30 years. In 2005, the national meteorological network consisted of 135 meteorological sites, while as a result of this inventory only 83 meteorological stations are confirmed. From 207 hydrological stations in 1990, 102 stations are documented in June 2023 as part of this inventory.

Regular water flow measurement has been decreasing constantly from the regime change until 2008. With the reforms this activity has been almost completely interrupted, due to the lack of technical-hydrologist staff and the institution's very limited budget (SIDA, 2019).

As a general observation, the conditions of the hydrological and meteorological stations fall far behind the WMO standards for functional stations. For all manual and automatic meteorological stations, calibration and replacement or repair of the sensors is needed. The same stands for the hydrological sensors. There has been a tentative of modernising and upgrading the network from manual to automatic stations, supported by donor funding, which did not lead to improved data collection, nor increase of number of stations/places where the measurements are done. For the last ten years IGEO did not undertake regular field visits, monitoring trips and maintenance of the stations due to the lack of funds from the institute. Calibration of sensors/each station is also not performed during the last decade. It should be noted that the meteorological and hydrological yearly book, after 1989, have not been published.

7.4.3 Recommendations regarding the Meteorological Stations

Based on the results from the inventory and specific station data sheets as well as findings from several projects/ donors' analysis (like WB, ZAMG, Pro-news, GIZ) the following recommendations are deducted:

Prioritization of stations in the country meteorological network by going through an in-depth scientific analysis to determine the measurement locations of a modernized network. This prioritization can serve the future investment in the network. Below is a summary of some of the main criteria for the selection of meteorological stations. These criteria are published on the official website of WMO and are also published at different times by local scientific institutions (IHM or IGEO).

The criteria for selection are related to:

- i. The mission of a meteorological station is to carry out observations in a certain area by being placed in that geographical location, with physical-geographical and climatic conditions that are most representative of the area in question.
- ii. Criteria of continuity of observation series. Many of the meteorological stations have been closed for various reasons. Placing a new meteorological station in the same place restarts the series with new meteorological data and enables a set of scientific and operational activities in the field of meteorology.
- iii. Criteria of the density for the number of meteorological measurement sites per unit area (with about 100/km²/station), referring to domestic and foreign scientific publications officially recognized by the WMO (World Meteorological Organization).
- iv. Criteria of complete monitoring of climatic zones and sub-zones which complete the climatic regionalization of Albania.
- v. Criteria of meteorological monitoring of areas of special importance for national security such as cities, agricultural areas, river basins, hydropower plants, etc.

Three categories of priority meteorological stations proposed, are as follow:

- The stations under **category 1** are the main priority points which are proposed to be equipped with automatic stations with a full cycle of climatic elements;
- Stations under **category 2** are meteorological stations with a smaller range of elements than the first category, just the main elements, air temperature, wind;
- Stations in **category 3** are pluviometry stations which are used only for measuring the amount of rain and snow.

Stations of the first category proposed by IGEO are 76 meteorological stations that close the climatic cycle of meteorological monitoring.

Provision of new automatic meteorological stations.

The reasoning for this proposal comes from the fact that Meteorological Diary (DM4) stations (in the Table 10 below) are manual weather stations that are still existent and currently provide data for six parameters (but the quality of data is of concern due to the lack of calibration of the sensors for a long time). These manual stations are installed around the years 60'-90' for the purpose of measuring up to 32 parameters including thermometers of the earth's surface. These stations are very important because the way they are distributed makes it possible to provide data that represent all zones and sub zones of climate change in Albania. Thus, they become a priority for the meteorological network and in order to increase the quality of data as well as reporting data in real time, it is of utmost need to install new automatic meteorological stations in the same location as manual ones. Please note that refurbishing of the manual stations for the same location is also considered important to ensure a smooth transition from manual to real time collection of the data (See Table 10).

Table 10: Meteorological diary (DM4) stations (geolocation)

Nr.	ID	x	y	H
1	Durrës	41.31035	19.45758	0
2	Elbasan	41.11023	20.08666	123
3	Ersekë	40.33733	20.67947	1022
4	Fier	40.7275	19.56276	15
6	Gorre	40.90408	19.67675	6
7	Himarë	40.10347	19.75024	30
8	Kryevindh	41.09181	19.53152	129
9	Kukës	42.03972	20.41556	361
10	Korçë	40.61408	20.77781	873
11	Lezhë	41.78607	19.64608	31
12	Përmet	40.23626	20.3517	241
13	Pogradec	40.90153	20.65563	701

14	Poliçan	40.60643	20.10066	255
15	Pukë	42.04698	19.8961	784
16	Qafshul	41.21327	20.38075	980
17	Rrëshen	41.76764	19.87675	89
18	Sheqeras	40.73944	20.77306	819
19	Sukth i ri	41.37016	19.55144	13
20	Tiranë	41.32636	19.82202	110
21	Voskopojë	40.52848	20.57758	1251
22	Xarrë	39.72718	20.05986	43
23	Cërnicë	42.35814	20.07773	347

7.4.4 Recommendations regarding the Hydrological Stations

Based on the results from the inventory and specific station data sheets as well as findings from several projects/ donors' analysis (like WB, ZAMG, Pro-news, GIZ) the following recommendations are given:

→ Prioritizing the hydro network

By defining the measurement locations for a modernized network. Some of the main criteria referring to the WMO standards and the standards set by the local scientific research institutions for the selection of hydrological stations are presented below. Stations of the first category proposed are 46 hydrometric stations and the criteria for the selection of hydrometric measuring are generally related to the most complete monitoring of the levels of the river network in Albania. Referring to the WMO standards and the standards set by the local scientific research institutions the basic criteria are:

- Monitoring of incoming flows in the territory of Albania. These criteria enable continuous monitoring of how much water enters the territory of Albania through rivers and streams. Through these stations, the incoming flow in our country is analysed.
- Continuous monitoring of watersheds. The modernization of the stations in the entire course of the rivers brings the possibility of accurate analyses of the progress of their course.
- Optimizing the location of new and current measurements in specific points (mainly the middle course of rivers) in which the rise in river levels provides direct information that the flow will bring the risk of flooding in areas (residential, agricultural lands) that are located in the lower banks.
- Monitoring the flows in the river discharges which are mainly in the west of the territory. Through this distribution it is possible to analyse a water balance for our country, knowing how much water leaves the Albanian territory.

→ Provision of new automatic hydrological stations

Stations of the first category proposed are 46 hydrometric stations that realizes and complete the monitoring of the levels of the river network in Albania. These priority stations are hydro stations that directly measure flows and water levels and provide data in real time to IGEO. These stations must also have manual hydrometers at the same locations.

With the data collected hydrologists make predictions and decisions concerning water level, flood activity and impact as well as provide early warning for floods and information on water balance for all water catchment basins (Table 11).

Table 11: Geolocation of priority hydrological stations

No	Stations	N	E
1	Sukth Vendas	41.52569	19.61839
2	Fushe Kruje	41.47932	19.71895
3	Ura e Gjoles	41.46736	19.69167
4	Shupal	41.40153	19.90831
5	Ndroq	41.26462	19.66041
6	Sallmonaj	41.36103	19.54918
7	Bovilla	41.44541	19.86689
8	Shkumbini Paper	41.04983	19.95656
9	Shkumbini Ura E Polisit	41.16369	20.23022
10	Shkumbini Rogozhine	41.06396	19.65146
11	Mati Shoshaj	41.60753	20.02847
12	Mati Milot	41.69922	19.726
13	Ulez	41.67996	19.89381
14	Shkopet	41.69129	19.83093
15	Uraka Uraka	41.6915	19.99903
16	Liqeni Shkodres Shiroke	42.05956	19.454778
17	Buna Dajc	41.98625	19.414167
18	Gomsiqe Gomsiqe	41.97934	19.645232
19	Kiri Rasek	42.11462	19.574984
20	Perroi Vermoshit	42.5876	19.719513
21	Drini Bacallek	42.0425	19.491917
22	Buna Shkoder	42.05056	19.491972
23	Pr. Lepushesh Vermosh	42.565	19.734876
24	Cemi Bashkuar Tamare	42.44314	19.539694
25	Buna F. cimentos	42.03928	19.48275
26	Drini I Zi Kovashice	41.59683	20.441111
27	Vau i Dejes	42.0151	19.6359
28	Komani	42.1078	19.8257
29	Fierze	42.2489	20.0444
30	Valona-Gri	42.3163	20.0579
31	Prespa e Vogel	40.68063	20.994436
32	Pogradec	40.9077	20.651026
33	Prespa e Madhe	40.7873	20.907464
34	Drini i Lezhes-Lezhe	41.78046	19.642188
35	Breg-Lumi	42.30414	19.7965
36	Lekbibaj	42.28816	19.939581
37	Vjosa Carshove	40.11226	20.54017
38	Vjosa Permet	40.24047	20.3535

39	Drinosi Ura e Leklit	40.25931	20.05553
40	Vjosa Memaliaj	40.35189	19.97278
41	Dorez	40.39245	19.80675
42	Shushica Vodice	40.41633	19.58258
43	Vjosa Mifol	40.63444	19.46081
44	Kalasa Tatzat	39.9916	19.9767
45	Bistrice cuke	39.84709	20.02531
46	Pavla Bogas	39.72115	20.13307

7.4.5 Recommendations for the Observers

Observers play a key role in observation, measurement, collection, recording, and transmission of hydrological and meteorological parameters and information on various atmospheric phenomena. 94% of observers in hydrological and meteorological stations were keen and willing to continue performing this task and most of them considered it as a service for the community and family tradition, even though the compensation they get from the state is minimal. Nonetheless, all of them recommended to: a) replace and modernise the sensors, b) regular maintenance and inspection of manual and automatic stations from IGEO technicians, c) supply with basic materials for data recording, like register, diary, and other stationaries. These measures will increase the quality of data collected from the observers and ensure real time data transmission to the Hydromet Institute. While IGEO experts, as a result of the discussions with the observers during field expeditions, recommend that observers need a) training on how to use new instruments for data recording from the stations and b) training for alternate observers (usually another family member).

8. Project Design and Activities

The ALBAdapt project aims to increase the adaptive capacity and climate resilience of Albania, through generation, coordination, and effective use of climate information – in the form of a functional NMHS and NFCS – and a people-centred multi-hazard early warning system (MHEWS), which together constitute a ‘joined-up’ climate information and early warning system (CIEWS).

8.1 Theory Of Change and Project Approach

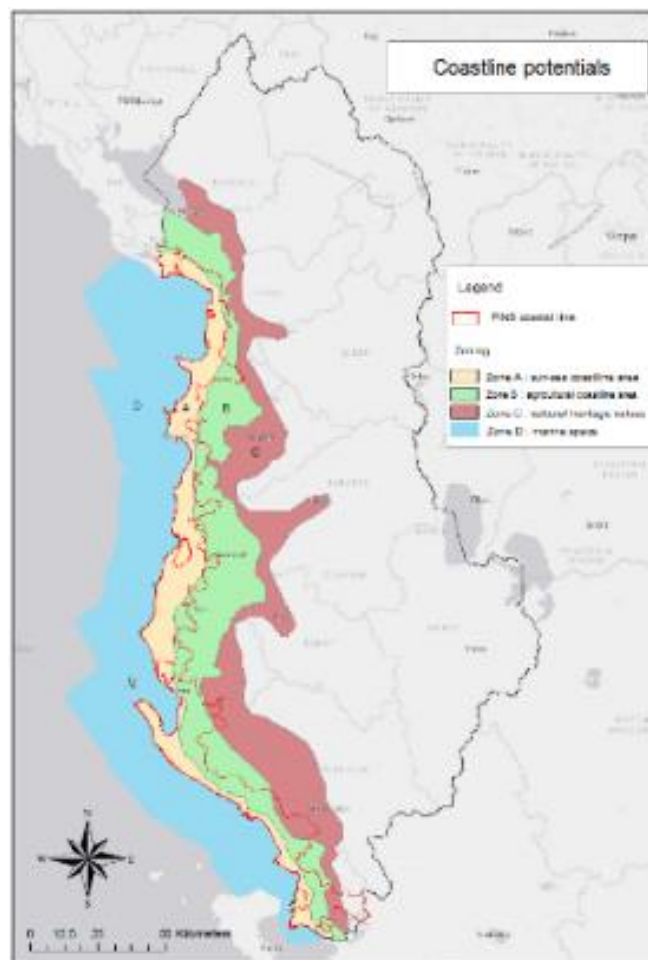
The ALBAdapt project strives at modernizing, along the entire value chain of the NMHS. This approach aligns with growing evidence – globally and in Albania specifically – that partial modernization, such as focusing solely on the observational network, yields limited improvements in service delivery (Rogers and Tsirkurov, 2013). The broader perspective enables the project to consider neglected elements of the value chain, such as sustainable maintenance procedures, staff training and user needs.

“**IF** the Albanian NMHS and NFCS are effectively operationalized to ensure the provision of timely and accurate climate data and services, and the capacities of involved institutions are strengthened, **THEN** vulnerable communities are more climate-resilient with enhanced livelihoods, **BECAUSE** adaptation to climate-induced hazards is facilitated by high-quality climate information and a fully functional MHEWS.”

8.1.1 Project Geography

While the NMHS, NFCS and MHEWS will be enhanced – or established for the first time – for the entire population, early action and the development of a pipeline of EbA / eco-DRR measures will be focused on the Albanian coastal lowlands (coastal belt). This area, which represents a significant share of the Albanian population and economy, is especially important for the agricultural (‘agricultural belt’) and tourism (‘sun-sea belt’) sectors and is at particular risk of the adverse impacts of climate change. The project’s on-the-ground interventions will focus on the 12 coastal municipalities (Figure 32).

Figure 32: The four coastal belts as defined in the integrated cross-sectorial plan for the coast



Source: IGEO

Currently, Albania's NMHS (IGEO) faces challenges in implementing a comprehensive modernisation programme, leading to sub-optimal hydro-met information provision and end-user dissatisfaction. While past efforts undertaken by baseline projects have achieved some improvements, they were insufficient to meet the demands set by the WMO for a functional NMHS. Developing a rejuvenated or restructured NMHS represents a unique opportunity to align Albania with ongoing needs related to the provision of weather, hydrological and climate services. Climate change and digitisation have transformed the sector and many NMHSs world-wide face considerable obstacles to keeping up with this transformation due to legacy institutional structures and systems that are resistant to innovation. A rejuvenated or restructured Albanian NMHS will greatly benefit from modern technical solutions, cooperation with European and international initiatives, and close integration with hazard management, which will provide the NMHS with greater relevance and political support on a long-term basis.

Albania currently lacks a National Framework for Climate Services. IGEO's climate services are currently limited to a basic daily warning bulletin and a monthly retrospective climate bulletin. These two products are distributed using e-mail and IGEO's website. IGEO does not have a formal platform to engage with users. Due to this 'passive' (one-way) interaction with users, there is no product development co-designed with specific user groups and little incentive to expand the range of climate services offered. Evidence from other countries demonstrates that more structured, two-way interaction with users, accompanied by comprehensive sharing of data, helps to better meet users' requirements and build strong partnerships. These partnerships also help to continually improve the quality of climate products and services, as well as facilitate private sector engagement in the hydro-met sector – with the dynamism, innovation, user-focus and additional investment that such engagement implies (GFDRR, 2021), (Frei, 2021).

8.1.2 Theory of Change

The ALBAdapt project aims to increase the climate resilience of Albania, through generation, coordination and effective use of climate information – in the form of a functional NMHS and NFCS – and a people-centred multi-hazard early warning system (MHEWS), which together constitute a ‘joined-up’ climate information and early warning system (CIEWS). It will support national partners to put in place a fit-for purpose multi-hazard early warning system (MHEWS) that addresses, for the first time, multiple climate hazards in a structured, coordinated and ‘joined up’ manner (Figure 33). The geographical scope of the MHEWS will be national, although, of course, individual hazard-related needs will be geographically differentiated: for instance, flooding is particularly prominent in flood-prone areas of the coastal zone and selected basins (such as the Drin, Erzen, Ishem, etc.). The project will establish an Albanian MHEWS that connects:

- i. The reformed NMHS and the NFCS with
- ii. Emergency preparedness and response, enabling economic sectors and local communities – including vulnerable groups to undertake actions in advance of, in anticipation of and in response to tailored warnings.

The theory of change diagram is shown in Figure 33. The project will put in place a comprehensive suite of measures to remove identified barriers to achieve the project objective and, ultimately, address the climate problem.

Table 12: Barriers Addressed by the ALBAdapt Project

Type of Barrier	Barrier	Project Measures	Sub-Activity
Institutional	Operational challenges faced by the NMHS	<ul style="list-style-type: none"> Detailed drafting, agreement and endorsement of the institutional design of a rejuvenated or restructured NMHS. 	1.1.1.1
	Dispersed and uncoordinated hydro-met activities across different institutions	<ul style="list-style-type: none"> Development of a draft Law on Weather, Climate and Hydrological Services to formalise the design of the rejuvenated or restructured NMHS, its roles and responsibilities, and coordination with other entities (including NCPA in relation to the MHEWS). Development and endorsement of a detailed set of institutional roles, responsibilities and inter-institutional coordination arrangements. Adoption of a phased approach with regard to complementary service providers (e.g. MMS, AlbControl): initially addressed through enhanced cooperation and coordination arrangements, with potential medium-term merging or restructuring of roles. 	1.1.1.1
	Negligible private sector involvement in climate service provision	<ul style="list-style-type: none"> Design and establishment of an NFCS (including an NCIS and a UIP) to structure and catalyse private sector engagement with hydro-met data and services. Innovation system awareness-raising to sensitise the private sector to climate services as a potential business opportunity. Establishment of an online innovation community. Development of a portfolio of 30 climate service business ideas. Provision of intensive incubation support and ‘road testing’ (real-world use-cases) for three climate service business ideas. 	1.2.1.1 3.1.1.1 3.1.1.2
	Weak linkages between the NMHS and NCPA	<ul style="list-style-type: none"> Development of a draft Law on Weather, Climate and Hydrological Services to formalise linkages between the NMHS and NCPA (as the coordinating entity for the MHEWS). Design and establishment of the AlbaMet NCIS to systematise data sharing, storage and processing. 	1.1.1.1 1.2.1.2 2.1.2.1

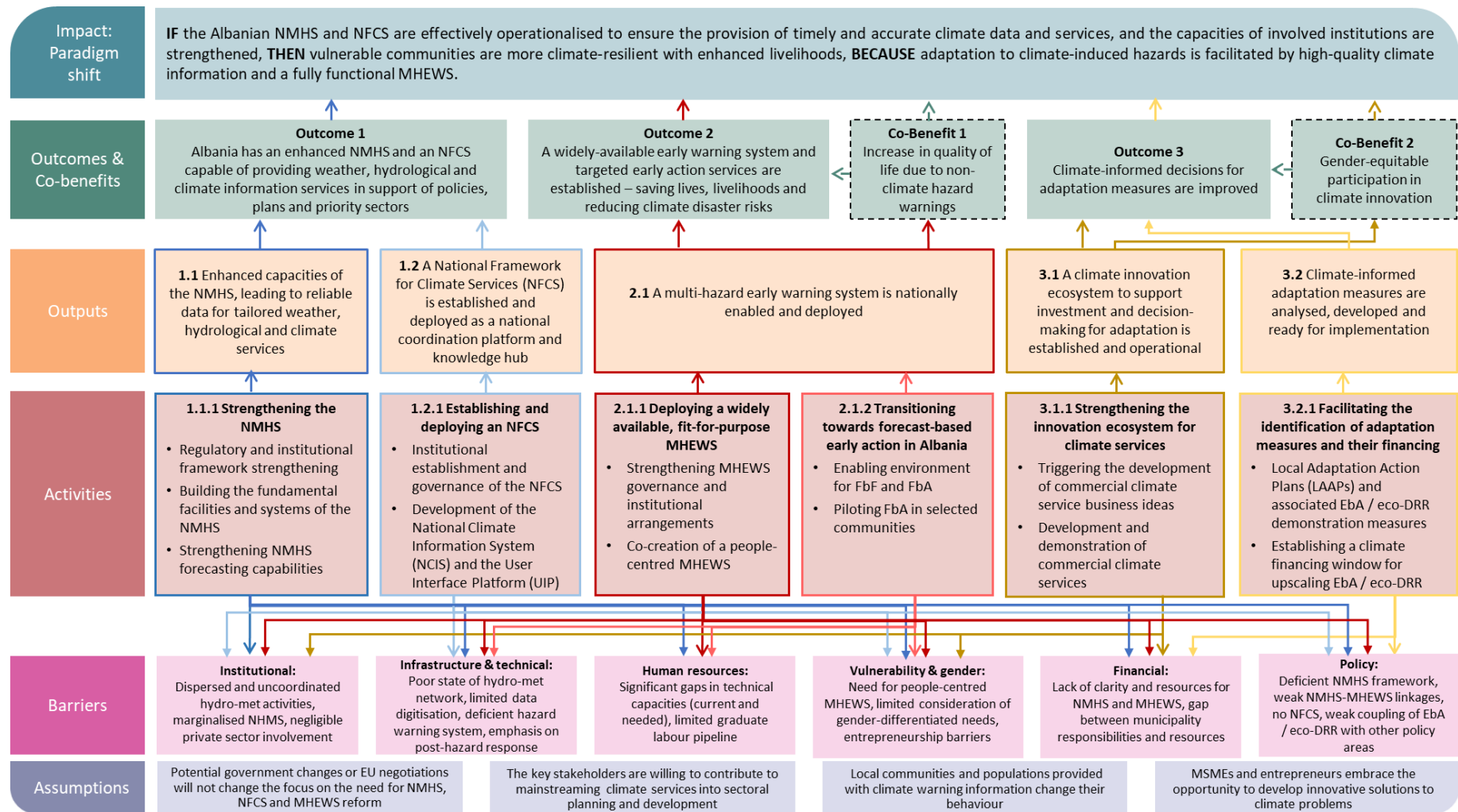
		<ul style="list-style-type: none"> Establishment of the FbA Task Force to mainstream FbA into the NMHS and NCPA. 	
	Absence of a single, unified MHEWS	<ul style="list-style-type: none"> Development of a MHEWS Policy that, inter alia, defines the architecture, institutional roles, responsibilities and functions of a 'joined-up' MHEWS – augmented by institutional SOPs and, where necessary, amendments to the Laws on Civil Protection and Climate Change. Establishment of a MHEWS Executive Committee. Inclusion of wildfires in the MHEWS. 	2.1.1.1
	Municipalities' technical, capacity and financial challenges to fulfil the civil protection role envisaged for them under Albania's decentralisation reforms	<ul style="list-style-type: none"> Design and implementation of a capacity building programme for coastal belt municipalities, including support to community engagement and understanding of vulnerable groups. Design and implementation of awareness-raising campaigns to enable coastal belt municipalities to reach communities / target sub-communities. Design and implementation of a capacity building programme for FbA implementation in coastal settlements (including simulation exercises). Development of LAAPs for each of the twelve coastal belt municipalities. 	2.1.1.2 2.1.2.2 3.2.1.1
Infrastructure, technical and services	Poor state of the meteorological observation network, including malfunctioning stations and manual data collection	<ul style="list-style-type: none"> Development of a network concept and acquisition and installation of approximately 35 automatic weather stations and 60 hydrological stations (numbers to be confirmed during project implementation). Design and implementation of a capacity building programme for NMHS staff on network management. 	1.1.1.2
	No comprehensive maintenance, replacement and financing plan for the hydro-met network	<ul style="list-style-type: none"> Development of a draft Law on Weather, Climate and Hydrological Services that embodies a formal legal obligation on the government to maintain NMHS funding and stipulates the protection and maintenance arrangements for hydro-met facilities. Development of an NMHS business strategy. 	1.1.1.1
	Limited digitisation of hydro-met data	<ul style="list-style-type: none"> Digitisation of paper-based archives (with quality control) and structured storage on the MCH-DMS. Establishment of the AlbaMet NCIS to serve as a digital data repository and online resource. Digitisation of the MHEWS, including inter-operability of institutions' ICT systems and GIS integration with ASIG. 	1.1.1.2 1.2.1.2 2.1.1.1 2.1.1.2
	Limited involvement in regional and international hydro-met / EWS initiatives	<ul style="list-style-type: none"> Development of a draft Law on Weather, Climate and Hydrological Services that stipulates NMHS and MHEWS engagement with international treaties and cooperation frameworks, including with WMO and the EMI. Project support for engagement with WMO, ECMWF, EUMETNET, MeteoAlarm, SEECOF, SEECOP, SEE-MHEWS-A, etc. 	1.1.1.1 2.1.1.1 2.1.1.2
	Deficiencies in the hazard warning system (fragmented, slow, narrow scope, no mobile phone functionality)	<ul style="list-style-type: none"> Transition the NMHS towards two daily shifts (early and late), and a night-time shift in emergency situations, thereby providing continuous surveillance. Design and implementation of a training programme for meteorological and hydrological forecasters. Development of flood nowcasting capabilities. For each hazard-type, development of input data, thresholds and benchmarks to enable objective, standardised warning production. 	1.1.1.3 1.2.1.1 2.1.1.1 2.1.1.2

		<ul style="list-style-type: none"> • Development of AlbaMet Alert as a platform within the AlbaMet NCIS, and formalisation of the relationship between NEBS and AlbaMet Alert. • Use of CAP for alerts. • Design and establishment of the mobile phone alerts system as part of AlbaMet Alert. 	
	Forecasts and warnings are weather- or hazard-related, not impact-related	<ul style="list-style-type: none"> • Development of hazard impact models for six coastal belt settlements. • Implementation of FbA pilots (incorporating impact-based logic) in three coastal belt settlements. 	2.1.2.1 2.1.2.2
	Core focus of civil protection is on post-disaster response, not preparatory or anticipatory action	<ul style="list-style-type: none"> • Analysis of the foundations of FbA / FbF in Albania. • Design and implementation of a capacity building programme for the NMHS, NCPA, municipalities, NTPA, etc. • Establishment of the FbA Task Force to mainstream FbA into institutions and policies (NAP, National DRR Action Plan, etc.). • Establishment of the FbA Community of Practice. • Implementation of changes to civil protection institutions' policies and mandates to enable pre-emptive action. • Development of school emergency FbA plans in coastal municipalities. • Implementation of FbA pilots in three coastal belt settlements. 	2.1.1.2 2.1.2.1 2.1.2.2
	No systematic use of decision support tools	<ul style="list-style-type: none"> • Development of a software-based DST and its integration into MHEWS operations. 	2.1.1.1 2.1.1.2
Human resources	NMHS human resource constraints	<ul style="list-style-type: none"> • Design and implementation of a multi-year, multi-dimensional capacity development programme for the NMHS, based on the new institutional duties and functions derived from the Law on Weather, Climate and Hydrological Services. • Development of a higher education (universities, vocational colleges) curriculum to supply a future workforce. • Design and implementation of a capacity building programme for NFCS institutions and users / beneficiaries. • Design and implementation of a capacity building programme for climate change scenario development. 	1.1.1.1 1.2.1.1 1.2.1.2
	NCPA human resource constraints	<ul style="list-style-type: none"> • Implementation of a detailed assessment of NCPA regarding its capacities to receive, process and utilise climate data and information. • Design and implementation of a capacity building programme for NCPA. 	2.1.1.1 2.1.1.2
Vulnerability and gender	Need for greater inclusion for the MHEWS to be considered truly 'people-centred'	<ul style="list-style-type: none"> • Implementation of an inclusive MHEWS design process, including integration of vulnerable groups' needs, views and priorities; design of the most effective communication channels to reach target groups; and implementation of a public awareness campaign that specifically includes vulnerable groups. 	2.1.1.1 2.1.1.2
	Need for greater inclusion in municipal plans	<ul style="list-style-type: none"> • Design and implementation of 'last mile' MHEWS capacity building support for coastal belt municipalities, including components focused on vulnerable groups. • Impacts on vulnerable groups explicitly incorporated into the TSCDs and LAAPs. 	2.1.1.2 3.2.1.1
	Limited consideration of gender-	<ul style="list-style-type: none"> • Explicit attention given to women's participation and needs in NFCS design and implementation (including the NFCS 	1.2.1.1 1.2.1.2 2.1.1.1

	differentiated needs in NMHS and MHEWS design and operations	<p>technical report, stakeholder dialogue, capacity building and AlbaMet stakeholder consultations).</p> <ul style="list-style-type: none"> • Explicit attention given to women's participation and need in MHEWS design and implementation (including communication channels and the public awareness campaign). • Incorporation of differentiated user needs (including gender) into the DST. • Design and implementation of gender-disaggregated MHEWS data-streams to address the differentiated needs of women and men. • Design and implementation of 'last mile' NHEWS capacity building support for coastal belt municipalities, including gender-related components. • Explicit incorporation of gender-related impacts in the TSCDs and LAAPs. • Inclusion of a gender-oriented stakeholder on the governing committee of the ADF EbA / eco-DRR financing window. 	<p>2.1.1.2 3.2.1.1 3.2.1.2</p>
	Challenges faced by women entrepreneurs (financing, role models, etc.)	<ul style="list-style-type: none"> • Inclusion of the Women Founders Network Albania (WFNA) to play a key role in innovation system awareness-raising. • Incorporation of a gender component in the scoring of climate service business ideas for incubation support. • Inclusion of a gender capacity building component in incubation support. • Development of a lessons-learned report on empirical challenges and opportunities for climate service providers, including explicit consideration of gender-related issues. 	<p>3.1.1.1 3.1.1.2</p>
Financial	NMHS financial constraints	<ul style="list-style-type: none"> • Development of a draft Law on Weather, Climate and Hydrological Services that embodies a formal legal obligation on the government to maintain NMHS funding. 	<p>1.1.1.1</p>
	Need for adequate MHEWS funding	<ul style="list-style-type: none"> • Development of a MHEWS resources plan to institutionalise long-term funding mechanisms and mobilise non-government sources of finance. 	<p>2.1.1.1 2.1.1.2</p>
	Financing needs for upscaling EbA / eco-DRR	<ul style="list-style-type: none"> • Inclusion of EbA / eco-DRR measures in coastal belt municipality LAAPs. • Storage of LAAPs in a central NTPA online repository (linked to AlbaMet) to facilitate targeted investment. • Design and establishment of an ADF EbA / eco-DRR financing window, accompanied by revision of the ADF Strategic Plan, capacity building and integration options for the Medium-Term Budget Process (MTBP). 	<p>3.2.1.1 3.2.1.2</p>
	Municipality financial constraints	<ul style="list-style-type: none"> • Development of a MHEWS resources plan that explores links between central government MHEWS funding and municipalities' DRR / emergency response budgets. • Design and establishment of an ADF EbA / eco-DRR financing window as a funding mechanism for (primarily) municipalities. 	<p>2.1.1.1 3.2.1.2</p>
Policy	Need for strengthened policy framework to govern reformed, 'joined up' NMHS and MHEWS	<ul style="list-style-type: none"> • Development of a draft Law on Weather, Climate and Hydrological Services to formalise the design of the rejuvenated or restructured NMHS, its roles and responsibilities, and coordination with other entities (including NCPA in relation to the MHEWS). 	<p>1.1.1.1</p>
	No NFCS to support development	<ul style="list-style-type: none"> • Design and establishment of an NFCS. 	<p>1.2.1.1</p>

	of the climate services sector		
	No policy framework to mainstream EbA / eco-DRR across key sectors; need for improved planning and management of EbA / eco-DRR interventions.	<ul style="list-style-type: none"> • Inclusion of detailed descriptions of EbA / eco-DRR measures in coastal belt municipality LAAPs, which, in turn, inform NDC, NAP etc. implementation and periodic updates. • Implementation of 5-10 EbA / eco-DRR demonstration measures, covering a range of hazard-types in a range of coastal belt municipalities. • Development of EbA / eco-DRR replication reports to facilitate accelerated, problem-free implementation of similar measures elsewhere in Albania. 	3.2.1.1

Figure 33: Theory of change



Source: Own elaboration

8.1.3 Project Scope

The ALBAdapt project aims to increase the adaptive capacity and climate resilience of Albania, through generation, coordination and effective use of climate information in conjunction with an early warning system (CIEWS).

As a result, vulnerable Albanian communities will be more resilient to climate change impacts, will be able to take early action, and will be able to make informed, climate-related investment decisions, particularly those related to water-related hazards in the coastal belt.

The project is structured across three Components:

- Component 1: Weather, hydrological and climate information services;
- Component 2: Multi-hazard early warning system and early action;
- Component 3: Climate-informed investment decisions.

Key project results will include:

- The government establishes fit-for-purpose institutional and regulatory frameworks for the effective implementation of the national meteorological and hydrological service (NMHS) and a national framework for climate services (NFCS), including the establishment of a national climate information system (NCIS): AlbaMet.
- The NMHS possesses the human, institutional, procedural, financial and infrastructure capabilities to effectively coordinate and cooperate in order to provide effective meteorological, hydrological and climate data and services.
- The NMHS, the National Civil Protection Agency (NCPA) and municipalities sensitise beneficiaries to climate risks, so they know why, where and how to react.
- Leveraging the improvements to the NMHS, NCPA, in fulfilment of its mandate, provides early warnings through a multi-hazard early warning system (MHEWS) that beneficiaries receive, understand and can take early action on.
- Trained municipal officials, Red Cross volunteers and communities at the local level ('last mile') are ready to respond to and handle climate hazard situations appropriately.
- All stakeholders, including government organisations, NGOs, civil society and the private sector (notably, micro, small and medium-size enterprises (MSMEs)) contribute to the design and widespread, effective use of climate services to enhance the implementation of adaptation options and to put measures in place that reduce the impacts of climate risks for society and for the economy.
- The benefits of hydro-met data are maximised by involving private sector actors in the provision of climate services.
- Investments in ecosystem-based adaptation (EbA) / eco-disaster risk reduction (eco-DRR) measures are identified, prioritised and demonstrated.

While the NMHS, NFCS and MHEWS will be enhanced – or established for the first time – for the entire population, early action and the development of a pipeline of EbA / eco-DRR measures will be focused on the Albanian coastal lowlands (coastal belt). This area, which represents a significant share of the Albanian population and economy, is especially important for the agricultural and tourism sectors and is at particular risk of the adverse impacts of climate change.

The ALBAdapt project is aligned with the Revised Nationally Determined Contribution (NDC, 2021) (Republic of Albania, 2021a) and the National Adaptation Plan (Republic of Albania, 2021c), and with national policies and strategies – notably, the Law on Climate Change (2020), the Law on Civil Protection (2019), the National Climate Change Strategy (2021) (Resource Environment Centre, 2022) and the National Disaster Risk Reduction Strategy (2022) (Republic of Albania, 2022b). The ALBAdapt GCF project is specifically identified as Strategic Project 11 in the associated National Disaster Risk Reduction Action Plan.

Table 13: ALBAdapt project components, outcomes, outputs, activities and sub-activities

Component 1 – Weather, hydrological and climate information services	Outcome 1 Albania has an enhanced National Meteorological and Hydrological Service (NMHS) and a National Framework for Climate Services (NFCS) capable of providing weather, hydrological and climate information services in support of policies, plans and operations across all priority sectors.	Output 1.1 Enhanced capacities of the NMHS, leading to reliable data for tailored weather, hydrological and climate services	Activity 1.1.1 Strengthening the National Meteorological and Hydrological Service	Sub-Activity 1.1.1.1 Supporting comprehensive institutional reform of the NMHS
		Output 1.2: An NFCS is established and deployed as a national coordination platform and knowledge hub	Activity 1.2.1 Establishing and deploying an NFCS	Sub-Activity 1.1.1.2 Building the fundamental facilities and systems of the NMHS
				Sub-Activity 1.1.1.3 Strengthening NMHS forecasting capabilities
				Sub-Activity 1.2.1.1 Institutional establishment and governance of the NFCS
Component 2 – Multi-hazard early warning system and early action	Outcome 2 A widely-available early warning system and targeted early action services are established - saving lives, livelihoods and reducing climate disaster risks.	Output 2.1 A multi-hazard early warning system is nationally enabled and deployed	Activity 2.1.1 Deploying a widely available, fit-for-purpose MHEWS	Sub-Activity 1.2.1.2 Development of the National Climate Information System (NCIS) and the User Interface Platform (UIP)
				Sub-Activity 2.1.1.1 Strengthening MHIEWS governance and institutional arrangements
			Activity 2.1.2 Transitioning towards forecast-based early action in Albania	Sub-Activity 2.1.1.2 Co-creation of a people-centred MHIEWS
				Sub-Activity 2.1.2.1 Creating an enabling environment for forecast-based early action in Albania
Component 3 – Climate informed investment-decisions	Outcome 3 Climate-informed decisions for adaptation measures are improved.	Output 3.1 A climate innovation ecosystem to support investment and decision-making for adaptation is established and operational	Activity 3.1.1 Strengthening the innovation ecosystem for climate services	Sub-Activity 2.1.2.2 Piloting FbA in selected communities
				Sub-Activity 3.1.1.1 Triggering the development of commercial climate service business ideas
		Output 3.2 Climate-informed adaptation measures are analysed, developed and ready for implementation	Activity 3.2.1 Facilitating the identification of adaptation measures and their financing	Sub-Activity 3.1.1.2 Development and demonstration of commercial climate services
				Sub-Activity 3.2.1.1 Territorial Adaptation Action Plans (LAAPs) and associated EbA / eco-DRR demonstration measures
				Sub-Activity 3.2.1.2 Establishing a climate financing window for upscaling the EbA/eco-DRR measures

Source: Own elaboration

8.2 Project Design

The project presents the following special features:

- **Scaling up GIZ experience in the country to modernize NMHS:** The project will enable a Paradigm shift in climate hazard forecasting and warning from a reactive hazard-based system to a user-centered and impact-based system, in line with the WMO GFCS and building upon GIZ's in-country hydro-met experience.
- **Holistically addressing climate induced disaster risks,** including both anticipatory action in case of disasters and measures to systematically reduce climate risks (EbA Eco DRR)
- **Aligned with WMO initiatives and standards:** ALBAdapt is designed in coordination and compliance with WMO initiatives and guidelines. WMO will also contribute to the project implementation and will be invited to selected steering meetings.
- **Promotes private sector involvement and strengthens the use of digital technologies:** ALBAdapt seeks to use climate information effectively within municipalities, communities and small businesses (Particularly in the agriculture and tourism sector), to make informed investment decisions to reduce long-term disaster risks. To facilitate the on-take of climate information, innovative tools and analytics are facilitated along with their co-financing through an innovation hub and a dedicated window.
- **A public and private financial strategy:** The project seeks to (i) mobilize public and private financing resources for prioritized activities that reduce climate risks within the target territories, for local communities including small to medium size enterprises and (ii) to secure public resources for the NFCS and to create a market for CIEWS.

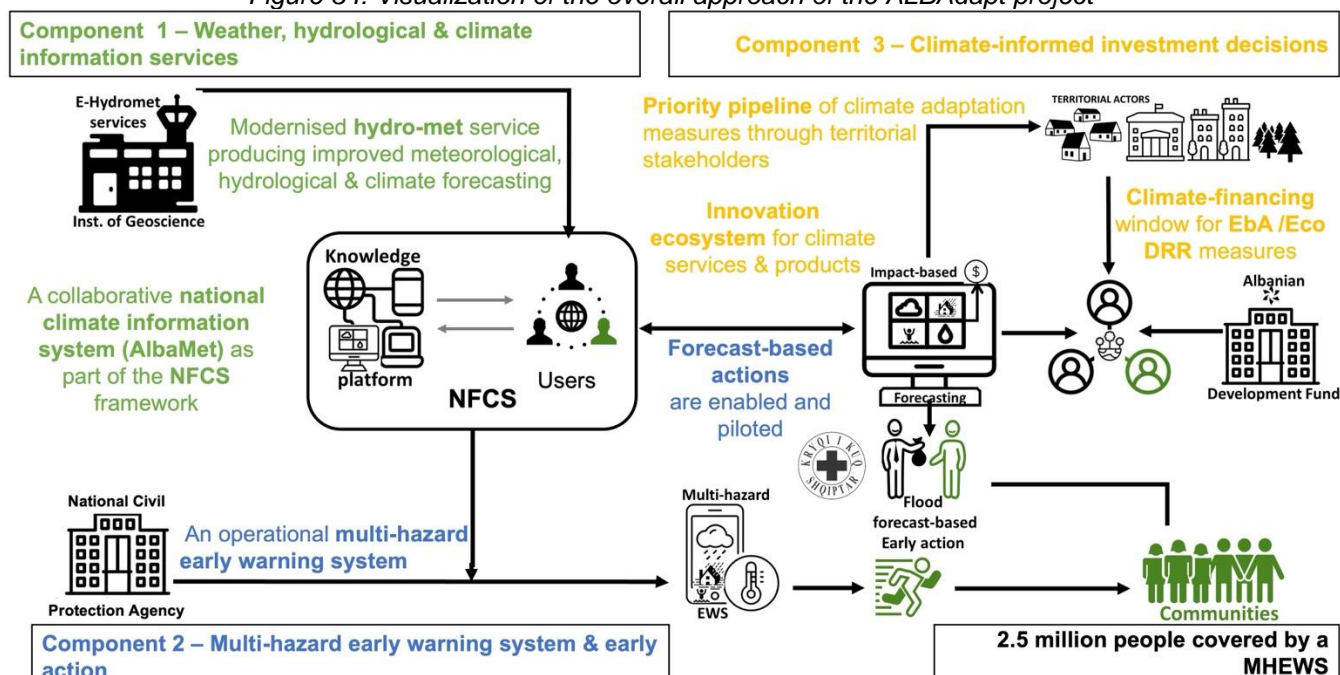
8.2.1 Project Paradigm Shift

IF the Albanian NMHS and NFCS are effectively operationalised to ensure the provision of timely and accurate climate data and services, and the capacities of involved institutions are strengthened, **THEN** vulnerable communities are more climate-resilient with enhanced livelihoods, **BECAUSE** adaptation to climate-induced hazards is facilitated by high-quality climate information and a fully functional MHEWS. The approach adopted by the ALBAdapt project is visualized in Figure 34.

Key project results will include:

- The government establishes fit-for-purpose institutional and regulatory frameworks for the effective implementation of the NMHS and an NFCS, including the establishment of a national climate information system (AlbaMet);
- The NMHS possesses the human, institutional, procedural, financial and infrastructure capabilities to effectively coordinate and cooperate in order to provide effective meteorological, hydrological and climate data and services;
- The NMHS, NCPA and municipalities sensitize beneficiaries to climate risks, so they know why, where and how to react;
- Leveraging the improvements to the NMHS, NCPA, in fulfilment of its mandate, provides early warnings that beneficiaries receive, understand and can take early action on;
- Trained municipal officials, Red Cross volunteers and communities at the local level ('last mile') are ready to respond to and handle climate hazard situations appropriately;
- All stakeholders, including government organizations, NGOs, civil society and the private sector (notably, MSMEs) contribute to the design and widespread, effective use of climate services to enhance the implementation of adaptation options and to put measures in place that reduce the impacts of climate risks for society and for the economy;
- The benefits of hydro-met data are maximized by involving private sector actors in the provision of climate services;
- Investments in EbA / eco-DRR measures are identified, prioritized and demonstrated.

Figure 34: Visualization of the overall approach of the ALBAdapt project

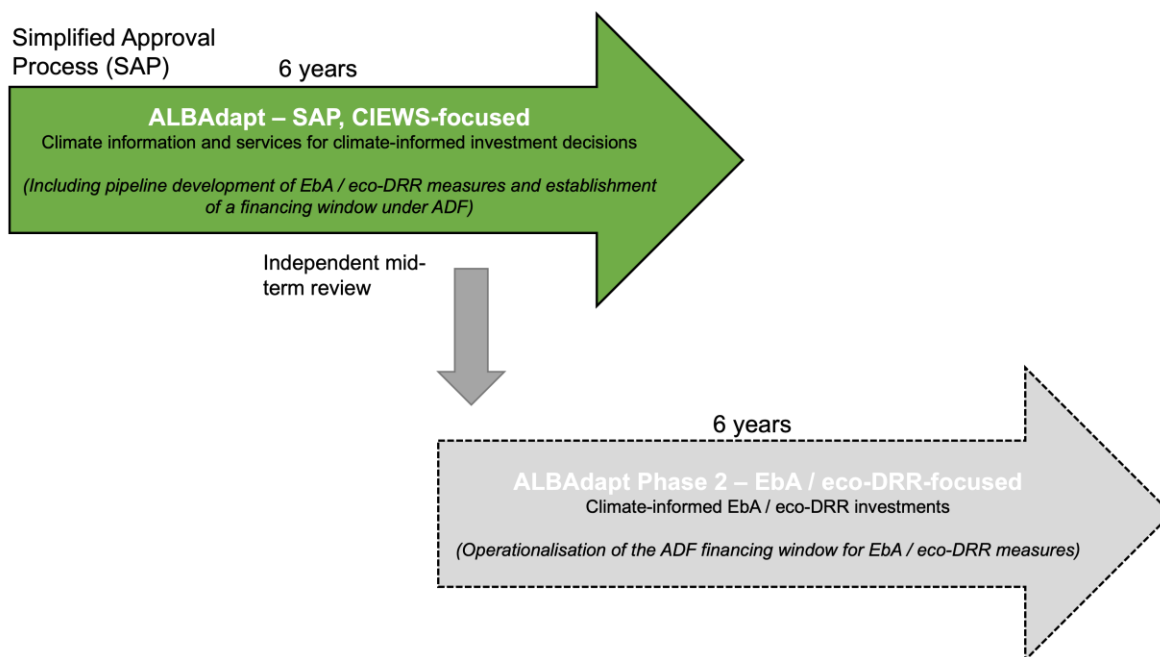


8.2.2 A Programmatic Paradigm Shift: A Two-Phased Approach

Based on the country's needs and the urgency to reduce climate risks, the ALBAdapt project was initially designed to cover the entire CIEWS value chain, from strengthening of the hydro-met service to investment on the ground. However, in order to optimize the allocation of financial resources and to ensure that scale-up is conditional upon successful completion of foundational tasks, the initial project design has been partitioned into two phases:

- A first phase ('ALBAdapt') that establishes the necessary elements for climate-informed decisions, including the restructuring and reinforcement of the NMHS, establishment of the NFCS, strengthening of the MHEWS, catalysing private sector involvement in the provision of climate services, the development of a pipeline of agreed EbA / eco-DRR interventions, and implementing selected demonstration projects.
- A second phase ('ALBAdapt Phase 2') that will leverage the foundational achievements and lessons learned of Phase 1 to scale-up on-the-ground EbA / eco-DRR investments through the newly established ADF climate financing window (Figure 35).

Figure 35: SAP programmatic approach



Source: Own elaboration

This pre-feasibility study refers exclusively to the first phase, which provides a strategic opportunity to achieve a paradigm shift towards climate-informed decisions and investments for a climate-resilient Albania, particularly in one of its most vulnerable regions, the coastal belt. The subsequent project, ALBAdapt Phase 2, may be submitted at a later stage, subject to: (i) satisfactory performance in the independent mid-term review of the ALBAdapt project, and (ii) stakeholder agreement to proceed, notably from the Government of Albania. GCF Board approval for the ALBAdapt project is wholly separate from, and does not pre-judge, Board approval for ALBAdapt Phase 2, **which would be submitted as a separate Funding Proposal**.

8.2.3 Paradigm Shift Dimensions

The ALBAdapt project contributes to the three paradigm-shifting pathways of the GCF Climate Information and Early Warning System (CIEWS) Sectoral Guide, namely:

- Strengthening climate information services;
- Promoting impact-based MHEWS and early action; and
- Improving CIEWS for investment and financial decisions (GCF, 2022). ALBAdapt project contributions to the 4 drivers of paradigm shift for each of the three CIEWS pathways are presented in Table 14.

8.2.3.1 Scalability

The project will scale-up the development and use of CIEWS. This will be achieved by investing in technology, improving data collection, developing institutional capacities and enhancing the use of climate information for preparedness, anticipatory response and adaptation (Activities 1.1.1, 2.1.1 and 2.1.2, in particular). The NFCS (Activity 1.2.1) will create a space for climate services co-production, bringing together service providers and users. Mainstreaming community-responsive landscape interventions (EbA / eco-DRR) into planning processes will enhance the integration of climate information for nature-based solutions in the coastal belt and pave the way for scaled-up investment in nature-based solutions under a second, subsequent phase of the project.

8.2.3.2 Replicability

It is important to note that, worldwide, fewer than half of countries report being covered by a MHEWS, so the replication potential of a project such as ALBAdapt is significant (UNDRR and WMO, 2022). The

project is also building the basis for replicability of the piloted FbA and the identification of EbA/EcoDRR actions/measures.

8.2.3.3 Sustainability

Communities and local leadership, including women and youth, will be strengthened to ensure the sustainability on the use of the climate analytics and services. The final beneficiaries of climate advisory services will be directly involved in producing relevant climate information via the co-creation space of the established NFCS and the innovation hub. The information from sectoral working groups by the NFCS will be integrated in government responses to reply to the identified needs. Access to climate information services via ECAS, ACAS, WCAS, and HCAS platforms could support the planning, programming, and decision-making for further replication.

Financially the project will support the mobilization of public and private resources for the NFCS, including the maintenance of the hydromet network as well as a financial resources strategy as part of the development of a climate financial mechanism under ADF, which operationalization is expected to take place in a subsequent phase of the project. Public-private partnerships will catalyse innovative investments and financing for long-term sustainability for services providers. The increased economic output with decreased socio environmental and economic impact will stem from the combined results of i) improved planning and programming to reduce climate risk through better preparedness and maintenance of ecosystems or the natural infrastructure or both, and ii) improved participation of different stakeholders via capacity development and participatory decision-making.

Table 14: ALBAdapt approach in relation to the GCF paradigm-shifting pathways and drivers

CIEWS Sectoral Guide		Transformational planning & programming	Catalysing climate innovation	Mobilisation of finance at scale	Coalitions and knowledge to scale-up success
Paradigm-shifting pathways	Strengthening climate information services	<ul style="list-style-type: none"> Support establishment of the NFCS to strengthen generation and uptake of climate services [► Output 1.2 – Activity 1.2.1] 	<ul style="list-style-type: none"> Enhance hydro-met service provision and optimise network infrastructure, including building e-infrastructure to reduce costs and enhance efficiency [► Output 1.1 – Activity 1.1.1] 	<ul style="list-style-type: none"> Regularise and scale-up government budgetary allocation for hydro-met services [► Output 1.1 – Activity 1.1.1] 	<ul style="list-style-type: none"> Establish a collaborative digital knowledge platform (AlbaMet NCIS) to enhance climate decision-making and service provision [► Output 1.2 – Activity 1.2.1] Systematic capacity building for the NMHS, NFCS, MHEWS and last-mile coastal belt communities [► Output 1.1 – Activity 1.1.1; Output 1.2 – Activity 1.2.1; Output 2.1.1 – Activity 2.1.1; Output 3.2 – Activity 3.2.1] Strengthen engagement with regional and international CIEWS frameworks and initiatives [► Output 1.1 – Activity 1.1.1; Output 1.2 – Activity 1.2.1; Output 2.1 – Activity 2.1.1]
	Promoting impact-based MHEWS and early action	<ul style="list-style-type: none"> Promote community engagement in designing and implementing forecast-based action [► Output 2.1 – Activity 2.1.2] Enhance mechanisms for strengthening capacity at all stages of the MHEWS value chain [► Output 2.1 – Activity 2.1.1] 	<ul style="list-style-type: none"> Make fit-for-purpose MHEWS widely available [► Output 2.1 – Activity 2.1.1] 	<ul style="list-style-type: none"> Design and establish a financing window within ADF for scaling-up EbA / eco-DRR investment [► Output 3.2 – Activity 3.2.1 of current project; to be followed up in ALBAdapt Phase 2] 	
	Improving CIEWS for investment and financial decisions	<ul style="list-style-type: none"> Develop climate-informed project investment decisions (project pipeline) [► Output 3.2 – Activity 3.2.1] 	<ul style="list-style-type: none"> Improve the informational basis for, and systematise, MHEWS decision-making, including issuance of warnings [► Output 2.1 – Activity 2.1.1] 	<ul style="list-style-type: none"> Promote enabling environment, business ideation and business development for climate services investment [► Output 3.1 – Activity 3.1.1] 	

Source: Own elaboration

8.3 Description Of Project Components, Outputs, Activities and Sub-Activities

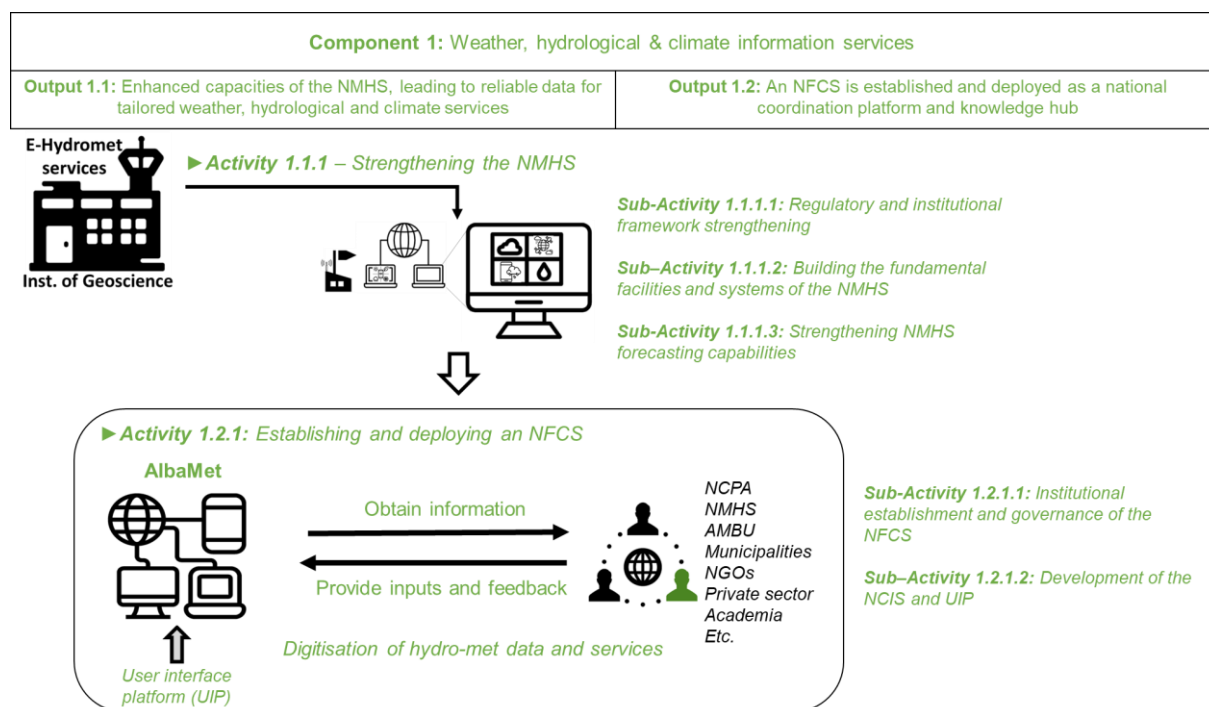
The components of the project, including the display of the tasks involved in the development of the respective activities and sub-activities, are a detailed description of them, categorized based on the:

- Baseline, providing the status quo of the circumstances prior to the intervention through the ALBAdapt project.
- Description of what the project aims to achieve, and how it plans to achieve them, based on the identified gaps between the expected results and the aforementioned baseline.
- Justification section, which strives to rationalize the decisions undertaken and explains why such actions ought to be undertaken, including the how such actions relate to the expected results.
- Results section, describes the expectations and the outcomes of the actions undertaken on the description section to achieve the results while referencing to the starting point, namely the baseline.

Besides the interlinkages resulting from the description of the tasks to achieve the proposed objectives and outcomes, the tables provided in this section, aim to describe the details regarding the Executing Entities that will be involved in the implementation of the respective activities, the expected results of the actions (at the activity level) and the way the activities would contribute to the achievement of the Output.

8.3.1 Component 1 – Weather, Hydrological And Climate Information Services

Figure 36: Representation of component 1



Source: Own elaboration

Outcome 1: Albania has an enhanced National Meteorological and Hydrological Service (NMHS) and a National Framework for Climate Services (NFCS) capable of providing weather, hydrological and climate information services in support of policies, plans and priority sectors.

Output 1.1: Enhanced capacities of the NMHS, leading to reliable data for tailored weather, hydrological and climate services

Activity 1.1.1: Strengthening the NMHS

IGEO faces fundamental challenges in fulfilling the NMHS role, as defined by WMO (WMO, 2015b). Financial instruments and regulatory frameworks to perform critical operational functions, such as station maintenance, are inadequate, and the existing legal framework (Order IGEO, 2011) does not sufficiently elaborate the NMHS's operational role. Past international assistance has improved the assets and capacities of IGEO, but many of these gains could not be sustained due to the institutional shortcomings and fragmented nature of the support. There is a pressing need for far greater coordination and data-sharing (and uniform – higher – data quality) between Albanian institutions (and, more broadly, with civil society, the private sector and the general public), accompanied by clearly-described institutional roles and responsibilities.

Investments into meteorological and hydrological services are needed at large scale, but these should be accompanied by institutional strengthening and capacity development that provide the NMHS with the means to fulfil its role sustainably. Investments are needed along the entire value cycle: the observational network is only partially functional; data flows and archiving tasks are fragmented and generally do not feed into international protocols (Global Telecommunication System (GTS) (WMO GTS Overview, 2024) / WMO Information System (WIS) (WMO WIS Overview, 2024); and quality control is insufficient. The lack of a reliable operational network strongly limits the development of meteorological, hydrological and climate services, which are, as a result, severely under-developed.

Output 1.1 seeks to remove the barriers that restrict NMHS's ability to provide reliable data and weather, hydrological and climate services to current and potential future users. Activity 1.1.1 supports Output 1.1 by strengthening the Albanian NMHS and developing the regulatory, financial and institutional environment for long-term operations and sustainable funding. Activity 1.1.1 also modernises key aspects of the hydro-met system, including investment in new meteorological and hydrological stations, data management and quality control systems. Meteorological and hydrological forecasting capabilities – using on-the-ground and remote sensing data – will also be strengthened to deliver on early warning and climate service needs.

Sub-Activity 1.1.1.1: Regulatory and institutional framework strengthening

GCF financial instrument utilised: technical assistance grant
Executing Entity: GIZ

Task 1 – Mapping and assessment

A more detailed *actor mapping* for the sector will be undertaken, focusing especially on the private sector, the inter-relations among private sector actors (start-ups, SMEs, larger corporate entities, financial institutions, etc.), and specific sectoral and functional needs (including potential clients) in relation to hydro-meteorological services. The actor mapping will also include a gender component to better understand gender-related needs, gaps and potential synergies across the sector, which will then form the basis of structured gender engagement between government, civil society and private sector institutions (see the Gender Action Plan, summarised in Section D.3.4). A hydro-met services *legal framework assessment* will also be undertaken, analysing the needs and respective gaps (including gender-related gaps) for hydro-meteorological services according to the existing legal framework (the Laws on Climate Change and Civil Protection, the NSDEI, NDRRS, NDRRAP, etc.), as well as the requirements to address international commitments (UNFCCC, WMO, etc.).

Task 2 – Design of a rejuvenated or restructured NMHS

Based on the outcomes of the actor mapping and the legal framework assessment (Task 1), a multi-stakeholder consultation process will be implemented to discuss the options for NMHS reform. The engagement of the government (including PMO, MoFE and line ministries, as well as other public institutions); academia; CSOs and NGOs – notably, the Cooperation and Development Institute, a well-respected public policy think-tank, and organisations with a gender focus and those representing ethnic groups; and the private sector (including the Albanian Chamber of Commerce) will be ensured in order to facilitate the development of a widely accepted, financially sustainable and functional solution.

Achieving effective institutional reform will require the deep involvement of the government as the driving stakeholder and long-term investor. Core operations, such as investing in a national observational network, are natural monopolies, and worldwide models suggest that these functions are best covered by government as a public good, augmented where feasible with private-sector sub-contracting and commercial provision of services (WMO, 2019a). However, the current available government funding dedicated to hydro-met core operations is insufficient to meet the minimum requirements. Therefore, integral components of the NMHS reform consultations will include:

- *Operating model*: Identification of which services can be efficiently handled by existing actors and which ones require the involvement of a potentially new actor(s).
- *Funding model*: Detailed consideration of – and, ultimately, firm commitment to – sustainable funding by the government of the long-term operations of the NMHS (beyond the ALBAdapt project horizon). Aligning this commitment with the EU accession process and with the development of strategic sectors such as tourism and renewable energy will strengthen the case – and appetite – for such investment.

The business-as-usual scenario is one in which IGEO continues to operate as the NMHS in its capacity as an academic institution. The MeteoSwiss Assessment Report presents three alternative illustrative scenarios for NMHS reform, which can serve as starting points for detailed discussion:

- *‘Reanimation’*: continuation of IGEO as the NMHS, but accompanied by a change of institutional status (to a public body), strengthened operational capacities and increased collaboration with other actors (domestic and external).
- *‘Operationalisation’*: separation of academic and operational roles, with IGEO retaining its research-related NMHS mandate while operational NMHS responsibilities are shifted to a new government agency situated under a ministry (similar to the status of NCPA under the Ministry of Defence). Dual affiliation of staff between the two NMHS institutions – research and operations – could be considered to ensure that the mutually-beneficial links between hydro-met research and practice are retained.
- *‘Start from scratch’*: IGEO’s formal involvement in the NMHS is severed completely and an alternative institution – a government agency or a departmental unit – is established as the NMHS. IGEO’s hydro-meteorological equipment and staff are absorbed by the new NMHS institution, which would build a new institutional culture.

The Assessment Report outlines the advantages and disadvantages of each of these scenarios, accompanied by options within each one. For example, continuation of IGEO’s role as the NMHS would be the most straightforward option from an administrative perspective, would entail the least disruption and would reinforce hydro-met research-operations linkages. Moving NMHS responsibilities to an entity under the Ministry of Defence would ensure proximity to the principal beneficiary of NMHS data and forecasts, NCPA. It would also serve to complement the activities of MMS. Indeed, integration of the NMHS into NCPA itself could be considered: such close integration of hydro-met and civil defence functions has been successfully adopted by a number of countries, most notably Italy in the region. Alternatively, situating the NMHS under PMO would ensure proximity to AMBU and hydropower agencies; or, if under MoTE, to the tourist sector and the climate change agenda.

The Assessment Report recommends a *phased approach* with regard to complementary service providers such as MMS and Albcontrol. Seeking to dissolve these institutions – or, at least, their hydro-met functions – in the short-term could prove challenging, and it is not uncommon for different agencies to handle specific services (as seen in Austria, for example, which has a similar model). However, in the medium and long term, restructuring these duties might be considered. For example, some of the

responsibilities currently handled by MMS could be transferred to the NMHS, especially if both entities operate under the same ministry. An illustrative example is provided by Switzerland, where the military has outsourced a significant portion of its weather-related requirements to MeteoSwiss and plans to dissolve its own military meteorology functions.

The detailed institutional design of the NMHS will be drafted and endorsed by the responsible institutions of the Albanian government. Based on the agreed mandate and set of services to be provided by the NMHS, the design will provide a detailed set of institutional roles and responsibilities, inter-institutional coordination arrangements and a funding model to deliver this mandate. This NMHS design will be included in the draft Law under Task 3. (Further revision of the design may occur during the parliamentary approval process).

For the purposes of the project description below (notably, but not exclusively, Sub-Activities 1.1.1.1-1.1.1.3), it is assumed that IGEO will continue to serve as the NMHS. This is a reasonable default assumption, but a final decision will be made by the responsible government institutions during project implementation.

Task 3 – Legal reform

To underpin the NMHS institutional reform, development of a draft Law on Weather, Climate and Hydrological Services is essential. Albania currently lacks a distinct legal framework for the operations of IGEO. Furthermore, alignment of hydro-met activities with the Law on Civil Protection is required to effectively 'join up' IGEO and the MHEWS, an alignment that has hitherto been relatively weak. Elements of the Law will include (inter alia):

- Design: using the design developed under Task 2, including the mandate of IGEO, its institutional structure, coordination with other entities (including NCPA) and dedicated state budget support for operations and maintenance.
- The Law will embody a formal legal obligation on the government to maintain hydro-met funding.
- The Law will include an explicit requirement for IGEO to operate a 24/7 service.
- The Law will reference the existing legal requirement for IGEO to appoint a gender focal point.
- The Law will stipulate the requirement to establish an NFCS, as well as data provision to other government platforms (e.g. the water cadastre).
- Identification of basic public services, the conditions for free services, and the scope for paid-for / commercial services and revenue generation.
- The role of research and development.
- Meteorological, hydrological and climate activities carried out by other entities (such as MMS).
- Protection and maintenance of hydro-met facilities, including the responsibilities of land-owners.
- Requirements of observations (technical specifications, data quality, frequency, etc.).
- Radio frequencies.
- Issuance of forecasts and warnings.
- Roles and responsibilities of IGEO in disaster situations.
- International treaties and cooperation, including with WMO and the EMI.

The project will support submission of the draft Law to the appropriate Parliamentary Commissions within 6 months of its preparation and will provide technical support, as required, during deliberation of the Law.

Task 4 – IGEO capacity building

A multi-year, multi-dimensional, gender-inclusive capacity development programme for IGEO will be designed and implemented, based on the new legal framework (as outlined in the new Law on Weather, Climate and Hydrological Services) and the new institutional duties and functions derived from the Law. The project will support specialised trainings, on-the-job training, mentoring (with international counterparts in other NMHSs, as well as from technical specialists), study tours and short-term (3-5 months) needs-tailored secondments / placements to well-established NMHSs in the region. These capacity development measures will be available to technical and managerial staff of IGEO as well as

the staff of other institutions that are expected to closely coordinate with IGEO in defined roles. These measures will be coordinated with, and linked to, the capacities needed under Sub-Activity 1.1.1.2. The capacity building will be implemented according to the best available standards and in close cooperation with WMO and other NMHSs in the region, as well as – for the gender component – gender specialists and NGOs.

Task 5 – IGEO business strategy

IGEO's principal source of financing will be the state budget. As detailed in the Law on Weather, Climate and Hydrological Services, the state budget will cover defined elements of NMHS staffing, operations and maintenance costs. However, the Law will encourage IGEO to supplement its income and expand its range of services beyond the legally prescribed minimum service levels. The ALBAdapt project will work with IGEO to develop a business strategy that is aligned with the opportunities and limitations imposed by the Law, that reflects in-house technical capabilities (current and future) and that serves particular market needs (e.g. in sectors such as agriculture or tourism).

Task 6 – Higher education curriculum development

An important need for the overall hydro-met sector in the country, including IGEO and private sector entrants attracted and supported by Activity 3.1.1, will be curriculum development for universities and vocational colleges. This will include integration of meteorology and hydrology into undergraduate programmes (initially in related subjects such as physics and earth sciences, and subsequently in stand-alone degree courses), as well as the promotion of thesis specialisations at master's degree and doctorate levels. There are currently no degrees in meteorology offered in Albania; even for hydrology, courses tend to be basic and 'traditional' (with limited coverage of sophisticated modelling or remote sensing techniques, for example). Building the capacity of the education system to support the future supply of suitably qualified and suitably skilled staff for the hydro-met sector is vital for the ongoing sustainability of IGEO and the climate services ecosystem.

The project will co-develop, with Polis University and Epoka University (and potentially others, including vocational colleges), new elective taught modules on meteorology, hydrology and climatology that students can select (on a voluntary basis) as part of their bachelor's and master's degrees in relevant subjects (primarily physics and earth sciences). The project will assist universities to develop promotional materials (flyers, brochures, etc.) to accompany these modules in order to raise student awareness. These materials will emphasise gender inclusivity in order to promote the entry of women into a traditionally male-dominated sector. By project-end, the expectation is that, subject to module take-up and relevant government approvals, the universities will have gathered sufficient experience, and the modules will have become sufficiently established / mainstreamed, that each subject will become a separate degree course in its own right, potentially at master's level first before later extending to bachelor's level.

Universities will also be allocated a dedicated area within the AlbaMet National Climate Information System (see Sub-Activity 1.2.1.2) to promote research and teaching collaboration.

Task 7 – Regional and international cooperation

In cooperation with WMO Region 6 (Europe), the ALBAdapt project will support IGEO engagement with regional initiatives, including:

- ECMWF products and opportunities to benefit from significant investment by European meteorological services in the context of the EWC, C3S, etc.
- Close cooperation with EUMETNET to help rationalise and minimise the cost of national investment in the Albanian observation network.
- Joining the EUMETNET MeteoAlarm programme.
- Enhanced national participation in SEECOF. The project will support an application from Albania to host a Forum meeting.
- Full participation in the South-East European Consortium for Operational Weather Prediction (SEECOP) and SEE-MHEWS-A to improve forecasts and warnings with adjacent countries.

- Bilateral cooperation with neighboring NMHSs to ensure Albania can benefit from their data: e.g. radar data from Italy and hydrological data from Greece.

Sub-Activity 1.1.1.2: Building the fundamental facilities and systems of the NMHS

GCF financial instrument utilised: technical assistance grant

Executing Entity: GIZ

The current meteorological and hydrological observational network is in a very poor state, despite substantial investments in recent years. Even newer devices suffer from inadequate maintenance and calibration, leading to data drift and sensor deterioration. A considerable number of manual meteorological stations supervised by IGEO and visited during ALBAdapt project preparation missions are no longer operational. Sub-Activity 1.1.1.2 will modernise the observational network.

Task 1 – Development of a network concept

A network concept – i.e. a comprehensive concept for all types of observations, including the number of required stations, their locations, their sensor arrays and the associated communications infrastructure – will be formulated based on: (i) the systematic diagnostic already undertaken; (ii) additional consideration of environmental conditions and user needs (including meteorological, climatological and hydrological aspects) following the WMO Rolling Review of Requirements (RRR) approach to ensure alignment with the needs of the WMO Integrated Global Observing System (WIGOS)(WMO, 2022c); (iii) exclusion of areas that are legally protected for heritage purposes (i.e. sites of cultural, historical or archaeological significance); and (iv) the desirability of developing a reference climate.

With regard to the reference climate, the manual observations carried out in Albania since 1953 represent a valuable asset, particularly for developing climate services. The network concept will, therefore, identify approximately 20 existing, operational stations that cover a broad swathe of Albanian territory. Given the ageing profile of many manual observers (many of whom will soon retire), manual stations will be prioritised. The sites of the selected existing stations will be allocated new (additional) monitoring stations (installed under Task 4) that will operate for a number of years in parallel with the existing stations. Simultaneous generation of data from old and new stations in identical settings will enable the construction of a consistent, homogeneous time-series. The work conducted under this Task of Sub-Activity 1.1.1.2 relates to the selection of appropriate sites for the purpose of constructing the reference climate; the actual installation of the stations will be undertaken under Task 4, and the development of the reference climate will be undertaken under Sub-Activity 1.2.1.2.

Local expertise for Task 1 will be required, as well as technical expertise on how to formulate a network concept. The Albanian territory is a particularly challenging one, as it includes a diverse range of environmental conditions (from alpine to maritime) that each have their own network challenges (road accessibility, mobile network signal strength, snow, storm damage, etc.). Emphasis will be placed on technological homogeneity of monitoring stations where feasible to ensure efficient station maintenance and management of transmission protocols and data streams. The variety of technologies currently managed by IGEO hinders the operational capability of the observational network.

Task 2 – Validation of station emplacements

Preference will be given to existing stations sited on public land. Before deploying new stations on public or private land, or renewing existing stations on private land, it will be critical to formalise the roles and responsibilities of the land-owners. Long-term contracts will be negotiated with land-owners, outlining their responsibilities to provide physical access, prevent vandalism and ensure basic maintenance. The ProNEWS project in Albania demonstrated that neglecting this aspect can jeopardise sustainability and identified this as a principal lesson-learned from the project (Novatech Studio, 2019).

Task 3 – Acquisition of meteorological and hydrological station infrastructure

Based on the results of the inventory survey undertaken by GIZ and IGEO during project preparation (Annex 2f) and the needs identified by MeteoSwiss (Annex 2i), acquisition of approximately 35 automatic weather stations and 60 hydrological stations is envisaged. Final selection of the instrumentation and the numbers and locations of the stations will be defined in the network concept (Task 1). On this basis, Task 3 will initiate and manage the tendering process for the acquisition of the required hardware and associated equipment.

Task 4 – Installation of meteorological and hydrological station infrastructure

The installation of the stations will require a specialised company to prepare the ground, lay the foundations, install fencing, set up the equipment (including telecommunications) and activate the sensors. IGEO staff will work alongside the electrical engineers to provide technical inputs and, conversely, to learn from the engineers. This will provide valuable on-the-job training that will support future in-house IGEO maintenance capabilities, as well as facilitate formal hand-overs of the installed equipment to IGEO (Or an alternative NMHS institution, if national stakeholders decide to move NMHS responsibilities to a different institution: see Sub-Activity 1.1.1.1, Task 2.).

Task 5 – Capacity building for network management

Some expertise for managing the observational network currently resides in IGEO, but competing academic duties of staff and the limited operational budget mean that network management and maintenance have not hitherto been accorded the priority they require. Moving forward, some routine tasks can be sub-contracted to private companies, but it is important that the reformed NMHS is able to strengthen the in-house expertise needed to manage the network and to implement an ongoing maintenance programme. The project will co-develop a capacity building programme for at least 10 IGEO staff members in conjunction with national stakeholders and one or more international partners. WMO, for example, operates regional training centres, including one in Italy (Istituto di Biologia ed Accologia Applicate), and a Global Campus for e-learning. EUMETNET operates an online e-learning programme, the Education and Training Collaborative Network (EUMETCAL). One or more such partners will be selected during project implementation.

Task 6 – Database management system

Station data will be transmitted to a database system, where it is structured and stored in a data warehouse compliant with WMO standards. The Meteorological, Climatological and Hydrological Database Management System (MCH-DMS) (WMO, 2018a) that IGEO has recently started to use respects international standards, is open-source (hence preventing vendor lock-in) and has an active, worldwide online user community. It can also be used as a data repository, using a standardised format, for the decades-worth of observational records that are currently stored on paper. The ALBAadapt project will provide technical and capacity building support to ensure the MCH-DBS is properly maintained and will assist IGEO to digitise its paper-based archive and produce a hydro-meteorological yearbook.

Task 7 – Quality control of station data

Implementing an automatic quality control system is essential to ensure a clean and reliable data stream from the observation stations. The project will assist IGEO to put in place quality control methods and software solutions.

Sub-Activity 1.1.1.3: Strengthening NMHS forecasting capabilities

GCF financial instrument utilised: technical assistance grant
Executing Entity: GIZ

Task 1 – Forecasting workstation

Establishing a simple forecasting workstation is crucial for accessing key resources from selected global and regional service providers. A forecasting workstation consists of hardware (essentially, a powerful processor), software and monitors. Such a workstation can facilitate the identification of severe weather

conditions for issuing timely warnings and enable standardised procedures for weather surveillance. Traditionally, NMHSs have acquired their own workstation hardware; more than 30 NMHSs worldwide use their own hardware in conjunction with the Finnish Meteorological Institute's (FMI's) SmartMet software, which is licence fee-free and partly open source. Increasingly, however, cloud-based workstation options are becoming more attractive, as up-front costs are lower and the NMHS is freed from operations and maintenance responsibilities (software updates, hardware faults, cybersecurity, etc.).

IGEO could, for example, use the ECMWF Integrated Forecasting System (IFS) (European Centre for Medium-Range Weather Forecasts) as its workstation solution: this would, by itself, provide sufficient capability to generate warnings and would require the purchase only of some monitors. Alternatively (or additionally), the DEWETRA platform (ICPD, 2014) available at (but not currently used by) IGEO might offer another viable solution to link forecasting activities with civil protection operations. The project will undertake a detailed assessment of these, and other, options, including consideration of ongoing operational costs, training needs and alignment with a range of different use-cases. Following subsequent stakeholder discussions, the project will then implement the agreed solution.

Task 2 – Forecaster training

The expertise of IGEO's forecasters, who possess the necessary know-how to interpret weather information and assign warning levels, is an asset for building and improving this activity. However, to establish a robust and standardised operational procedure, further development and training is required. Such training should ideally be given, periodically over several years, by a regional NMHS partner with experience in short-term forecasting in a similar geographical context. The EUMETSAT Education and Training Collaborative Network (EUMETCAL) is an ideal collaborative structure in which to conduct this training, with the WMO Education and Training Standards (WMO, 2015a) providing the technical basis. The project will organise such forecaster training in conjunction with a regional NMHS.

Additionally, the project will ensure that IGEO forecasters are trained on hydrological monitoring using international tools (European Flood Awareness System (EFAS), Flash Flood Guidance System (FFGS), etc.) and on the internal alert system once established. On a longer-term basis, meteorological and hydrological forecasting capabilities could be split between specialised staff to address user needs and new service opportunities.

Task 3 – Flood nowcasting

While forecasting for weather and climate can, to a large degree, be achieved with international sources, it is more difficult to source reliable international forecasts of hydrological responses due to the importance of local factors (topography, land cover, hysteresis (e.g. previous soil saturation events), etc.). Flood forecasting is a complex undertaking. The Panta Rhei hydrological model that is currently in use in the Drin-Buna River basin (GIZ, 2019b) is judged by the MeteoSwiss Assessment Report to be too advanced, relative to the level of current IGEO technical expertise, for scaled-up adoption elsewhere. Instead, the Assessment Report recommends a gradualist approach, starting with simple solutions and increasing the level of sophistication over time.

The most basic predictions for rising water levels can be achieved with measurement data alone and by defining critical thresholds that inform warnings. Implementation of this approach requires: (i) a set of monitoring sites where water levels are measured, and (ii) field visits to define critical thresholds. These field visits can also serve as an opportunity to perform detailed cross-sectional measurements of the riverbed, thereby enabling updates to rating curves in readiness for more sophisticated modelling prediction in the future.

With the support of a regional NMHS peer, the project will work with IGEO to: (i) put in place a simple automated monitoring system for larger rivers, and (ii) develop critical thresholds for each monitoring location, thereby allowing near-future forecasting ('nowcasting') of floods. The project will also: (iii) conduct cross-sectional measurements at each monitoring location, (iv) update, or create rating curves for each monitoring location, and (v) train IGEO personnel (and potentially the personnel of other institutions with flood-related roles, such as AMBU and NCPA) on operating the new flood nowcasting

system. (This will complement the capacity building on EFAS, FFGS, etc. provided under Task 2). The project will also: (vi) channel alerts issued by the flood nowcasting system through the AlbaMet Alert platform developed under Activity 2.1.1, which will, in turn, support the development of forecast-based action (FbA) under Activity 2.1.2.

Output 1.2: A National Framework for Climate Services (NFCS) is established and deployed as a national coordination platform and knowledge hub

Activity 1.2.1: Establishing and deploying an NFCS

The ALBAdapt project will work with national stakeholders to establish an NFCS as an institutional mechanism to coordinate, facilitate and strengthen collaboration among national institutions to improve the co-production, tailoring, delivery and use of science-based climate data, forecasts and services. The NFCS will be built in line with the WMO NFCS framework guidelines (WMO, 2018c), which are, in turn, aligned with the GFCS guidelines (WMO, 2014a).

According to these guidelines, Albania currently occupies Category 1 (the lowest category) of the GFCS framework, exhibiting baseline features of: a basic range of climate data services and information products; a weak early warning system and limited experience with forecast-based action; and lack of updates for climate application tools and climate-informed investment. The project will enable Albania to develop critical capacities in each of the 4 GFCS framework categories.

Special attention will be given to women's participation in NFCS design and implementation. Capacity building for stakeholders will be developed following the WMO guidelines for capacity development for climate services (WMO, 2020).

Sub-Activity 1.2.1.1: Institutional establishment and governance of the NFCS

GCF financial instrument utilised: technical assistance grant
Executing Entity: GIZ

Task 1 – NFCS technical report

To facilitate subsequent NFCS-related stakeholder discussions (Task 2), the project will first commission a technical report on Albanian NFCS design and governance options. The report will provide clear, reasoned recommendations on the basis of desk research, international experience and a series of in-depth interviews with key (current and potential future) producers and users of hydro-met data and information. These interviews will span the public and private sectors (including institutions representing start-ups and MSMEs) and civil society, and will encompass sectors including agriculture, water management, energy, academic research, healthcare, municipal services, disaster response and the coastal belt. CSOs and NGOs active in climate change adaptation and disaster response, gender-based CSOs / NGOs and those serving vulnerable groups such as ethnic groups and disabled communities (such as the Aarhus Centre and 'Women in Integration'), will be interviewed and their views will be fully reflected in the report's recommendations.

The MeteoSwiss Assessment Report recommends an approach of 'starting small' and gradually expanding the NFCS thereafter, as this will accelerate the initial establishment of the NFCS and can accommodate later evolution and adaptation of climate services. The technical report will re-examine this assumption but is expected to adopt a similar approach when formulating its recommendations.

Task 2 – NFCS stakeholder dialogue

A small number of interested and relevant government and non-government partners (including private sector representatives, sectoral representatives, NGOs (including NGOs with gender expertise and representing vulnerable groups), academic institutions and start-up accelerators) will be brought together to initiate NFCS design discussions and to develop an indicative organisational structure for the NFCS. As stipulated by WMO guidelines, a core precept of an NFCS is co-production of climate

services with users, which requires a process of partnership-building, iterative dialogue and feedback (WMO, 2018c). The starting point of the discussions will be provided by the NFCS technical report, but the project will provide additional facilitation and technical support as required (e.g. on WMO NFCS guidelines) and will make available NFCS personnel from other countries in the region who can provide insights on the strengths and weaknesses of their own NFCS structures. An early task of the dialogue stakeholders will be to define key sectors for initial NFCS prioritisation and to identify stakeholder groups that represent these sectors. This will likely result in additional partners being invited to join the dialogue discussions.

Like the NFCSs of a number of European peers, it is envisaged (subject to confirmation during stakeholder discussions) that the Albanian NFCS will be organised in the form of a virtual centre overseen by an Executive Committee consisting of core relevant institutions and served by a small secretariat (1-2 full-time-equivalent staff) hosted by IGEO. Once the virtual centre is operational, additional institutions may be able join on an ongoing basis as, for example, the NFCS expands the sectoral or functional scope of its operations.

Task 2 will result in an inclusive NFCS design and governance structure that commands widespread support, including (crucially) from IGEO and relevant line ministries.

Task 3 – NFCS legal and institutional framework

The project will work with ministries and PMO to secure the government's formal endorsement of the proposed NFCS design. This design will also be reflected in the Law on Weather, Climate and Hydrological Services (developed under Sub-Activity 1.1.1.1). The project will develop associated agreements to regulate institutional roles, responsibilities and cooperation in the framework of the NFCS, utilising, or building on, the NMHS institutional agreements developed under Sub-Activity 1.1.1.1, as required.

Task 4 – NFCS capacity building

In order to ensure that the NFCS advances beyond an attractive concept 'on paper' and becomes an operational reality that serves to improve the provision of 'climate services' (encompassing meteorological, hydrological and climate services) by the public and private sectors to a range of end-users, a capacity building package, oriented around online and physical workshops and training materials, will be developed. The specificities of this capacity building programme will be tailored to the design of the NFCS adopted (e.g. initial sectoral priorities, member institutions of the Executive Committee, etc.), but its broad scope will include (inter alia):

- Supporting the professional orientation and awareness of senior management in the member institutions of the Executive Committee to ensure strong national ownership.
- Staff training on climate services in key NFCS institutions. 'Climate service' is not a term or a concept that is widely understood in Albania, with most data processing for information generation or decision-making purposes currently undertaken in-house within institutions (in which circumstances it is not typically thought of as a 'climate service') or limited to simple weather forecasts that are not precisely targeted at different user needs. The development of novel, more sophisticated and more targeted climate services requires not only technical expertise but also a more entrepreneurial mind-set and a far more granular understanding of user needs (and how to gather information about these needs) than currently exist in the Albanian hydro-met community.
- Training for key users / beneficiaries to build capacities to understand hydro-met and climate information, and to match current and planned hydro-met capabilities with their ongoing needs: i.e. to identify and express demand for particular climate services. The focus of this training will be on: (i) stakeholders relevant to the initial sectoral priorities chosen for the NFCS; (ii) counties, which are legally responsible for serving 'last mile' disaster risk reduction needs and which therefore represent a key stakeholder group to benefit from, and potentially contribute to, new climate services; and (iii) user-groups who are climate-vulnerable because of their exposure to climate hazards and/or their relative inability to adapt (e.g. women, the elderly, people with disabilities, ethnic groups, etc.).

Sub-Activity 1.2.1.2: Development of the National Climate Information System (NCIS) and the User Interface Platform (UIP)

GCF financial instrument utilised: technical assistance grant
Executing Entity: GIZ

Albania is in its infancy with regard to climate services. The MeteoSwiss Assessment Report (Annex 2j) observes that several fundamental steps must be taken to deliver such services, noting that “the development of a fully-fledged NCIS is beyond the horizon of the ALBAadapt project, but a set of basic activities would allow the provision of a continuous and user-relevant perspective on past, present and future climate change in Albania.” Accordingly, Sub-Activity 1.2.1.2 will adopt a gradualist approach to NCIS development by implementing the initial, priority activities recommended by the Assessment Report.

Task 1 – Reference climate

A reference climate that incorporates climate data derived from ground observations is an indispensable basis for all other activities. For instance, it facilitates the interpretation of current weather events with respect to the reference, it serves as a basis for interpreting climate model output, it represents an effective climate change communication tool and, ultimately, it can stimulate the development of new climate services and improve the quality / usefulness of those already being provided.

Development of a reference climate requires long-term records (typically a minimum of 30 years) at specific locations, ideally with representative geographical coverage. Continuous observations are critical. In principle, Albania should be in a position to develop such a time-series from its observation network, which has been operating since 1953. However, a number of intermediate steps are required: (i) historical data must be digitised; (ii) data – historical and recent – needs to be quality-checked and homogenised (e.g. to account for data artifacts that may have been introduced due to displacements in station locations or instrumentation changes); and (iii) future observations, from stations introduced by the ALBAadapt project, need to be consistent with past observations (or statistically corrected to ensure consistency).

Digitisation of the paper-based archive data will be undertaken under this Task, with the digitised data subsequently stored in the MCH-DMS database system supported under Sub-Activity 1.1.1.2. Quality-checking and homogenisation of the data will also be undertaken under this Task, drawing on WMO and/or international NMHS expertise to assist with this process. Alignment of past and future observations will be ensured by operating a set of duplicate (old / new) monitoring stations in parallel on the same sites for a number of years, as described in Sub-Activity 1.1.1.2.

The reference climate that is developed, both local (site-specific and interpolated for larger surrounding areas) and national, will be maintained and continuously updated by IGEO. It will be considered a public good and the data will be made freely available on the AlbaMet NCIS (see Task 4) to all stakeholders. A sub-set of stakeholders – such as municipalities developing or updating their DRR plans – may benefit from access to the raw data, but the key benefits of the reference climate data-set are expected to stem from its use in value-added climate services, such as alert systems, forecasts and sectoral applications (hydro-power management, agronomic apps for farmers, etc.).

Task 2 – Climate indices

A standard way to communicate climate change is to use indices that have been defined to address typical user-needs from various sectors. As a starting point, WMO has defined a core set of descriptive indices for weather and climate extremes (WMO, 2009). The risks to infrastructure and people are typically sensitive to high or low values of meteorological variables; understanding the extremes allows an optimal balance to be struck between, on the one hand, adopting high standards (safety, construction, etc.) that are potentially very costly and, on the other hand, ignoring risks (with varying degrees of probable realisation) altogether. Most existing infrastructure in Albania – buildings, river embankments, sewage networks, etc. – has been built on the implicit assumption that the climate is

stationary. This is no longer a tenable assumption and climate indices can be used as a means of tracking climate change and updating standards accordingly.

The WMO's 27 core indices for temperature and precipitation capture various characteristics of extremes, including frequency, amplitude and persistence. Tools for the computation of these indices are widely available (For example, the open-source R package, Climate Indices Visualisation). As well as the core set of 27 indices, additional extreme indices can be defined that are more specific to adaptation needs in Albania. Building on the homogenised, long-term time-series data-set developed under Task 1, the project will, under Task 2, implement the following actions:

- Undertake an inventory of indices currently (i) calculated and (ii) published in Albania. The two are not necessarily the same, as the fragmentation of hydro-met responsibilities across different institutions, combined with poor communication between these institutions, has led to a patchwork of data-sets and indices (sometimes duplicated) being used.
- The indices currently produced will be collated centrally (as opposed to the current fragmented system) in the framework of the AlbaMet platform (see Task 4). They will be reviewed, quality-controlled and amended as necessary, and will be produced for the entire climate reference data-set time period.
- IGEO (Or an alternative NMHS institution, if national stakeholders decide to move NMHS responsibilities to a different institution: see Sub-Activity 1.1.1.1, Task 2) will be provided with the tools and skills to construct the core indices that are not currently being produced. These additional core indices will also be stored centrally under the AlbaMet portal.
- All the core indices will be made publicly available, free of charge.

Task 3 – Climate change scenarios

Climate model simulations provide the basis for developing climate change scenarios. The IPCC is continually updating climate model integrations and the data is made freely available. The C3S data portal, for example, offers pre-processed data streams – such as regionalised data from the EURO-CORDEX simulations (Euro-Cordex) for CMIP6 climate change scenarios (CMIP6, 2023) – with a programming interface that allows the computation of future climate conditions for specific geographical areas.

The project will build the technical capacity of IGEO to develop such scenarios for Albania. Despite the international availability of pre-processed data, scenario development is a complex undertaking, requiring, for instance, a deep understanding of statistical downscaling approaches and the quantification of location-specific uncertainty. IGEO does not currently have this capacity.

Following this capacity building, IGEO will be able to develop climate scenarios of varying degrees of sophistication and spatial granularity. Initial applications will be to inform future UNFCCC-related work (NCs, BURs, future iterations of the NAP, etc.), but more tailored applications – for specific renewable energy generators, flood management in specific catchment areas, etc. – are envisaged. Depending upon the application, scenario development services may be offered free of charge or as a paid-for service, with income generated being reinvested to further improve IGEO's capabilities.

Task 4 – AlbaMet National Climate Information System (NCIS)

Tasks 1-3, as well as tasks implemented under Sub-Activities 1.1.1.2 and 1.1.1.3, and also, to a lesser extent, under Component 2 in the context of the MHEWS, will result in IGEO generating considerable volumes of additional data and information on an ongoing basis. Hydro-met observational data will be stored in the MCH database management system; other data will be stored in a variety of formats and systems. The ALBAdapt project will work with IGEO, as well as other key stakeholders (notably, NCPA, AMBU and ASIG) to develop an integrated data platform which will serve as Albania's NCIS. This platform is provisionally called AlbaMet, but a final decision on name and branding will be made by national stakeholders during project implementation.

WMO defines an NCIS as “the mechanism through which information about climate (past, present and future) is routinely collected, stored and processed to generate products and services that inform often complex decision-making across a wide range of climate-sensitive activities and enterprises.” (2018c)

Further, “knowing user requirements and understanding how users apply climate information will be essential for designing, disseminating and encouraging uptake” of NCIS services (WMO, 2014a).

The AlbaMet platform, which will pull data from the MCH-DBS and from other data storage systems across a range of institutions, as well as potentially storing data ‘in the cloud’ (see below), will enable a single point of access to a comprehensive body of data and information, ranging from raw data (e.g. station observations) and processed data (e.g. the climate reference data-set) to climate services such as weather forecasts, warnings and, in the future, expanded service offerings such as sectoral advisories, bespoke climate scenarios and app-based functionality.

Different areas of the AlbaMet platform will have different ‘walled garden’ access rights, such that – for example – the general public can access public data-sets, commercial service providers can access raw data that they are then able to process and re-package, government institutions can share information with each other, universities are able to collaborate on research and teaching, and NCPA can manage alerts in a dedicated AlbaMet Alert section of the portal (see Sub-Activity 2.1.1.2 for further information about AlbaMet Alert).

Development of the AlbaMet platform will require careful design and implementation (as well as ongoing maintenance). However, as noted by the Assessment Report, the restructuring planned for the NMHS (see Activity 1.1.1) offers a unique opportunity to accomplish data integration from the very outset, as well as to avoid the proliferation of legacy tools that many other NMHSs must deal with on a daily basis (Jacobs, 2021). To minimise the information and communications technology (ICT) burden of AlbaMet development and ongoing maintenance, the project will explore the possibility of using the European Weather Cloud as the underlying platform. Use of such a cloud-based solution will also serve to facilitate data exchange to/from the Albanian NMHS and other NMHSs, as well as providing ready access to additional processing and analysis capabilities. A tailor-made user interface – similar to, for example, the Atlas of Climate Services operated by the Swiss National Centre for Climate Services (Swiss Federal Office for the Environment) – will enable Albanian stakeholders to access and interact with the AlbaMet platform in an intuitive, user-friendly manner.

The project will, under Task 4, undertake the following actions:

- Commission a technical report on the ICT requirements of the AlbaMet platform, considering a range of factors that include: WMO NCIS guidelines; lessons-learned from the NCIS systems of peer NMHSs; current and anticipated data-streams, formats and storage requirements – informed, in part, by the newly-formalised roles and responsibilities of hydro-met and civil protection institutions put in place under Activities 1.1.1 and 2.1.1; desired functionalities of the platform (e.g. simple storage and retrieval of data vs. data manipulation and analytical capabilities, both now and in the future; data visualisation capabilities, etc.); the technical capabilities of Albanian institutions to maintain a complex ICT system; and data security (which may be particularly relevant to data generated by MMS, as a military institution, and to commercial service providers and clients). The report will also provide detailed costings of various AlbaMet design options, as well as recommendations.
- Using the findings of the technical report as a starting point for discussions, a stakeholder consultation process will be implemented to discuss the options for AlbaMet development. The consultations will be managed by the NFCS Executive Committee, which will gather expert inputs from other institutions – government, academia, private sector and civil society (including gender-oriented organisations). The project will provide support, such as inviting international experts or other NMHS representatives to offer insights, as required.
- The NFCS Executive Committee will make 2 recommendations: (i) a recommended AlbaMet design, including a design process with allocated roles and responsibilities and budget requirements; and (ii) an associated operations and maintenance (O&M) plan that details the staff and systems that will be required to ensure AlbaMet functioning on an ongoing basis, including scale-up or enhanced functionality needs that are envisaged as future developments.
- The NFCS Executive Committee will submit its recommendations to PMO and MoFE for final government endorsement and confirmed O&M budget allocation (As government institutions are heavily represented on the NFCS Executive Committee, such a final endorsement from the government is regarded largely as a formality, albeit a useful one).

- Once government endorsement has been received, the project will work with the NFCS Executive Committee to construct the AlbaMet platform – e.g. hiring programmers and site developers, purchasing hardware (e.g. servers) if required, signing contracts with cloud service providers, etc.
- Based on the findings of the technical report on Albanian institutions' ICT capacities, a targeted capacity building programme will be designed and implemented to address any gaps that exist in these institutions' abilities to manage the smooth operations of the AlbaMet portal.

Task 5 – User Interface Platform (UIP)

WMO defines a UIP as “a structured means for users, climate researchers and climate information providers to interact at all levels...The objective of the UIP is to promote effective decision-making where it involves climate considerations” (WMO, 2014a). WMO identifies 4 key outcomes of a UIP:

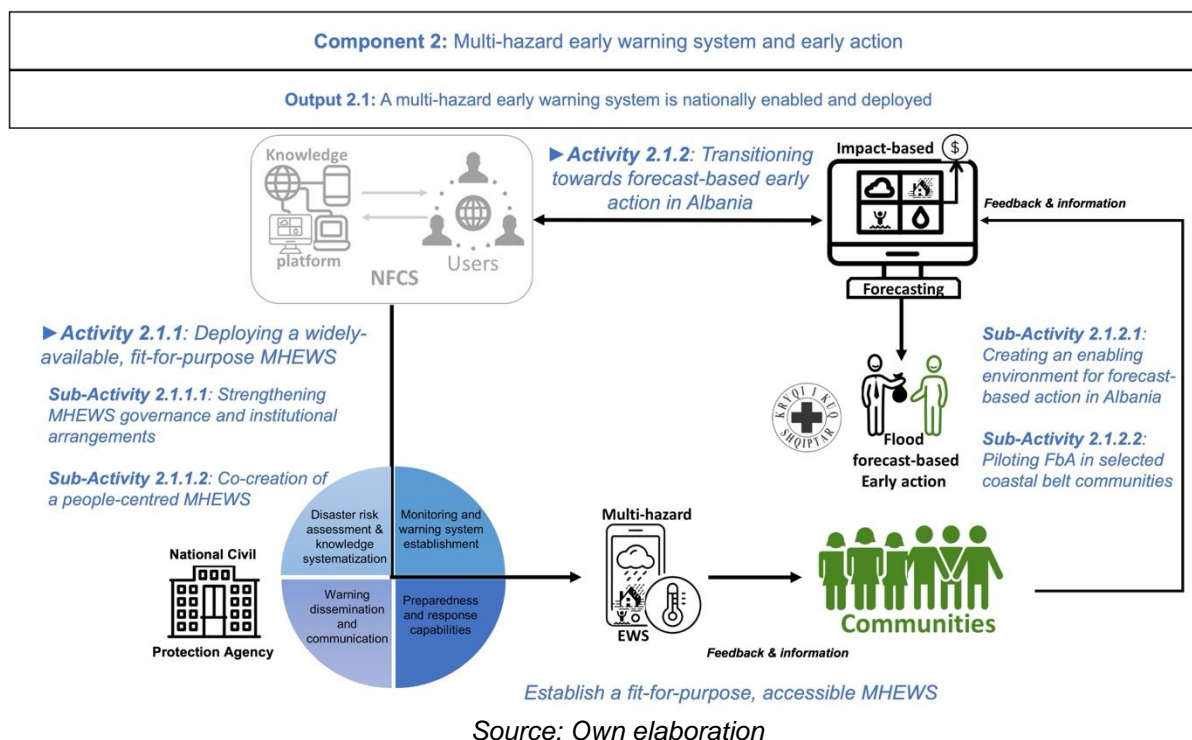
- Feedback: identifying the optimal methods for obtaining feedback from user communities.
- Dialogue: building dialogue between climate service users and those responsible for observation, research and information systems.
- Outreach: improving climate literacy in the user community, and literacy of the climate community in user needs.
- Evaluation: developing monitoring and evaluation measures that are agreed between users and providers.

Further, WMO elaborates a number of forms that a UIP can take, including (solely or in combination): committees and working groups, workshops, conferences, inter-agency task teams and internship programmes. UIP models vary widely between countries (Gerlak et al, 2017), (WMO, 2018d), ranging from passive, one-way communication platforms (primarily websites) and interactive activities such as workshops and conferences, to focused bilateral relationships between individual service providers and users (WMO, 2017). The AlbaMet platform developed under Task 4 will serve as a website for the NMHS. The content of the current IGEO website, which includes news, weather forecasts, hazard updates, academic research and other content, will be transferred to, and thereafter updated on, AlbaMet.

Further, the ALBAdapt project will work with IGEO to establish an interactive component of the UIP. Options will be explored early in project implementation, but stakeholder discussions undertaken during project preparation suggest that an annual national climate forum, attended by a wide range of stakeholders across a broad spectrum of sectors (including local government and civil society), is the most appropriate model for facilitating information exchange, collective problem-solving and strategic planning without placing an undue administrative burden on IGEO. The project will provide logistical and technical support to IGEO to organise and implement the first two such annual forums (or the equivalent, if national stakeholders choose an alternative UIP model).

8.3.2 Component 2 – Multi-Hazard Early Warning System and Early Action

Figure 37: Representation of component 2



Outcome 2: Albania establishes a widely-available early warning system and targeted early action services – saving lives, livelihoods and reducing climate disaster risks.

Output 2.1: A multi-hazard early warning system is nationally enabled and deployed

Activity 2.1.1: Deploying a widely-available, fit-for-purpose MHEWS

A MHEWS is a system capable of simultaneously identifying and addressing a range of hazard-types, their locations and their severity. A MHEWS can provide warnings for multiple hazards through consistent monitoring of weather phenomena, and their implications for – in the Albanian context – floods, droughts, storms, landslides, heatwaves and forest fires. A *people-centred* MHEWS is one that is designed and implemented to incorporate the knowledge, capacities and needs of communities at risk, including marginalised communities (UNDRR, 2023a).

Following WMO best-practice guidance, a MHEWS should build on four main pillars: (i) disaster risk knowledge based on systematic collection of data and disaster risk assessments; (ii) detection, monitoring, analysis and forecasting of hazards and possible consequences; (iii) dissemination and communication, by an official source, of authoritative, timely, accurate and actionable warnings, and associated information on likelihood and impact; and (iv) preparedness at all levels to respond to the warnings received (WMO, 2018b). An effective MHEWS requires explicit, transparent and robust governance and institutional arrangements, namely the policies, systems and processes that specified institutions, communities and individuals use to plan, manage and coordinate their activities (WMO and UNDRR, 2023).

Sub-Activity 2.1.1.1: Strengthening MHEWS governance and institutional arrangements

GCF financial instrument utilised: technical assistance grant

Executing Entities: GIZ, NCPA

Task 1 – Institutional and legal gap analysis to formalise the cooperation between the NMHS, NCPA and other relevant institutions

The Government of the Republic of Albania and the entities in charge of operating the MHEWS will be accountable to the population of Albania for reducing exposure and vulnerability to climate-induced extreme weather events. A formal MHEWS Policy is required to outline the process for administering and controlling the MHEWS, accompanied by defined institutional roles and responsibilities. The following detailed steps will be undertaken:

- *Assess governance and institutional arrangements for multi-hazard management:* based on best practice (CDEMA, 2016), the team of experts will evaluate:
 - The adequacy of the accountability mandate and legal / institutional jurisdictions of the principal actors.
 - The roles, responsibilities, interactions and information exchanges that will be required between the principal actors (including, inter alia, IGEO, NCPA, AMBU, NTPA, ARC, municipalities, etc.) for effective MHEWS operations.
 - The current and required capacities of the actors to perform these roles. (The assessment of NCPA will be particularly detailed and is described below).
 - How the current 'system' (decentralised and uncoordinated efforts focused on various aspects of hazards, hazard mapping, hazard warnings, etc.) can best be leveraged for transformation into a systematised, 'joined up' MHEWS.
 - How the MHEWS monitoring and warning system can become a 24/7 service.
 - The adequacy of the current system for serving the needs of vulnerable groups, including women, the elderly, youth, people with disabilities and ethnic groups.
- *Conduct an assessment of the existing Law on Civil Protection and the Law on Climate Change*, and undertake consultations with territorial stakeholders, community representatives, national / local government entities and CSOs / NGOs (including those that are gender-oriented and those that represent ethnic groups), to ensure the adequate legal anchoring of new Standard Operating Procedures (SOPs) and Quality Management Systems (QMSs) (see Task 2). In particular, based on Article 46 of the Law on Civil Protection and in coordination with development of the AlbaMet NCIS under Sub-Activity 1.2.1.2, the appropriate legal instruments to mandate and enable IGEO to share data with external institutions (such as NCPA) will be identified, particularly in the context of weather forecasting. If changes to the Law on Civil Protection and/or the Law on Climate Change are requested by the government, the project will work with national stakeholders to draft appropriate revisions.
- *Conduct a detailed assessment of NCPA* regarding its capacities to receive, process and utilise climate data and information:
 - What data / data streams are currently received and from which institutions?
 - What additional data-sets that currently reside with other institutions would assist NCPA to perform its MHEWS-related functions?
 - What additional data-sets that do not currently exist would assist NCPA to perform its MHEWS-related functions?
 - What are the needs in terms of frequency of delivery?
 - How is the current data processed and interpreted by NCPA to create hazard risk assessments? What additional processing could be undertaken?
 - What role can be played by innovative data-collection and processing techniques, such as mobile apps, drones and artificial intelligence (AI)?

Based on the analysis and consultations undertaken in Task 1, key elements of the MHEWS – architecture, functionality, institutional roles, issuance of warnings, financing, etc. – will be designed in subsequent Tasks. The emphasis will be on participatory co-design by government and non-government

stakeholders to ensure collective ownership and a truly people-centric, gender-inclusive model, conditioned by pragmatic high-level government oversight – from PMO and MoFE – to ensure that the design process overcomes institutional inertia or resistance if and when required.

Task 2 – MHEWS governance and institutional roles

In an intrinsically multi-institutional system – and, moreover, one with a limited track-record of past collaboration and in which expertise and information are dispersed – it will be vital to formalise and operationalise NCPA's role as the central, coordinating institution of the MHEWS. A key aspect will be apportionment of roles and responsibilities between the (rejuvenated or restructured) NMHS and NCPA. Broadly, IGEO will be responsible for collecting and processing raw hydro-met data, making it 'EWS-relevant' and systematically sharing it with NCPA (for further processing, onward sharing, issuance of warnings through NEBS and AlbaMet Alert (see Task 6), etc.).

Under Task 2, the project will design the institutional arrangements for MHEWS governance and functioning, based on the findings of Task 1:

- Like the NFCS set up under Component 1, it is envisaged (subject to the analysis and consultations undertaken) that the MHEWS will be organised in the form of a virtual centre that is overseen by an Executive Committee consisting of core relevant institutions and is served by a small secretariat (1-2 full-time-equivalent staff) hosted by NCPA. The MHEWS Executive Committee is expected to liaise with the NFCS Executive Committee on a regular basis. Once the MHEWS is operational, additional institutions may be able to join on an ongoing basis as, for example, the MHEWS expands the sectoral or functional scope of its operations. The structure and roles and responsibilities of the Executive Committee will be drafted under this Task (Task 2).
- Institutional roles in the MHEWS will be formalised through SOPs, which will be drafted under this Task (Task 2). A set of agreed performance indicators and targets for each MHEWS institution, accompanied by agreed institutional mechanisms – staffing, internal processes, reporting, inter-institutional data-sharing (including of gender-disaggregated data), etc. – to monitor institutional compliance with MHEWS requirements will also be drafted. These QMSs will serve as a feedback mechanism for the SOPs. They will be administered by the MHEWS secretariat and will be reported to the Executive Committee on an annual basis.

Task 3 – Ensuring the MHEWS is 'people-centred'

The design process will incorporate:

- *Inclusion*, at an early stage, of local government (municipalities, counties) and non-government stakeholders (communities, ARC, NGOs, CSOs, academia and the private sector) through structured and fully documented engagement (meetings, workshops, questionnaire surveys, etc.).
- The *integration of vulnerable groups' views* – youth, the elderly, women, disabled individuals, ethnic groups, at-risk professions (e.g. farming, construction) and geographically-defined groups (e.g. coastal dwellers, flood plain dwellers, etc.) – and their active participation in the decision-making and monitoring process through consultations (undertaken primarily by NCPA and ARC) and outreach campaigns (third-party support).

A key element of these consultations will be to develop a detailed understanding of each group's distinctive needs with regard to hazards and their hazard responses – e.g. their differentiated prioritisation of hazards, the time they require to respond to a hazard early warning, the guidance or additional information they require when responding to an expected hazard event, etc (Pfeil and Dressel, 2017). As noted by WMO, "A recurring problem in early warnings is that the authors of warnings rarely know the end users well. Recipients, when they receive the message, often do not understand its full meaning, particularly when it incorporates technical language – this can result in a misunderstanding of warnings and a lack of trust in the issuing authorities." (WMO, 2022b)

These differentiated needs can then be reflected in the Decision Support Tool (DST; see Task 7), in recognition of the fact that different groups may require different warnings and in different time-frames.

- Surveys, consultations and workshops to assess the *best communication channels to reach communities and vulnerable groups*, including considering the use of diversified routes of communication and warning dissemination: i.e. traditional combined with innovative digital solutions, including mobile text messages, mobile app(s), e-mail, social media platforms, local radio stations, etc.
- *Design of a public awareness campaign*, to be launched in parallel with the MHEWS. In a country (such as Albania) that lacks a MHEWS, it is necessary to publicise and explain a new warning system with professionally prepared communications. In addition to (i) raising awareness and understanding among the general public (and targeted sub-groups), such communication can (ii) help to build trust in 'the system' (and hence also in the warnings issued) and (iii) thereby improve responses to warnings and overall climate resilience, as well as (iv) promote a culture of preparedness and anticipatory action to complement reactive responses to warnings.

Task 4 – Complementarity and coherence with the wildfires EWS

To ensure that the MHEWS is truly multi-hazard, wildfires – hitherto not addressed by NCPA – will be incorporated. Building on baseline work undertaken in Albania by NCPA and JICA (NCPA, 2022a), JICA is planning to support a detailed assessment of: analysis of the capacities and legal mandates of stakeholders involved in managing forest fires (notably, the National Forestry Agency (AKP) and the National Agency for Protected Areas (AKZM)); assessment of the chain of command regarding forest fires (and the development of protocols for fire hazards); and the software and hardware requirements of establishing a forest fire EWS capability.

The project will ensure complementarity and coherence between the MHEWS and JICA's support to the forest fire EWS through regular consultations and the preparation of technical documents analysing the protocols and technologies proposed by JICA and the harmonisation requirements with broader MHEWS systems and needs.

Task 5 – Digitisation of the MHEWS

Digital tools offer considerable potential to improve important aspects of EWS functioning, including data transfer, data processing, data sharing, data assessment, reporting and issuance of hazard warnings. Key elements of digitisation design will include:

- *Consultations with the National Agency for Information Society (AKSHI)*, as the government entity in charge of digital content provision and operationalisation, to provide the necessary administration rights and flow of data information consent needed for operationalisation of the MHEWS. (This will be coordinated with AKSHI support to the AlbaMet NCIS under Sub-Activity 2.1.2.1).
- *A detailed assessment of the ICT systems currently in use by relevant institutions* (NCPA, IGEO, AMBU, ARC, etc.), coordinated with the AlbaMet ICT technical report commissioned under Sub-Activity 1.2.1.2 and accompanied by recommendations for improving their interoperability and suitability for the MHEWS (usability, cybersecurity, data archiving, digital 'layering' / coupling of different hazards, use of the Organisation for the Advancement of Structured Information Standards (OASIS) Common Alerting Protocol (CAP) (OASIS, 2010) for warnings, etc.):
 - A sub-set of this work will focus on assessment of two-way geographical information system (GIS) data exchange with ASIG to enable ASIG to integrate environmental hazards into its mapping products (including its flagship online geoportal) and to enable the MHEWS to leverage the rich (multiple-layered) spatial data managed by ASIG.

- A second sub-set will focus on the gender disaggregation potential of different data-streams to address the differentiated needs of women and men.

Task 6 – Hazard warnings

Hydro-met warnings are currently issued by an array of institutions, notably IGEO and NCPA but also MMS, Albcontrol, AMBU, KESH and others in specific sectoral contexts, in a variety of formats and through a variety of communication channels. As these fragmented warning systems are brought together under a single MHEWS structure, it will be necessary to impose greater consistency and coherence across them. The importance of rapid, high-quality warnings is also rising as members of the public are increasingly able to fill information vacuums with other, potentially less trustworthy, sources that can result in misinformation, unnecessary panic or, conversely, unnecessary apathy (Reuter et al, 2017), (Appleby-Arnold et al, 2019). In this context, Task 6 addresses the warnings themselves (content, thresholds, etc.); Task 7 addresses the communication channels used to disseminate the warnings.

The MHEWS will address a range of climate-related hazards, including floods, droughts, storms, landslides, heatwaves and forest fires. For each of these hazard-types, the project will work with the relevant stakeholders to:

- *Define the input data needed to produce the warning.* The data (measurements and forecasts) needed to detect a potential extreme event are different for each type of hazard. The longer the hazard chain, the more data is typically needed to capture a possible extreme event and estimate its associated impact. For most hazard-types in Albania, different institutions are involved – with varying degrees of coordination – at different stages of the hazard chain, with hydro-met data supplied by IGEO, MMS, Albcontrol, AMBU and others, which is then used by an array of ‘downstream’ institutions to analyse hazards such as river flooding and landslides. There is considerable scope for rationalising this system to improve data consistency and quality and to avoid unnecessary duplication of efforts.
- *Define the thresholds.* Although the warning system should, ideally, be impact-based, the first step in the identification of a potential extreme event is usually undertaken at the level of the forecast hazard. One typical approach is to define critical thresholds based on the return period: e.g. the number of millimetres of precipitation statistically connected with a return period of five years. The return period is an indirect measure of impact and enables the characteristics of different climatic regions to be captured by a common metric. The computation of the return period of a hazard-type requires the availability of long-term time-series of observations with sufficiently high quality. Building on the work undertaken in Sub-Activity 1.2.1.2 on the reference climate and climate indices, the project will undertake an inventory of data-sets (which currently reside across different institutions, in digital and paper-based form) to ascertain for which hazard-types such thresholds can usefully be constructed.
- *Integrate impact.* The next step is to connect the thresholds with an appropriate description of the potential impact of each hazard-type and, therefore, what actionable behavioural advice should be mentioned in the associated warnings. At a later stage of MHEWS development, the use of impact modelling to support decision-makers can be considered, but this is beyond the scope of current capacities or, indeed, immediate priority needs. Impact-based modelling will be supported on a relatively small scale (for selected communities) under Sub-Activity 2.1.2.1; this will provide a solid foundation for later scale-up (outside the scope of the ALBAdapt project).
- *Define benchmarks.* Benchmarks are useful to monitor a warning system and its quality over time and to develop it further. As the main goal of hazard warnings is to reduce the number of victims and the amount of damage, two key performance benchmarks for a particular hazard warning system are: (i) what fraction of extreme events are detected in advance, with warnings communicated as a result; and (ii) what is the rate of false positives: i.e. what fraction of warnings are needlessly issued? Such benchmarks are generally more straightforward to design and implement for meteorological hazards than other hazard-types, and each requires careful consideration of temporal and spatial scales: a warning issued *just* before a hazard

event or one that is too geographically broad (thereby reaching many individuals who are unaffected by the hazard event) may not be particularly effective or may actually be positively harmful: for example, it may undermine trust in the warning system or encourage complacency among affected populations. Working with stakeholders, the project will develop a set of benchmarks with which to assess and monitor the quality of the warnings issued.

Task 7 – Strengthening of the hazard warning system

As outlined under Task 6, warnings are issued by a range of institutions. NCPA itself currently operates two effectively separate warning systems: (i) the National Emergency Broadcast System (NEBS) through TV and radio in the case of major disasters, and (ii) lower-priority warnings issued by e-mail and online (and even phoned directly to municipalities). Although some individual warning systems work well (though many do not), the overall system is confusing, inefficient and occasionally contradictory. The project will work with stakeholders to rationalise and improve the system:

Consolidation of warning outlets. All hazard early warnings will emanate from just two sources: (i) NEBS, for the most serious and/or large-scale hazards; or (ii) the AlbaMet Alert section of the AlbaMet NCIS (see Activity 1.2.1) for lower-priority and/or more localised or targeted hazards. As the institution responsible for day-to-day management of both NEBS (currently) and AlbaMet Alert (in the future, with project support), NCPA will oversee both early warning channels. NCPA will therefore play a considerably more central role in processing and issuing warnings.

Improved NEBS. NEBS is generally considered to perform reasonably well: it is well understood by the general public, it attracts high-level government support (warnings are typically issued following approval from PMO) and the TV / radio broadcasters willingly cooperate. Partly because the system is only rarely used (only for the most serious alerts) and partly because it has evolved incrementally over time, its operations are somewhat ad hoc and largely based on informal understandings. The project will work with NCPA, the broadcasters and other parties (such as PMO) to place NEBS on a more formal footing, with documented institutional roles and responsibilities, standard operating procedures (including links with the DST under Task 8) and a clear division of responsibility with AlbaMet Alert.

AlbaMet Alert will become the ‘clearing house’ for alerts issued on all other (non-TV / radio) media, including geographically localised alerts and alerts issued through mobile phones (see below), online, e-mail, social media platforms, etc. All warnings issued through AlbaMet Alert will eventually use CAP, meaning that NCPA can activate multiple warning communication channels with a single input, thereby considerably reducing the cost and complexity of managing a multi-media warning system (WMO, 2022b), (UNDP, 2012). Further, AlbaMet Alert will be designed (in conjunction with Sub-Activity 1.2.1.2) to incorporate two-way communication. In addition to disseminating warnings to end-users, end-users – such as municipal authorities, emergency services and ARC – will, in turn, be able to upload photos and text to AlbaMet Alert, thereby providing NCPA with real-time situation updates.

Mobile phone alerts system. Albania does not currently have a warning system that is disseminated through mobile devices. Working with NCPA, the two mobile network operators (Vodafone and One Albania) and the mobile phone operating system providers (Apple for iOS devices and Google for Android devices), the project will commission a detailed technical study on design options for such a system.

The focus will be on functionality that is embedded in the mobile network architecture (e.g. SMS messages) rather than on bespoke mobile apps (i.e. functionality specific to mobile devices). SMS messages can be received by any type of mobile phone (not just sophisticated smartphones) and the functionality comes pre-installed (unlike apps). Moreover, SMS is located ‘deeper’ in the network and is therefore protected by more layers of security than device-based software (BEREC, 2020).

Three principal technologies will be considered:

- Cell Broadcast (CB) sends an SMS-based warning message to all mobile phone users in a defined geographical area – within a ‘cell’ or in a user-defined collection of cells. Since CB is broadcast, a single message can reach potentially all phones in the target area without

needing to know the number of mobile devices and without affecting users' privacy. When a CB message is received by the user, it is displayed automatically on the mobile phone screen without any user interaction and with a special standardised ringtone and vibration, making the CB message recognisable as an alert. In addition, the user needs to acknowledge the alert before being able to use the phone. CB messages are allocated the highest priority on the network, meaning they are unaffected by network congestion.

- Location-Based SMS (LB-SMS) identifies the list of actual mobile subscribers in the target area and sends an individual SMS to each recipient. This enables enumeration of recipients in an area (situational awareness), individual delivery reports (real-time status on successful delivery) and language-specific content (based on recipients' country codes). It also means that it is possible to: (i) send alerts to people who enter the affected area after the initial alert was sent, and (ii) update people who leave the area after the initial alert was sent (e.g. as part of an evacuation). The components of a typical LB-SMS system are installed inside each mobile operator's network. Privacy-sensitive information, such as mobile numbers and user identification data (which a mobile operator stores for normal network operations), does not, therefore, typically need to be shared with third-parties. LB-SMS warning messages do not automatically produce notification sounds or a ringtone different from ordinary SMS messages (although end-users can manually introduce this functionality through their mobile phone settings) and it is thus possible for end-users to overlook warning messages.
- Automatic Voice Calling (AVC) delivers recorded audio messages to mobile phones in the target area. AVC is generally used as a supplementary alert system to CB or LB-SMS because it can address some of the shortcomings of text messages, particularly for users with impaired eyesight. CB and LB-SMS standards are, in principle, capable of supporting text-to-speech, whereby an incoming SMS is converted into audio. However, this functionality is dependent upon the end-user's mobile device. The ability of SMS messages to display text in different fonts (larger characters or higher contrast) is also device-dependent, and SMS does not support the inclusion of multimedia content such as pictures.

These technologies are well-established and governed by international standards. Based on stakeholder discussions undertaken during project preparation, there is an expectation that, on balance, CB is the most appropriate technology for Albania: it is the most straightforward to implement from an engineering perspective; since 2012, it has been supported by the default messaging app on Android and iOS devices; it raises the fewest privacy concerns; and there is an associated EU technical standard – EU-Alert, based on ETSI TS 102 900 (European Telecommunication Standards Institute) – that can enable technical coherence and similar user experience across the region.

These issues will be explored in the technical study, as will related issues such as:

- *Whether and how to address foreigners' (primarily tourists') needs – such as issuance of warnings in other languages.*
- *Whether to issue all-clear messages.*
- *Whether to augment an SMS-based warning system with AVC.*
- *The hardware and software requirements of the different technologies – a message-forwarding interface between AlbaMet Alert and each of the mobile operators, appropriate message sorting and 'broadcasting' infrastructure on the mobile networks, and, for LB-SMS, a location database – and who (government, NCPA, mobile operators, etc.) will bear the costs. Apple and Google would also be required to activate the appropriate settings in an operating system update sent to mobile phones.*
- *Assessment of required changes to the legal or regulatory environment – for instance, to enable the government to mandate the adoption of alert functionality by mobile operators.*

Task 8 – Integration of a software-based DST into MHEWS operations

Current risk assessment is undertaken in physical meetings, which can be affected by lack of consistency (attendance by different institutions and different staff members each time) and lack of available expertise and serves to significantly slow hazard response times. A technically appropriate DST that commands the trust and engagement of MHEWS stakeholders will enable ongoing, systematic analysis of data shared by IGEO, other 'official' sources (e.g. AMBU) and, potentially, supplementary sources (e.g. data uploaded to AlbaMet Alert from the field) (Pillar 1), to facilitate consistent and

objective assessment of hazards (Pillar 2), automatic or quasi-automatic warning dissemination (Pillar 3) and preparedness (Pillar 4) (European Commission, 2019b). The information stemming from the DST will help NCPA to determine the hazard magnitude and potential impacts, and start communication with sectoral and territorial stakeholders as per protocol. Additionally, by linking the DST to NEBS and AlbaMet Alert, the warning dissemination mechanism will be triggered to warn communities in the relevant areas that the identified hazard is expected. Key elements of DST design will include:

- Technical specifications:
 - Software, back-ups, server and database format requirements for the operationalisation of the DST.
 - Data scope and resolution (temporal and spatial).
 - Hardware infrastructure design, based on a consultancy that will evaluate how to effectively implement the third pillar of the EWS. Given that the first and second pillars of the EWS are covered by the software and hardware needs that will be provided by Component 1 and the infrastructure procurements for the operationalisation of the NMHS, the hardware aspects of Component 2 will focus mostly on warning dissemination as well as workstations and other equipment required for enhanced NCPA analysis / processing of IGEO-supplied data.
 - How to integrate existing and to-be-developed forecasting models (e.g. hydrological forecasting models) as inputs into the DST.
 - Integration of the wildfire component within the framework of the DST.
 - The data format, timeline, indicators and frequency to be shared with the EUMETNET MeteoAlarm platform.
- Needs assessment of the personnel requirements to operationalise the DST and to integrate it into NCPA (institutional arrangements).

Task 9 – Strengthening linkages and cooperation with international mechanisms

The project will:

- *Establish structured dialogues with MHEWS stakeholders* to understand the historical and current lack of exchange with international MHEWS partners (underlying political, institutional, financial or technical barriers that need to be overcome).
- *Map potential cross-border partnerships* that would support NCPA's strategic priorities.
- *With international expertise, stemming initially from WMO, develop a framework for international exchange* that adheres to, and harmonises with, national and international standards.
- *Develop an integration roadmap* for incorporating the Albanian MHEWS into the EUMETNET MeteoAlarm platform. This will enable (i) Albania to benefit from warnings issued by neighbouring countries and (ii) will enable NCPA to share its warnings with MeteoAlarm (for the benefit of regional neighbours), as well as (iii) allowing the warnings delivered to MeteoAlarm to be retrieved by other organisations (including private companies) for own-use or redistribution on their own platforms.
- *Develop an upscaling roadmap*, based on GIZ's 10-year experience with the CCAWB project, for regional cooperation with partners on transboundary flood risk management.

Task 10 – Development of a MHEWS resources plan

The project will:

- *Analyse the potential for institutionalising long-term funding mechanisms for the MHEWS* from NCPA's parent ministry (the Ministry of Defence), from NCPA itself, from other line ministries and institutions with MHEWS roles, and for including MHEWS funding within the 4% DRR budgets that municipalities are legally required to maintain. Discussions with relevant stakeholders will be held in conjunction with PMO and MoFE to ensure high-level policy alignment and prioritisation.
- *Analyse the potential for mobilising non-government sources of finance*, such as international donors and development partners, IFRC, etc. This Task will also closely coordinate with the analysis of forecast-based financing (FbF) under Activity 2.1.2.

- On the basis of stakeholder discussions and analysis, *develop a 5-year MHEWS resources plan* that is endorsed by the government and accompanied by a formal replenishment process that is automatically triggered every four years in readiness for the next 5-year funding cycle.

Sub-Activity 2.1.1.2: Co-creation of a people-centred MHEWS

GCF financial instrument utilised: technical assistance grant

Executing Entities: GIZ, NCPA

Task 1 – Implementation of legal enhancements and institutional arrangements

Task 1 builds on the foundational preparation and design work of Sub-Activity 2.1.1.1 to implement and operationalise the MHEWS.

Through the establishment of technical working groups (TWGs) to address specific issues (legislation and regulatory framework, governance, data-sharing, international cooperation, etc.), Task 1 will implement and operationalise:

- The *changes to laws, policies and regulations* identified as required under Sub-Activity 2.1.1.1 Task 1 (MHEWS design and functioning), Task 4 (forest fire roles and legal mandates), Task 5 (data sharing) and Task 7 (NEBS functioning, mobile alert system functioning).
- *Formal adoption and implementation of the MHEWS governance and operational infrastructure*: Executive Committee, NCPA-hosted secretariat, SOPs and QMSs, regular schedule of meetings, designated focal points, etc.
- *Implementation of the public awareness campaign* designed under Sub-Activity 2.1.1.1 Task 1.
- *Integration of the forest fire EWS capability within the structure and systems of the MHEWS*, building on the consultations and assessments undertaken under Sub-Activity 2.1.1.1 Task 4.
- *Implementation of ICT measures* – hardware and software acquisition and integration – relating to data sharing, data processing, data archiving, cybersecurity and use of standard protocols, as recommended by the technical report commissioned under Sub-Activity 2.1.1.1 Task 5 (and under Sub-Activity 1.2.1.2), to ensure MHEWS institutions' ICT systems are interoperable and technically capable of supporting the joined-up collaboration enabled by the legal, regulatory and institutional reforms. This will include the ICT requirements associated with upgrading NCPA's analytical and data-processing capabilities (e.g. of incoming IGEO data).
- *Implementation of AlbaMet Alert as a dedicated MHEWS-related section of the AlbaMet NCIS*. The AlbaMet platform will primarily be designed and implemented under Sub-Activity 1.2.1.2. To minimise the ICT burden and cost, it is envisaged that a cloud-based solution, possibly the EWC, will be used. Additional hardware or software requirements associated with the AlbaMet Alert component of AlbaMet will be addressed in this Task (i.e. Sub-Activity 2.1.1.2 Task 1). These requirements will stem from (inter alia):
 - Conversion of warning systems to use CAP.
 - Rerouting warning systems through AlbaMet Alert.
 - Incorporating two-way communications functionality into AlbaMet Alert.
- *Implementation of a national mobile phone alert system*, informed by the technical study commissioned under Sub-Activity 2.1.1.1 Task 7. This will involve the acquisition, installation and testing of network infrastructure (primarily software-based) for point to multi-point communication: a CAP gateway, message forwarding, sorting and broadcasting capabilities, remote monitoring, and back-up and restoration functionality, potentially accompanied by a real-time user location database in the case of LB-SMS.

- *Implementation of the DST*, as designed under Sub-Activity 2.1.1.2 Task 8. This will involve the acquisition and installation of computer hardware (e.g. one or more workstations), acquisition of off-the-shelf and/or development of bespoke DST software, connections to input data streams and outputs to AlbaMet Alert (for automated issuance of warnings).
- *Implementation of the framework for international exchange, the integration roadmap and the upscaling roadmap.*
- *Implementation of the MHEWS resourcing plan* and formal adoption of the automatic replenishment process.

Task 2 – Capacity building of institutions, individually and collectively, so that they can perform their designated MHEWS functions

There is a clear need to enhance current capacities to ensure that key institutions are able to fulfil their MHEWS-related functions. Based on the capacity assessment of the key MHEWS actors undertaken under Sub-Activity 2.1.1.1 Task 1, the project will develop a systematic capacity building programme. Likely elements of this programme will include (subject to the findings of the needs assessment):

- *Training for institutions to meet their SOP / QMS obligations:* e.g. training on new software, data processing and quality control, new harmonised methodologies, hazard analysis and mapping, etc. This training will address gender-related aspects, notably gender-disaggregated data requirements.
- *Executive Committee training:* collective workshops for all Executive Committee members to agree strategic objectives and routine functioning of the Committee and associated secretariat, and how to engage with other stakeholders (ARC, academia, NGOs, the private sector, municipalities, etc.) – with a particular emphasis on inclusivity of vulnerable groups.
- *Forest fire MHEWS training:* training on integrating the new JICA-supported forest fire processes, tools and hazard management procedures into the MHEWS architecture and processes.
- *Hazard profiling:* in multi-institution workshops (to ensure consistency of approaches), relevant personnel will be trained on characterisation of hazard-types – input data, thresholds, benchmarks, etc.
- *NEBS training* on the new institutional roles and responsibilities and SOPs.
- *AlbaMet Alert training:* training for NCPA on management of the AlbaMet Alert platform (including two-way communication aspects), and training for relevant institutions (those that issue warnings and those that routinely receive them) on the operations of the platform: the processes for issuing warnings and having them screened and approved by NCPA; formats (CAP) and content of warning messages; delivery channels for warnings; categorisation of warning seriousness; etc.
- *Mobile phone alerts system training:* due to the novelty of the system in Albania and the central role in the early warnings system that mobile warnings are expected to assume, a dedicated capacity building programme on the mobile alerts system, additional to the more general AlbaMet Alert training, will be provided to: decision-makers (including politicians and senior civil servants); operational MHEWS personnel; MHEWS-relevant institutions, including ARC and municipalities; mobile network operators; and retail staff in electronics and phone shops (as an information channel to the general public). The training programme will include at least two national tests of the alerts system.
- *DST capacity building* and development of a user manual.

- *Measures to support international collaboration and engagement*, including training provided by international experts and short-term (1-3 month) secondments of Albanian staff to MHEWS-related institutions in the region, and vice versa.

Task 3 – Strengthening the capacity of the MHEWS ‘last mile’ in the coastal belt

A particular area of focus under Task 3 will be to strengthen the MHEWS-related capabilities of coastal belt municipalities – for example, building their in-house capabilities to engage with local communities (including women and vulnerable groups) and to formulate / update local hazard management plans (pre- and post-hazard event). This work will be conducted in collaboration with ARC, which has a long track-record of working with municipalities and local communities. It will also be closely coordinated with the Territorial Stakeholder Climate Dialogues (TSCDs) and Local Adaptation Action Plans (LAAPs) developed under Sub-Activity 3.2.1.1, such that the capacity building provided to municipalities addresses: (i) specific gaps in their ability to design and formulate LAAPs, as well as (ii) their ability to subsequently implement or coordinate the adaptation investments included in the LAAPs.

The project will:

- *Assess the MHEWS-related human capacity constraints of the coastal belt municipalities through surveys and interviews.* Based on consultations undertaken during project preparation, key gaps are likely to include (with different emphases across different municipalities): the design of preventive actions for identified hazards; lack of granular understanding of the needs of specific vulnerable groups; limited awareness of hazard-related data sources (e.g. flood maps, hydrological models, the work of internationally-funded baseline projects, etc.); limited understanding of municipalities’ roles in the warning communication chain; and post-hazard response planning.
- *Design and implement a capacity development programme* to address the identified gaps through a combination of workshops (online and in-person), seminars (online and in-person), guidebooks, instruction manuals, etc. Workshops and learning materials will be developed for municipalities collectively, where feasible; individualised capacity building will be offered to sub-sets of municipalities, or even single municipalities, where necessary and cost-effective.
- *Organise awareness-raising campaigns* with coastal belt municipalities and the general public, with a particular emphasis on the communities living in disaster-prone areas and other vulnerable groups:
 - *Training* regarding the use of AlbaMet Alert (when are alerts issued and through which channels, what is displayed, how to understand the information conveyed, and how to provide feedback).
 - *Training for communities:* where to address information and advisory requests in emergency cases (standard communication channels with the municipalities and with NCPA).
- *Analyse the foundations for FbA / FbF.* ARC and IFRC provided a successful cash and voucher assistance (CVA) programme in response to the 2019 earthquake. The subsequent lessons-learned report (IFRC and ARC, 2021) notes the significant potential that CVA interventions offer – and, notably, how much more rapidly and efficiently the earthquake CVA programme could have been implemented if it had been pre-planned rather than having been developed *after* the earthquake struck, and if the assistance had been *anticipatory* rather than post-event. Elements of required pre-planning identified in the lessons-learned report include: regular meetings between the CVA programme and municipalities to build trust and to facilitate the co-development of mobilisation plans; the designation of specific hazard-related thresholds or events – ideally incorporating some element of *impact* as well as simply magnitude – that trigger the activation of the mobilisation plans (i.e. FbA) and, potentially, the release of FbF funds; and warning or information systems that are in place and are capable of communicating trigger activation to relevant parties.

The core elements of FbF / FbA are addressed under Activity 2.1.2, but Sub-Activity 2.1.1.2 Task 3 will assist by incorporating within its 'last mile' support a technical study on how early warning dissemination at the municipality level through AlbaMet Alert – or, in the most extreme cases, NEBS – can be linked to the Red Cross's information requirements to deploy FbA and FbF (relating to, inter alia, the location, scale and exposure of relevant communities).

Activity 2.1.2: Transitioning towards forecast-based early action in Albania

As the paradigm of hazard management shifts from '*what will the weather be?*' to '*what will the weather do?*', national hydro-met and early warning systems worldwide are – gradually, unevenly – being reconfigured to bring the interconnectedness of natural hazards and disaster *impacts* more sharply into focus (IFRC, 2022), (Merz et al, 2020).

FbA is an innovative approach that supports *anticipatory* responses to natural hazards – behavioural change of individuals or the mobilisation of institutional plans *before* an impending hazard event causes damage (REAP, 2022b). FbA can be implemented in conjunction with 'standard' hydro-met forecasts (predicted rainfall levels, for example), but is best suited to IbF (predicted damage to assets or livelihoods, for example) that more readily indicate what pre-emptive measures are required and with what level of prioritisation (InsuResilience Global Partnership, 2023). FbF is a related – but generally more sophisticated and involved – concept in which hazard forecasts / warnings automatically trigger the release of emergency funds, either to institutions or to members of to-be-affected communities (REAP, 2022a).

Current forecasts and warnings issued in Albania are weather- or hazard-based rather than impact-based: they take no account of what effects the weather / hazard will actually have on people, assets or infrastructure, as this requires considerably more data and analytical capability than institutions such as IGEO and NCPA are currently able to deploy. To expect the MHEWS to pivot immediately to IbF is unrealistic, as experience from other countries – with more developed hydro-met and early warning systems – suggests the transition is evolutionary and requires incremental layering of expertise, data, tools, institutional mind-sets and, crucially, end-user trust in the institutions issuing the forecasts and warnings (Uccellini and Hoeve, 2019).

Nonetheless, the fundamental reorganisation and rejuvenation of the MHEWS that will be instigated under Activity 2.1.1 represents a strategic opportunity to *begin* the process of moving towards impact-based hazard management, in part as an enabling condition for FbA and FbF – and thereby facilitating the government's efforts to avert disaster through preparedness efforts, limit disaster impact by providing more targeted early warnings and accelerating recovery by delivering timely disaster response services to vulnerable citizens.

Sub-Activity 2.1.2.1: Creating an enabling environment for forecast-based early action in Albania

GCF financial instrument utilised: technical assistance grant

Executing Entities: GIZ, NCPA

Task 1 – Hazard impact models and thresholds for target communities

The project will work with the NMHS and NCPA to strengthen the scientific and technical capabilities for understanding, anticipating and addressing the impact of extreme weather events on vulnerable communities, with the objective of initiating FbA in Albania.

Hazard impact models will be developed using data provided by the upgraded NMHS and MHEWS, as well as supplementary, locally-gathered data. The intention, for a range of climate hazards, is to couple 'traditional' risk modelling with the additional dimension of community vulnerability to that risk, thereby enabling a fuller understanding of the *impact* of the hazard. Such impact modelling is necessarily geographically-specific and must be tailored to the 'community' of interest – for instance, the entire population of a town or a sub-population defined by poverty level, age (e.g. children, the elderly), gender or occupation (e.g. farmers) (Rufat et al, 2019), (Baky et al, 2020). It must also be periodically updated to account for (inter alia) climate change, demographic and economic change, land-use change,

urbanisation, etc (Cremen et al, 2022). For these reasons, impact modelling can quickly become time- and resource-intensive (Zscheschler et al, 2020), (Auffhammer, 2018).

In acknowledgement of the nascent state of hazard impact modelling in Albania, as well as the practical constraints associated with project implementation, Task 1 will develop hazard impact models for defined sub-populations in six coastal belt settlements. These settlements may be towns, villages or clusters of villages. The choice of settlements, hazard-types and sub-populations will be made during project implementation, on the basis of:

- Stakeholder consultations, at national and local levels.
- Data availability.
- Potential synergies, or outright overlaps, with: (i) the EbA / eco-DRR demonstration measures selected for Sub-Activity 3.2.1.1; and (ii) one or more of the products / services developed by the three climate service providers under Sub-Activity 3.1.1.2.

Under Sub-Activity 3.2.1.1, 5-10 EbA / eco-DRR measures, covering a range of climate hazard-types and sourced from a range of coastal zone LAAPs – i.e. from a range of municipalities – will be implemented with project support. Under Sub-Activity 3.1.1.2, the project will support three hydro-met / climate service providers to apply their products or services in ‘real world’ Albanian settings. This will enable the service providers to refine and ‘tweak’ their offerings in response to empirical testing and user feedback, as well as allowing users to benefit from the products / services on offer. Each service provider will be offered the opportunity to work with one user (a de facto customer) on a specific use-case – e.g. a specific investment initiative or measure.

From the perspective of ‘joining up’ different strands of the ALBAdapt project, as well as minimising project costs and maximising synergies between different sub-activities, it is helpful for linkages to be made between the hazard impact modelling (and subsequent FbA pilots under Sub-Activity 2.1.2.2), the EbA / eco-DRR measures and the support to service providers. Full alignment is neither feasible nor desirable, as each intervention has its own objectives and constraints. Nonetheless, the project will achieve partial alignment through the following:

- At least one of the three ‘real world’ tests of the hydro-met / climate services or products developed under Sub-Activity 3.1.1.2 will be in support of either: (i) (at minimum) a hazard impact model developed under Sub-Activity 2.1.2.1, or (ii) (ideally) one of the three FbA pilots designed and implemented under Sub-Activity 2.1.2.2. Whether option (i) or (ii) is pursued will depend on the nature of the services / products that receive incubation support: a modelling or mapping service / product could be deployed in support of the hazard impact modelling, whereas a broader range of services / products – including (inter alia) ones that support stakeholder engagement and communication, capacity building or simulation exercises, or that focus on particular user-groups (e.g. the elderly) – can be considered to support the FbA pilots. The nature of the services / products that receive incubation support will be known during project implementation.
- At least one of the three FbA pilots designed and implemented under Sub-Activity 2.1.2.2 will also serve as one of the EbA / eco-DRR measures under Sub-Activity 3.2.1.1.
- It is possible that the same FbA pilot will serve as a ‘real world’ test of a climate service / product AND will serve as an EbA / eco-DRR measure. Although this is a potentially desirable situation in some ways, it is not considered necessary and it would also potentially add to project implementation complexity. A decision will be made during project implementation, once the details of the FbA pilots, the climate products / services and the EbA / eco-DRR measures are known.

The expectation is that the majority of hazard impact models developed will focus on: (i) riverine flooding, as this is the leading hydro-met hazard in the coastal belt and NCPA and AMBU have already made considerable (if disjointed) progress on flood modelling and mapping, and (ii) a combination of physical exposure and socio-economic, demographic and gender-differentiated vulnerability.

For each settlement, a statistically representative survey will be conducted in the target sub-population(s) to understand members’ vulnerability / vulnerabilities to the relevant hazard and what coping strategies are typically employed. The survey results will be augmented with GIS data (for hazard exposure), other existing data sources (census, land-use maps, etc.) and hazard-related data (e.g. flood

maps). The findings of the technical study commissioned under Sub-Activity 2.1.1.2 Task 3 – on the Red Cross's (ARC's / IFRC's) information requirements to deploy FbA / FbF – will inform the definitions / dimensions of vulnerability employed.

Where possible, and subject to the overriding requirement to address the priority needs of the local communities, a diverse ensemble of models will be developed: one model may, for illustrative example, focus on the vulnerability of elderly residents to river floods while another may focus on the vulnerability of farmers' crops to storm damage. In seeking to diversify the models, the intention is to:

- Maximise the corresponding capacity building and learning opportunities for NCPA, NTPA and municipality staff, and other stakeholders (e.g. ARC, academics, NGOs).
- Maximise the replication potential outside the ALBAdapt project framework: i.e. to enable other municipalities to develop similar models themselves in conjunction with NCPA.
- Maximise the areas of overlap with the EbA / eco-DRR measures supported under Sub-Activity 3.2.1.1 and the climate services / products supported under Sub-Activity 3.1.1.2.

Each model will be used to define impact-based thresholds that can be linked to the MHEWS DST and AlbaMet Alert. When such a threshold is forecast to be exceeded, this will trigger an early warning – issued by NCPA to the relevant municipality and local stakeholders (e.g. ARC) – that will, in turn, initiate local anticipatory actions (FbA) and – eventually, as a later development in the medium-term, outside the project framework – the release of anticipatory finance (FbF) (NCPA will continue to issue warnings to all communities nationwide, as per the protocols and communication channels developed under Activity 2.1.1. Additional, specially-tailored warnings, linked to locally-calibrated meteorological thresholds, will be sent to the municipalities of the six coastal belt settlements participating in the FbA pilots).

While the threshold itself may be calibrated in hydro-met terms (such as mm of rainfall or river water level) to be compatible with MHEWS ICT and decision-making systems, the underlying logic will be one of impact: the threshold will be associated with a particular level of impact – such as the number of flood-affected households or the amount of economic damage to crops – that is judged to be 'significant' by local stakeholders (Gradations of significance, on a scale of severity, may also be considered). The triggers for FbA / FbF will be stress-tested and refined over time on the basis of empirical and stakeholder feedback, including from the pilots implemented under Sub-Activity 2.1.2.2.

Task 2 – Improving national and sub-national capacities for FbA

The project will build the capacities of IGEO, NCPA, municipalities, ARC, NTPA and other relevant institutions to understand and apply the information from hazard impact modelling and forecasts to develop a suite of anticipatory adaptation actions. The pilot FbA initiatives undertaken under Sub-Activity 2.1.2.2 will be used as practical learning tools and case-studies in the capacity building activities undertaken under Task 2.

- *Workshops* will be held with key national and local stakeholders to deepen understanding around impact modelling and critical thresholds (triggers), and how these can be used to develop appropriate pre-emptive responses to climate hazards. Particular attention will be paid to the needs of vulnerable groups within society.
- *Awareness-raising sessions* will be organised for relevant stakeholders – including municipalities located outside the coastal belt – to sensitise them to the importance and application of early warning IbF and FbA to protect public and private assets.

Task 3 – Establishing appropriate institutional arrangements for FbA

For successful implementation, FbA requires a high degree of political will and inter-institutional collaboration and cooperation. The ALBAdapt project will support the establishment of an FbA Task Force and an FbA Community of Practice to accelerate the adoption of FbA in the country.

- *FbA Task Force*: coordinated by NCPA and including at least one member to represent gender-based interests and one member to represent the interests of other vulnerable groups, the Task Force will be responsible for:

- Creating national ownership for FbA, mainstreaming it into IGEO and NCPA, and ensuring the active engagement of 'last mile' actors (municipalities, ARC, etc.). This will include, where necessary, changes to institutional rules and procedures and the national regulatory environment to allow pre-emptive action: most Albanian civil defence institutions currently react only *after* a hazard event has taken place and their legal mandates – e.g. the ability to order evacuations or to access emergency budgets – are predicated on hazard events having been officially declared.
 - Strengthening linkages with Albania's NAP and National DRR Action Plan (2023-2030), including through the LAAPs developed under Sub-Activity 3.2.1.1 that will inform and support both Plans.
 - Identifying financial opportunities, for both: (i) FbA (e.g. financing forecast-based actions with the assistance of Albania's national insurance schemes, disaster risk management funds, international development partners, etc.), and (ii) FbF, with the additional fund management and fiduciary responsibilities that would entail.
 - Conducting regular stocktakes as well as monitoring and evaluating progress on the development of FbA in the country.
- *FbA Community of Practice (CoP)*: The CoP will provide a bridge between government institutions (notably, IGEO and NCPA at national level and municipalities at local level) and civil society, including NGOs (including those with interests in gender and vulnerable groups), academia, and development and humanitarian actors, as well as the AlbaMet NCIS and the private sector. The project will host initial CoP meetings (until a rotational hosting schedule can be agreed amongst CoP members) and will work with CoP members to produce and disseminate knowledge products (including a flagship best-practice handbook) and organise learning events to encourage understanding of, and adoption of, anticipatory actions built around impact-based forecasts and warnings.

Sub-Activity 2.1.2.2: Piloting FbA in selected coastal belt communities

GCF financial instrument utilised: technical assistance grant

Executing Entities: GIZ, NCPA

Sub-Activity 2.1.2.2 will implement 'real world' applications of FbA in two contexts:

- Drawing from the six hazard impact models developed for coastal belt settlements under Sub-Activity 2.1.2.1, three of these settlements will be selected as FbA pilots. (Tasks 1-3).
- Building on work undertaken by the CCAWB baseline project, emergency FbA plans will be developed for schools at risk of flooding in the 12 coastal belt municipalities. (Task 4).

Task 1 – Development of FbA pilots

Selection of the three settlements will be made by the project on the basis of:

- Stakeholder capacities and levels of interest.
- Potential synergies, or outright overlaps, with: (i) the EbA / eco-DRR demonstration measures selected for Sub-Activity 3.2.1.1, and/or (ii) one or more of the products / services developed by the three climate service providers under Sub-Activity 3.1.1.2.
- The replication potential of the hazard-types or populations / sub-populations addressed by the models. To the extent that is feasible, the three chosen settlements will cover a diversity of hazard-types and/or beneficiary groups.

Development of Early Action Protocols (EAPs). The project will work with the municipalities responsible for the three selected settlements, as well as other local stakeholders (civil society, NGOs, ARC, etc.), to insert Early Action Protocols (EAPs) into the existing municipality emergency plans. These EAPs will address forecast-based actions to be undertaken in the post-warning, pre-hazard event time-period, relating to the hazard-type and the sub-populations covered by the settlement's impact model.

The precise nature of the EAPs will depend upon the hazard-type and the population(s) being targeted. Examples of EAPs might include (inter alia): evacuation of particular buildings, construction of temporary structures (e.g. sandbag reinforcements), establishment of mobile kitchens or mobile clinics,

deployment of generators, distribution of animal feed, mobilisation of psycho-social counselling, etc. In line with the project's Environmental and Social Action Plan (ESAP, Annex 12), EAPs that could potentially affect sites that are legally protected for heritage purposes – i.e. sites of cultural, historical or archaeological significance – will not be developed.

Development of the EAPs is expected to be a time-intensive process, requiring several rounds of stakeholder consultations, on-site visits and iterative design, accompanied by formal adoption. Consequently, the project does not anticipate revising other – existing – elements of the municipal plans, except where harmonisation demands it: i.e. where (i) existing plan elements must be updated or revised in order to enable implementation of the EAPs, or (ii) existing plans are anyway updated as a result of the LAAP development process (under Sub-Activity 3.2.1.1). However, municipalities will be encouraged to update / revise existing elements of their plans themselves (outside the framework of the ALBAdapt project) and, in this context, they will benefit from their exposure to the EAP development experience, as well as the capacity building support they receive under Sub-Activity 2.1.2.1.

Development of EAP standard operating procedures (SOPs). To operationalise the forecast-based actions, EAP SOPs will be established for the three municipal plans. The SOPs will define the roles and responsibilities – within defined time periods – of relevant actors vis-à-vis FbA.

Task 2 – Capacity building for FbA implementation in pilot settlements

On the basis of the EAPs developed, tailored capacity building programmes will be provided to each of the three settlements. These programmes will be linked to, and leverage where feasible, the municipality-level capacity building provided under Sub-Activity 2.1.1.2, but they will be targeted specifically at the settlements hosting the FbA pilots. Local government structures at the administrative unit (commune) level, ARC, CSOs and volunteers will be trained on: (i) FbA readiness (e.g. pre-positioning of equipment, sandbags, etc.), (ii) implementation of the EAPs when a warning is received (with particular reference to each stakeholder's SOPs), (iii) particular needs and constraints of the EAP target sub-populations (e.g. the elderly, women, children, specific occupational groups, etc.), and (iv) communication, reporting and coordination procedures during EAP implementation.

Task 3 – Implementation of FbA simulated warnings for the pilot settlements

NCPA will issue simulated early warnings to the pilot settlements – 'as if' the impact-based thresholds calibrated under Sub-Activity 2.1.2.1 had been triggered – in order to: (i) test the content and technological modalities of issuing such localised (geographical and hazard-specific) warnings (clarity, comprehension, technology, timeliness, etc.); (ii) the warning dissemination system (warnings from AlbaMet Alert to the municipalities, administrative units and local stakeholders; and warnings disseminated by the municipalities and administrative units themselves); and (iii) observe and, where necessary, refine and improve the FbA response (the ability of institutions to implement their SOPs in fulfilment of the EAPs, as well as the utility and effectiveness of the EAPs themselves, especially for women and vulnerable groups).

Task 4 – School emergency FbA plans

Albania has approximately 3,100 elementary and high schools, of which ~80% are single-building units and ~20% consist of more than 2 buildings (NCPA, 2022b). Half of schools operate with fewer than 50 pupils (UNICEF, 2019). Since 2017, 177 schools have suffered from flood damage, with many more considered to be at risk of floods and other hazards (NCPA, 2022b). The Fourth NC to the UNFCCC notes that schools are adaptation priorities because of: (i) the sheer number of buildings at risk, (ii) the highly vulnerable nature of schoolchildren, and (iii) the large replication potential: because Albanian schools use a small number of standard (often communist-era) architectural templates, emergency management plans, and even evacuation plans, can often be transposed directly, with only minor amendments, from one school to another (Republic of Albania, 2022a).

The GIZ baseline project, 'Adaptation to Climate Change through Transboundary Flood Risk Management in the Western Balkans (CCAWB)' (2012-2022) undertook, inter alia, flood risk mapping and community sensitisation to flood risks in Shkodër county. As part of this work, the CCAWB project

developed emergency management plans for seven schools and provided training (including practice drills) to 61 teachers and over 540 pupils on implementing the plans (Aarhus Information Centre 2022). In addition to the training directly related to the emergency management plans of the 7 schools, the CCAWB project also provided (unrelated) capacity building and awareness-raising support to an additional ~300 pupils and community members (based on the findings of the practice drills, the emergency management plans were revised and action plans were developed to update pupil and staff awareness (through lesson content, instruction videos, etc.) on an annual basis before the start of each wet season. Additionally, selected teachers received first aid training and certification from ARC). The initiative reached parents through flyers and the broader communities through local TV and radio stations (Aarhus Information Centre, 2021). The ALBAadapt project will build on this work to:

Develop a national schools risk map. NCPA has coordinated the development of national risk maps for floods, wildfires and landslides, and the geographical locations of schools are stored in digital maps maintained by the Ministry of Education, Sport and Youth (ACCE) and ASIG. 'Layering' the risk maps onto a schools location map is a straightforward exercise in a GIS – albeit one that does not appear to have been undertaken to date. The spatial resolution of the risk maps is fairly coarse, so localised risks facing individual schools will not be captured. Nonetheless, the map will provide a useful 'initial resource' for identifying at-risk schools, especially those located in flood plains, in fire-prone forested areas and in landscapes prone to landslides. As hydro-met data, forecasting and hazard modelling improve due to restructuring / creation of the NMHS, NFCS and MHEWS, the quality and resolution of the schools risk map will improve over time. The map will be freely available and will be maintained in the AlbaMet Alert component of the AlbaMet NCIS.

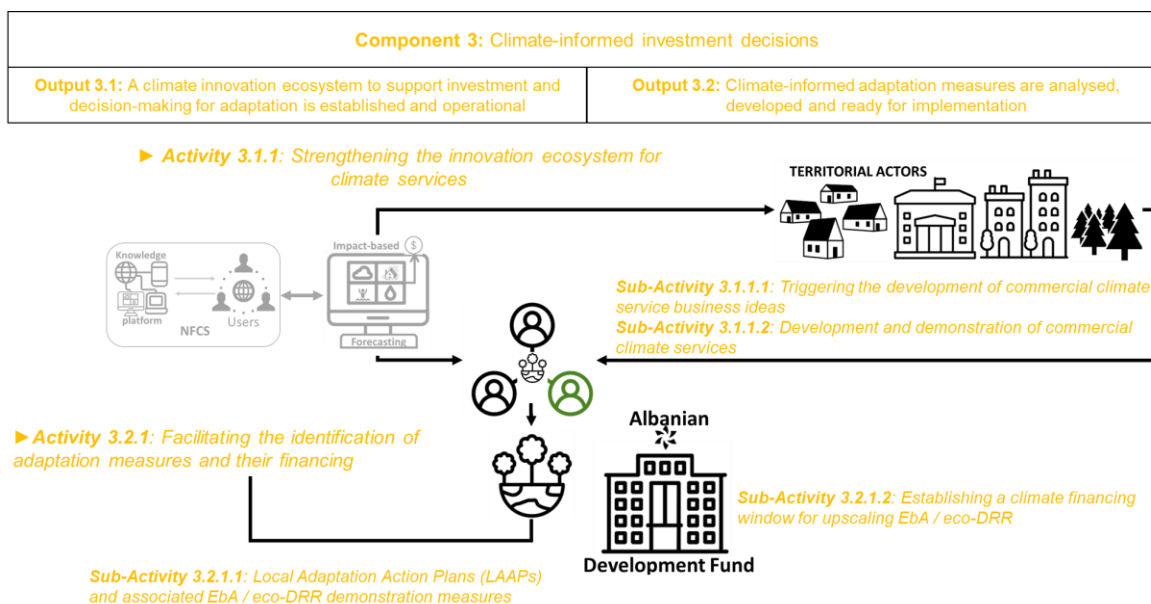
Using the schools risk map, the schools at risk of floods in the 12 coastal municipalities will be identified and *emergency management plans will be developed for all of these schools*. There are 457 schools (with ~78,600 pupils) in the 12 coastal municipalities. Based on stakeholder discussions and CCAWB experience, it is anticipated that approximately one-quarter of schools will be classified as 'at-risk' from floods: i.e. approximately 114 schools (with ~19,600 pupils). This estimate will be revised when the national school risk map has been developed.

Frame these emergency plans (plus the seven already developed by the CCAWB project) explicitly in the context of FbA: i.e. link the emergency response plans to a clear, systematic warning system that triggers the plans. Currently, warnings are generally not of high quality (limited advance warning, high rate of false positives); are not systematised through an efficient, transparent system (multiple warnings are issued by multiple institutions); and are not directly linked to schools – instead, warnings typically trickle through multiple intermediate layers (e.g. the municipality and the administrative unit) before reaching a school. Building on the reforms to the NMHS and MHEWS undertaken by Components 1 and 2, the project will put in place an early warning system for schools that is more timely and more accurate. The scope for using mobile alerts sent directly to schools through the to-be-established mobile functionality of AlbaMet Alert (Sub-Activity 2.1.1.2) will be explored during project implementation.

Work with NCPA to develop a *replication strategy* for the remaining at-risk schools in the six coastal belt counties (~155 schools), including how-to guides, case studies, and awareness-raising and training workshops.

8.3.3 Component 3 – Climate informed investment-decisions

Figure 38: Representation of component 3



Source: Own elaboration

Outcome 3: Improved climate-informed decisions for adaptation measures

Output 3.1: A climate innovation ecosystem to support investment and decision-making for adaptation is established and operational

Activity 3.1.1: Strengthening the innovation ecosystem for climate services

Private sector provision of climate services is under-developed in Albania: only one company is currently present in the sector. The improvements to the NMHS, NFCS and MHEWS implemented under Components 1 and 2 will open up new and promising opportunities for private sector supply of climate services, particularly in the context of:

- *Recent (positive) developments in the innovation policy environment.* There is now a dedicated State Minister for the Protection of Entrepreneurship and the Albanian Investment Development Agency (AIDA) is expanding its support to MSMEs. The 'Law on the Establishment and Operation of Technological and Scientific Parks' was approved by the Albanian Parliament in June 2022. The 'Law on the Establishment and Development of Innovative Start-Ups' was adapted in March 2022 to facilitate the overall process of ecosystem development: for example, by setting regulatory incentives for start-ups. In addition, the government has started to strengthen the connectivity of the innovation ecosystem, most recently by passing a law (in May 2023) to create the Startup Albania agency, intended to serve as a one-stop shop for start-ups (The Gaze, 2023).
- *Barrier removal activities for MSMEs undertaken in recent years by baseline projects,* including the GIZ-SIDA EU for Innovation project, the GIZ ProSEED project, the GIZ Open Regional Fund (ORF) project, the Swiss Entrepreneurship Programme and the Western Balkan Investment Framework (WBIF) 'Smart Cities-Smart Villages' project.
- *Albania's high vulnerability to climate change,* including in key economic sectors – such as agriculture, water, energy and tourism – that could serve as customers for climate service providers.

The ALBAdapt project will incentivise the commercial use of the improved NMHS and MHEWS data streams unlocked by Components 1 and 2. Specifically, Sub-Activity 3.1.1.1 will focus on *ideation*: i.e.

development of a set of high-potential climate service business ideas. Some of these ideas will then receive further *incubation* support under Sub-Activity 3.1.1.2.

Sub-Activity 3.1.1.1: Triggering the development of commercial climate service business ideas

GCF financial instrument utilised: technical assistance grant

Executing Entity: GIZ

The focus of Sub-Activity 3.1.1.1 is deliberately narrow and adopts the ‘less is more’ approach recommended by the EU for Innovation baseline project (EU for Innovation, 2022). The intention is not to undertake large-scale capacity building or institutional strengthening across the entire entrepreneurial ecosystem, as this would disregard the specific technical focus of the project (climate services) and the specialist set of skills associated with climate services, and would also represent a distraction from the project’s principal aim of catalysing a small number of early-mover innovators that can map a way forward for subsequent scaled-up development of the climate services sector. Instead, the focus will be on rapid assembly of a portfolio of promising climate service business ideas, some of which can be rapidly advanced into minimum viable products (MVPs). To support business ideation for climate services, Sub-Activity 3.1.1.1 will undertake the following tasks:

Task 1 – Innovation ecosystem awareness-raising

A structured programme of awareness-raising will be designed and implemented on: (i) the market opportunities associated with climate services (climate change adaptation needs in Albania, available IGEO / MHEWS data streams, business models from other national markets, etc.), and (ii) the specific ideation support measures that will be implemented by the ALBAdapt project (see below). The intention is to raise awareness and understanding of climate services as a potential business opportunity, as well as to mobilise ecosystem actors’ engagement with the project’s ideation activities in order to ensure a large number of high-quality business ideas. Awareness-raising will be undertaken through bespoke site visits to institutions, workshops, side-events at conferences and academic meetings, webinars, e-mail circulars, etc. Targeted institutions in the innovation ecosystem will include:

- University-based incubators (such as those at Metropolitan University, Marin Barleti University, Epoka University and Polis University) that have extensive, pre-established networks with entrepreneurs and MSMEs, as well as direct access to relevant academic departments (physics, computing, earth science, etc.) and staff and students (particularly post-graduate students).
- Universities that are located in the coastal belt (such as Shkodër and Elbasan), none of which currently operate incubators / accelerators, but which can offer deep understanding of local needs and capacities in the coastal region specifically.
- Non-university incubators whose portfolios include digital / ‘big data’ start-ups (e.g. Oficina, Yunus Social Business, TechSpace, etc.).
- The Women Founders Network Albania (WFNA), which has built up an extensive network of women entrepreneurs.
- Financial institutions, including local banks and invited international entities (notably, regional venture capital (VC) firms).
- Potential customers for climate services: business-to-business (B2B) services are considered to be more viable, at least initially, than business-to-consumer (B2C) services, so the initial focus will be on potential public sector users of weather data (e.g. ministries, specialised agencies and municipalities – with a particular focus on coastal belt municipalities) and medium- to large-scale corporates operating in weather-sensitive sectors (agriculture, tourism, energy, etc.).

Task 2 – Climate service ideation

Through a structured programme of ideation events (including workshops, hackathons and calls for proposals), a portfolio of 30 business ideas related to climate services will be assembled. A broad range of business ideas will be considered, including apps and software tools, hydro-met monitoring and forecasting (using a range of sensing platforms), consultancy services, publishing and others. There will

be no restriction on end-users, who might include (for example) farmers, tourist enterprises, energy generators (e.g. wind farms, hydro-electric power companies), central government, municipalities and others. The principal requirement is that business ideas leverage the data generated by the reformed NMHS and MHEWS: this data may be publicly (freely) available or may be purchased on commercial terms, and it may be augmented by additional data streams (e.g. international hydro-met data, bespoke data collection, etc.). Business ideas may be original or revised versions of existing ideas, but they must be at an early (pre-commercial) stage of development.

Business ideas will be sourced primarily from the institutions involved in the ecosystem awareness-raising, but any Albanian individual or private sector entity will be eligible to submit ideas (At the ideation stage, most ideas will typically be generated by individuals – such as entrepreneurs, academics and post-graduate students. Formal incorporation of a business will typically take place later, when the idea evolves from an abstract concept into a demonstration product. The point is that the project will not accept business ideas from public sector institutions, as the intention is to catalyse a private sector market for climate services that is nimble, responsive and commercially-driven). Calls for participation in workshops and hackathons, and calls for proposals for business ideas, will be actively promoted among entrepreneurs with backgrounds usually under-represented in start-up and innovation programmes, notably: (i) in women's networks, (ii) among ethnic groups, and (iii) entrepreneurs living outside Tirana, particularly in rural areas. All ideation activities will be conducted in a gender-sensitive manner.

Business idea generation will be both undirected (i.e. sector-, technology- and user-agnostic) and directed: the project will use themed workshops and hackathons, as well as specific calls for proposals, to 'steer' ideation in directions that address particular objectives:

- Addressing priorities identified in the NAP, NDC, NDRRS, etc.
- Promoting synergies with the hazard impact modelling under Sub-Activity 2.1.2.1 and the FbA pilots under Sub-Activity 2.1.2.2.
- Addressing municipal needs in the coastal belt, as identified in the LAAPs developed under Sub-Activity 3.2.1.1.

The process will follow a user-centric approach and will include:

- Awareness-raising and stakeholder engagement for climate service ideation (Sub-Activity 3.1.1.1).
- Incubation of the most promising ideas developed during ideation (Sub-Activity 3.1.1.2).
- Provision of financing for next steps towards realisation of the most promising business ideas (Sub-Activity 3.1.1.2).

A hackathon is a place-based programme that harnesses the power and imagination of stakeholders to co-create ideas to tackle local climate challenges. Over the span of 12-72 hours, a diverse group of participants, typically including entrepreneurs, business leaders, policy-makers, professionals, youth representatives, CSOs, academics, students and software / technology hackers, come together to collaborate on forward-thinking ideas. Hackathons represent a useful first step in the ideation and business creation process, serving as a tool to bring together community stakeholders to identify pressing climate challenges, build collective knowledge and begin to co-create local solutions (Rys, 2021).

The intention is to assemble a portfolio of at least 30 climate service business ideas. To the extent possible, business ideas from women entrepreneurs (or organisations representing women) will be encouraged. No formal screening or scoring of ideas will be undertaken at this stage (such scoring will occur under Sub-Activity 3.1.1.2), but a high level of implicit quality control is expected because of the specialist nature of the field, the types of stakeholders involved in ideation and the consultative (typically, team-based) quality of workshops and hackathons. A standard template, approximately ten pages in length when completed, will be developed for idea submissions, thereby ensuring that ideas are presented in a uniform, structured manner and with an acceptable level of detail.

The incentive to participate in ideation activities, aside from professional interest and the networking opportunities arising, is provided by the fact that three of the ideas submitted will receive intensive follow-up incubation support (see Sub-Activity 3.1.1.2).

Task 3 – Community-building

Following their participation in awareness-raising and ideation activities (Tasks 1 and 2), participants will be invited to join an open digital innovation community, through the existing AlbaniaTech platform (AlbaniaTech, 2024), for advancing climate entrepreneurship in Albania. This community will provide a forum for discussion, dissemination of news relating to the climate services sector, networking and innovation promotion. It will also serve as an online gateway to useful and inspiring information (including upcoming events). The digital community will:

- Connect like-minded entrepreneurs and other stakeholders in the country.
- Share knowledge.
- Offer the potential for financing, through the features provided by the AlbaniaTech platform.
- Promote learning about other relevant national and regional stakeholders and financing opportunities.
- Provide a forum for showcasing success stories and lessons-learned, including for women entrepreneurs specifically.
- Open up opportunities – calls for applications, information about new programmes and initiatives, etc.

The intention is to generate ongoing conversation and momentum in the climate services and innovation / entrepreneurial communities that continues after the project's ideation interventions, including further development of business ideas outside of the ALBAdapt project framework. The project will strive to achieve high diversity among digital community participants, with a particular focus on women entrepreneurs and entrepreneurs outside Tirana, particularly those located in the coastal belt.

Sub-Activity 3.1.1.2: Development and demonstration of commercial climate services

GCF financial instrument utilised: technical assistance grant; financial assistance (grants to climate service providers)

Executing Entity: GIZ

Task 1 – Portfolio screening and scoring

Climate service business ideas developed under Sub-Activity 3.1.1.1, described using the project-developed template, will be screened and then scored in order to select 3 of the ideas for incubation support.

Screening: as a first step, all submitted ideas will be screened against the following eligibility criteria:

- The applicant(s) is/are an individual or a formally registered business in Albania. In case the applicant is a formally registered business, it must fulfil the International Finance Corporation (IFC) definition of an MSME (International Finance Corporation, 2024): i.e. it meets two of the following criteria:
 - Fewer than 300 employees
 - Less than US\$ 15 million of total assets
 - Less than US\$ 15 million of annual sales
- If the applicant is a formally registered business, in order to comply with German non-profit law its ownership structure must credibly indicate that support provided by the ALBAdapt project will primarily benefit beneficiaries in a Non-Annex 1 country (i.e. the Republic of Albania).
- If the applicant is an individual, he/she must be an Albanian citizen.
- The business idea must be at a pre-commercial stage of development: i.e. no product or service is currently available for sale. The idea may be original or a revision of an existing product / service.
- The business idea will be assessed based on the preliminary following criteria:
 - It relates to one or more climate adaptation services (which may involve apps, software tools, monitoring, forecasting, consultancy services, publishing and others).
 - It uses hydro-met data generated by the reformed NMHS and/or MHEWS.

- The proposed climate service is not on the IFC exclusion list or any other E&S exclusion list of GIZ.
- The proposed climate service does not raise any environmental and social (E&S) 'red flags': that is, negative risks and impacts that would not be manageable during incubation support or during market deployment and that would be classified as Category B or A risks.

Scoring: Those business ideas that pass screening will be awarded an attractiveness score. These scores will be used to select three ideas for project-supplied incubation support. The scores will also be made publicly available on the digital community platform (established under Sub-Activity 3.1.1.1) and other venues, thereby enabling VC firms, donors, incubators and others to quickly identify high-potential ideas for further development. The scoring process will consist of two elements:

- Assessment by independent experts provided by the project (based on desk review). (75% of overall score).
- Interviews. The applicants will be invited to interviews. During the interviews, the applicants will be asked to present, in 10 minutes, their business ideas. After the presentation, the members of the selection panel will have the opportunity to ask questions (10 minutes maximum) to challenge the applicants on their ideas / business models, and also to assess their motivations. (25% of overall score).

Detailed scoring criteria will be developed during project implementation. Indicatively, criteria will include:

- *Climate adaptation potential*, assessed on the basis of: (i) the anticipated adaptation effectiveness of the product / service, and (ii) the anticipated market penetration of the product / service.
- *Paradigm shift potential*: in what way does the proposed climate product / service have the potential to be innovative and disruptive in the target market?
- *Alignment with other ALBAdapt project elements*: to what extent does the product / service potentially support: (i) one or more of the hazard impact models developed under Sub-Activity 2.1.2.1, or (ii) one or more of the three FbA pilots designed and implemented under Sub-Activity 2.1.2.2, or (iii) one or more of the EbA / eco-DRR measures designed and implemented under Sub-Activity 3.2.1.1.
- *Team*: Does the applicant have the qualities and abilities to grow the business (enthusiasm, background, technical and managerial skills, devotion to the business)?
- *Gender*: Is the application female-led, defined as the founder being a woman? Where there is more than one founder, are the majority of founders (50% or more) women? Will the applicant offer products or services that address a gender-related climate problem (e.g. one in which women are disproportionately vulnerable or affected)? Positive scoring in favour of women-led service providers is expected to contribute to the project's sustainability. Multiple studies concur that women-led companies tend to be disadvantaged in terms of access to capital, social discrimination and in being largely confined to low-margin sectors such as hospitality and retail (World Bank, 2014). In Albania, women entrepreneurs are disadvantaged, relative to men, in terms of access to market information, financial support and the benefits from enterprise development (UN Women, 2021). More than one-third of respondents in a survey conducted for the Fourth NC to the UNFCCC believe that there are differences in men's and women's abilities to react to climate change in Albania: promoting climate service ideas developed by women will help to address this gender gap (Republic of Albania, 2022a). The Revised NDC states that "all measures related to promoting gender equality in relation to adaptation should be considered as having very high priority" (Republic of Albania, 2021a).
- *Complementary finance*: the ability of the applicant to provide complementary finance in order to augment the financial support provided by the project. This is not a mandatory requirement, as it is acknowledged that demanding finance from a nascent enterprise in a nascent sector in a generally challenging national business environment may be excessively daunting for some entrepreneurs and may deter promising business ideas from progressing further. It may also be difficult to confidently validate applicants' statements in this regard – for example, if the funding is not sourced from easily-validated existing capital (e.g. bank savings) but, instead, will be mobilised from advances or donations from friends and family, future bank loans, etc. Nonetheless, the ability to provide complementary finance is considered a sign of

an applicant's 'seriousness' and ability to sustain future self-investment, and will be positively regarded.

Task 2 – Selection of three climate service ideas for targeted incubation support

Three of the developed business ideas will be selected for further project support. The selection will be made by a selection committee containing representatives of the project, the government, the private sector, financing institutions and civil society (detailed composition will be determined during the implementation). The criteria for selection will be developed during project implementation, in consultation with relevant stakeholders, but will be based predominantly on the scores assigned under Task 1.

The intention is to select three ideas that not only have (i) high climate adaptation impact and high business viability / potential, but that also (ii) address a spectrum of technologies, end-users and/or adaptation needs, and at least one can be deployed in support of (iii) one or more hazard impact models developed under Sub-Activity 2.1.2.1 or (iv) one or more of the FbA pilots designed and implemented under Sub-Activity 2.1.2.2.

Promising business ideas that are not selected for further project support will be shared with, and marketed to, stakeholders – including donors and VC firms active in the region – for potential support outside the project framework.

Task 3 – Provision of targeted incubation support to three climate service providers

Over the course of six months, the three selected climate service providers will benefit from a blend of training (three months) and mentoring (three months).

Training: The training will consist of a mix of in-person and online formats, provided to each of the three climate service providers separately. It will cover the following topics, adapted to the specific context / needs of each climate service provider:

- Business management and planning:
 - Value proposition: improving understanding of market opportunities, customer needs and unique product benefits.
 - Competition mapping: identifying the strengths and weaknesses of the offer, how the provider distinguishes itself from its competitors (if any) and finding its true competitive advantage.
 - Stakeholder mapping: determining the different partners the provider needs to launch and creating a map of its partner networks and distribution channels.
 - Business model and marketing: obtaining a clear picture of the activities essential to the growth of the business and learning how to attract customers and keep them coming back.
 - Financial and investment plan / capital allocation plan (e.g. until delivery of a marketable product).
 - Pricing: better understanding the costs of attracting customers and discovering the optimal price level to make the business financially viable.
 - Case-studies of similar climate services provided in other countries.
- Climate adaptation impact: building service providers' understanding of their potential climate adaptation impact; and providing the tools and methodologies to assess the scope and magnitude of this impact, and approaches to maximising this impact in the context of commercially viable business models.
- Environment and social (E&S) topics and gender:
 - Compliance with safeguards on labour and working conditions, including health and safety.
 - Training on risks of sexual exploitation, abuse and harassment (SEAH) and gender-based violence (GBV), and on the project's zero-tolerance policy.
 - Gender dimensions of climate business ideas and use of a gender lens in the provider's own business model (e.g. market research, consumer segmentation).

- Development of a grant-funded programme of activities tailored to the needs of each climate service provider. These activities will be funded and implemented after the training and mentoring have been successfully completed (see Task 4).

Because of the specialist nature of climate services and the under-developed market for such services in Albania, incubators in the country are currently unable to offer the expertise that the service providers require in the context of their training. Instead, the training will be provided by one or more specialist training institutions based outside Albania – expected to be incubators (or similar institutions) with solid track-records in supporting climate / environmental start-ups. The training institution(s) will be selected on the basis of transparent criteria using GIZ's standard procurement processes. The same institution(s) will provide training to all three climate service providers, but it/they will do so separately to: (i) ensure the specific circumstances / needs of each service provider are addressed, and (ii) to provide the service providers with confidence that their (potentially commercially sensitive) business ideas / strategies are not being shared with the other service providers.

As part of the training, the training institution will host a separate one-week workshop for each of the climate service providers (up to a maximum of five individuals representing each service provider) in the training institution's host country. During this week, and in addition to the standard training, networking events, meetings and site visits will be organised to expose the service provider to ideas, business models, experts and potential future sources of support (e.g. financial, technical, legal, etc.).

In order to increase scalability and replicability potential, the project will help build the climate services capacity of the Albanian start-up community. One Albanian incubator will be selected on the basis of transparent criteria (to be developed during project implementation) to participate in the training – primarily as a recipient of training ('incubation of incubators') but also, for specific topics where relevant and feasible, as a training provider. Where feasible, the incubator selection criteria will place weight on geographical diversity and gender opportunities (incubators with proven gender strengths and track-records).

Mentoring: Following the online training, each climate service provider will benefit from one-to-one mentoring, covering key topics such as production, sales, business management, climate innovation and leadership. The mentor – an expert selected for his/her relevant sectoral or commercial experience, and probably based in another country in the region – will regularly follow-up on the provider's progress, primarily through online communications but also including two in-country (Albania) visits. The (same) Albanian incubator will participate in mentoring sessions, thereby exposing the incubator to further sectoral / technological learning.

Task 4 – Climate service provider grants

Upon satisfactory completion of the training and mentoring programmes (the criteria for satisfactory completion will be developed during project implementation. Indicatively, they will cover areas such as: level of participation in the training and mentoring, level of achievement in the training and mentoring, and progress achieved with business idea refinement and development). The three climate service providers will each be eligible to receive a Euro 50,000 grant payment. The grant content will be developed under Task 3 and will be disciplined by a grant contract signed between the climate service provider and GIZ. The grant must be spent within six months of the grant contract being signed, with extension of this time period possible at the climate service provider's request and GIZ's approval. Thus, the overall timeline will be: training (three months), mentoring (three months) and grant usage (six months, with extension possible), which will, together, span a period of approximately twelve months.

The Euro 50,000 grant will be eligible for a broad range of activities relevant to enabling the service provider to develop an MVP in line with the business idea fleshed out during training and mentoring. Eligible activities can include (for example) further development of the product or service, market research, business development and procurement of equipment, services or personnel.

The grant contract will include clauses that aim to minimise the possibility of grant misuse, including:

- The need for additional validation should a substantive change in the use of the grant occur after the signing of the grant contract.

- Eligible items for grant financing: cost of newly hired staff, equipment, software / data / information services and professional services (e.g. legal, accounting) critical to the research and development (R&D), product development and business development functions. The service provider will need to justify the essential nature of the expenses and generally show that it is managing its business in a lean manner. Proof of expenditures (invoices, receipts, etc.) will need to be supplied.
- Exclusion lists and spending caps (for instance, for travel and entertainment costs, or remuneration of the founders / owners).
- Conflict of interest and anti-fraud clauses aimed at preventing the purchase of products and services from suppliers closely affiliated with the service provider.
- Adherence to E&S requirements on excluded activities.
- Provision of reasonable conditions of employment, protection of the workforce, and provision of a safe and healthy work environment.
- Zero tolerance of SEAH or GBV.

Task 5 – Empirical demonstration and testing

The project will support the three service providers to apply their products or services in 'real world' Albanian settings. This will enable the service providers to refine and 'tweak' their offerings in response to empirical testing and user feedback, as well as allowing users to benefit from the products / services on offer. In broader terms, there is a need to simulate real-world market scenarios in order to assess the sustainability of the products, define pricing and revise the business model of the service provider prior to actually going in the market.

Each service provider will be offered the opportunity to work with one user (a de facto customer) on a specific use-case – e.g. a specific investment initiative or measure. For at least one of the service providers, this use-case will be in support of: (i) a hazard impact model developed under Sub-Activity 2.1.2.1, or (ii) one of the FbA pilots designed and implemented under Sub-Activity 2.1.2.2. As one of the FbA pilots will also serve as one of the EbA / eco-DRR measures under Sub-Activity 3.2.1.1, it is possible (but not assured or necessary) that one of the service provider use-cases will also be in support of an EbA / eco-DRR measure.

The project will identify potential users, facilitate match-making between the service providers and users, and will cover legitimate costs associated with deploying the climate product / service (e.g. equipment costs, travel costs, etc.) up to a maximum of Euro 15,000 per demonstration initiative: i.e. Euro 15,000 x 3 = Euro 45,000 in total. Costs must be pre-agreed with the ALBAdapt project in advance.

To deploy a working product / service, the service provider must have an MVP. This will be in place by the end of Task 4 (above) and may, potentially, be in place earlier. Thus, the expected timeline is that the empirical demonstration and testing will occur over a period of six months, starting at the end of the six-month climate service provider grant period: i.e. the sequencing will be: training (three months), then mentoring (three months), then grant usage (six months) and then empirical demonstration and testing (six months). If an MVP is available earlier, demonstration and testing can also commence earlier (e.g. in parallel with the grant usage period).

At the end of the demonstration and testing phase, a stakeholder assessment meeting will be held – for the climate service provider and the user at a minimum but also including, where possible / relevant, other interested parties (e.g. central government, local government, civil society, local NGOs, etc.) – to assess the lessons-learned from the phase: e.g. whether the functionality and effectiveness of the product / service met provider and user expectations, problems encountered and potential solutions, real-world costs of applying the product / service and whether these match customer willingness / ability to pay on a commercial basis, other potential use-cases for the product / service, gender dimensions of the product that became apparent during testing or which could be enhanced / addressed in future, etc. To encourage open and frank debate between stakeholders, and to protect commercially sensitive information, the content of these assessment meetings will be treated as confidential. The discussions will be documented by the project but will not be published verbatim externally.

Task 6 – Lessons-learned report

On the basis of the assessment meetings and associated (confidential) reports, a public lessons-learned report will be made available by the project (e.g. on the project website, via the digital community established under Sub-Activity 3.1.1.1, via the AlbaMet NCIS established under Sub-Activity 1.2.1.2, etc.). This will distil the lessons learned – positive and negative – from the three demonstration and testing initiatives in as much detail as possible, subject to commercial and other constraints.

The intention is to provide constructive guidance to entrepreneurs and other ecosystem support organisations (ESOs, notably incubators / accelerators) on the empirical challenges and opportunities associated with rolling out commercial climate services in Albania, as well as to: (i) provide guidance to policy-makers on market barriers and challenges that need to be addressed (including gender-related barriers); (ii) raise awareness among innovation ecosystem actors (particularly regional VC firms and other sources of innovation finance) of the progress being made in the Albanian climate services sector; and (iii) inform the design of the climate financing window under Sub-Activity 3.2.1.2.

Output 3.2: Climate-informed adaptation measures are analysed, developed and ready for implementation

Activity 3.2.1: Facilitating the identification of adaptation measures and their financing

Output 3.2 will enable territorial stakeholders to use climate information and services in order to make climate-informed decisions about the climate-adapted development of the coastal belt. The use of NbS to address hydro-meteorological hazards is well established (Debele et al, 2019), and the government places considerable emphasis on the deployment of EbA / eco-DRR for this purpose. The NAP, for example, observes that “the challenge of climate change needs to be addressed inter alia through integrated and ecosystem-based approaches and instruments” (Republic of Albania, 2021c). The Fourth NC to the UNFCCC includes EbA in a list of six priority adaptation measures, alongside such central pillars as mainstreaming adaptation policy, establishing early warning systems and strengthening disaster risk management (Republic of Albania, 2022a).

Sub-Activity 3.2.1.1: Local Adaptation Action Plans (LAAPs) and associated EbA / eco-DRR demonstration measures

GCF financial instrument utilised: technical assistance grant
Executing Entity: GIZ

Task 1 – Territorial Stakeholder Climate Dialogues (TSCDs)

The National Territorial Planning Agency (NTPA) and municipalities currently engage in Territorial Stakeholder Dialogues (TSDs) to discuss spatial planning matters (Toto and Shutina, 2021). This is an established process that occurs on a regular (annual or near-annual) basis. Climate change, DRR and hazard management are not typically included in TSDs, and certainly not on a systematic basis; nor are external stakeholders (such as NGOs or the private sector) or other government entities (such as MoTE or NCPA) typically invited to participate.

Separately, and unconnected to the TSD process, Local Adaptation Plans (LAPs) are being gradually developed as an important municipal-level component of the NAP – specifically, NAP Priority Action 12, ‘Initiative for Municipal Climate Change Action Plans’. Municipalities are legally obliged to develop and periodically update emergency response plans, some of which incorporate DRR elements, but the LAPs are intended to address more foundational, and often longer-term, climate adaptation needs. One such LAP, which is awaiting formal endorsement, has already been developed by the municipality of Tirana (supported by GIZ) (GIZ and Municipality of Tirana, 2015), and eight more are currently under development with UNDP-implemented GCF readiness support (UNDP, 2019).

Under the leadership of MoTE, a (more inclusive) extension of the TSD process, Territorial Stakeholder Climate Dialogues (TSCDs), will be undertaken in each of the twelve municipalities in the coastal belt – identified by the NAP as a priority region for LAP development. For the first time, the TSD process and

the LAP process will be 'joined up', to the mutual benefit of both, and local adaptation investment needs will be (locally) identified and prioritised.

The TSCDs will build upon the underlying TSD structures, existing LAP development experience and, in addition, the approach applied by the GIZ Open Regional Fund for South-East Europe (ORF-SEE) baseline project (Deutsche Gesellschaft für Internationale Zusammenarbeit), which is conducting a series of local government dialogues across the Balkans, including Albania, to develop municipal-level Sustainable Energy and Climate Action Plans (SECAPs). While the SECAPs themselves are of limited relevance to the ALBAdapt project (as they focus on GHG mitigation measures in the energy and transport sectors), the ORF-SEE project incorporates a best-practice methodology for local stakeholder engagement (Covenant of Mayors for Climate and Energy, 2018) that will be adapted by the ALBAdapt project. This methodology also facilitates harmonisation between neighbouring municipalities' SECAPs to address cross-boundary issues – primarily transport in the case of SECAPs but anticipated to be primarily watershed management in the case of the ALBAdapt project.

Local municipalities already have considerable information and analysis available on a range of themes relevant to climate adaptation, albeit: (i) often not viewed through a climate change lens but, rather, from a sector-specific perspective (e.g. water management, agriculture, tourism, etc.), (ii) often scattered across multiple departments and agencies, and (iii) often lacking external (civil society, academic, private sector, etc.) involvement. The objective of the TSCDs is not to 'reinvent the wheel' or undertake new research. Instead, the objective is to help the municipal government, in conjunction with other local stakeholders, to:

- Develop a holistic understanding of the climate risks in its geographical jurisdiction.
- To make explicit links, often for the first time, between climate change, DRR and hazard management on the one hand and 'non-climate' policy objectives (e.g. social inclusion, gender equality, public amenities, urban planning, education, etc.) on the other.
- Identify adaptation measures to address key risks. Measures will be investment-oriented but may include associated 'soft' activities (e.g. capacity building or behavioural change). Proposed measures may be entirely new but, in many cases, are expected to be based upon pre-existing plans (e.g. drawn from municipal plans, past budget requests, NCPA reports, donor-funded studies, etc.). Adaptation measures can take a variety of forms across a variety of contexts (e.g. hillslopes, river flood plains, coastlines, urban and rural, etc.), but, in alignment with the NAP, particular focus will be applied to EbA / eco-DRR measures.
- Prioritise the identified adaptation measures according to four criteria:
 - Their adaptation impact if implemented: e.g. measured in terms of number of beneficiaries or monetary savings.
 - Their level of urgency: whether the climate threat is imminent or long-term.
 - How 'shovel-ready' they are: e.g. whether they require extensive feasibility analysis, permits to be issued, environmental impact assessments (EIAs) to be conducted, institutional strengthening prior to implementation, etc.
 - Their potential co-benefits: notably, relating to climate mitigation, gender and poverty alleviation.

Given the broad diversity of measures that municipalities will propose and the fact that many measures may have incomplete information (e.g. relating to costs or beneficiaries), such a prioritisation will inevitably be qualitative and approximate in nature. Nonetheless, it will provide a useful, albeit indicative, 'community-led' ranking of local climate investment needs.

The capacity building programme for coastal belt municipalities implemented under Sub-Activity 2.1.1.2 will address capacity gaps that prevent or hinder each municipality from effectively implementing the TSCD process or formulating the subsequent LAAPs (see below) – for example, lack of expertise in the municipality to assess the adaptation impacts or co-benefits of potential investment measures.

The following steps will be undertaken:

- With project support, each of the twelve coastal belt municipalities will establish (temporary) TSCD institutions:
 - A TSCD Working Group: consisting of a TSCD coordinator (drawn from municipality senior management and typically the individual(s) responsible for managing the TSD

- process) and a small group of representatives from relevant municipality departments and agencies.
- A TSCD Advisory Group: consisting of locally-relevant external stakeholders drawn from: central government (MoTE and NCPA), civil society (including, where feasible, women's, youth and ethnic group representatives), academia and the private sector.
 - The project will provide two days of training to the Working Group and Advisory Group members (together, for all twelve municipalities), providing guidance on the TSCD process and objectives (including timeline and milestones), the broader context (NMHS reform, creation of the NFCS, project support to the climate service provider ecosystem, etc.), the assessment of gender and other benefits, and documentation of TSCD findings (including the use of standardised templates, prioritisation criteria, etc.). Communication modalities will also be established so that municipalities with shared climate risks (e.g. a contiguous coastline or a shared river) can, during the TSCD process, communicate bilaterally or multilaterally to share information and formulate shared adaptation measures.
 - The Working Group in each municipality will commence the assessment of available information – existing databases, assessments and reports (including third-party documents: e.g. from donor-funded projects, local NGOs, etc.) and will proceed with analysing and synthesising it. The Advisory Group will be consulted at periodic intervals (expected to be a minimum of once per month and possibly more frequently) to provide guidance on interpreting the information, suggesting additional information sources, etc. The Working Group's findings, relating to both climate risks and to proposed adaptation measures, will be documented using a project-developed template; key information gaps will be noted. The assessment process is expected to take approximately three-four months.
 - In each municipality, a prioritisation workshop, bringing together the TSCD Working Group and Advisory Group members, will be held near the end of the assessment process in order to prioritise the identified adaptation measures using a standardised, project-developed process oriented around the four criteria outlined above (adaptation impact, urgency, 'shovel-readiness', co-benefits). In the case of trans-municipal adaptation measures, the Working Groups / Advisory Groups from the different municipalities can coordinate their prioritisations, but perfect harmonisation is not required or expected: a river embankment construction measure, for example, may be considered a high priority in one municipality but not in an adjoining municipality. Such variations in prioritisations are themselves a useful insight from the TSCD process. The prioritisation process and conclusions will be fully documented.
 - In each municipality, a public consultation event will be held for all interested stakeholders. The purpose of this event, which will be well publicised and attended by high-level local dignitaries, will be to present the Working Group findings, assess their acceptability with the local community and to identify risks, measures or sources of information that may have been overlooked. A 30-day consultation period will follow the consultation event, during which stakeholders can submit additional written feedback. A consultation report, summarising the consultation event and associated feedback, will be produced.
 - As a final step in each municipality, the TSCD Working Group and Advisory Group members will assemble for a follow-up workshop to amend the Working Group's findings in light of the feedback received. Changes will be fully documented.

Task 2 – LAAPs

Based on the outcomes of the TSCD process, the Working Group in each coastal zone municipality will draw up a LAAP. The draft LAAP will be reviewed by the Advisory Group, revised by the Working Group to reflect Advisory Group feedback, and then formally approved and adopted by the municipal government. The LAAP will form an integral component of the municipality's LAP, essentially serving as an itemised investment 'action plan' to materialise identified adaptation priorities. The LAAP will be maintained by each municipality as a 'living document', capable of being updated as circumstances change and new data / information becomes available (e.g. due to improvements in the NMHS, NFCS and MHEWS).

The LAAP will be a focused document that contains the entire set or a selected sub-set (to be decided by each municipality) of the prioritised investment measures identified by the TSCD process. The LAAP will contain at least one EbA / eco-DRR measure or more (Ministry of Environment, 2017). The LAAP is

intended to provide a pipeline of high-value and viable adaptation investments, including EbA / eco-DRR investments, accompanied by as much collated information about them as currently exists. The LAAP will use a standard, project-developed template that enables easy comparison across municipalities, as well as easy identification of strengths, weaknesses, financing needs, data gaps, gender benefits, etc. associated with each investment measure. The LAAP will serve as a tool for the municipality, guiding its own climate investment and planning decisions in line with the LAP, as well as a tool for central government, donors, financiers and others to direct financial or technical support to locally-endorsed adaptation priorities.

LAAPs will also be used as a resource by MoTE when implementing, and periodically updating, the NDC, NAP, NC and BUR; by NCPA when implementing the NDRRS and NDRRAP (2023-2030); and by NTPA for mainstreaming climate adaptation into territorial planning.

Each LAAP will be maintained and occasionally updated by the relevant municipality. A focal point will be appointed by each municipality to coordinate issues arising from the LAAP (e.g. subsequent investment decisions, stakeholder enquiries, etc.). The Working Group and Advisory Group will remain in place while the LAAP is prepared. When the LAAP has been finalised and endorsed, the Working Group and Advisory Group will be dissolved. The intention, by the end of the ALBAdapt project, is to mainstream the LAAP process into the broader TSD and LAP processes, such that climate adaptation discussions are embedded in, and joined up with, broader planning discussions.

The project will also support MoTE to maintain a central online repository of the LAAPs that offers full search functionality: for example, enabling users to search for adaptation measures by sector, approximate budget, level of readiness, gender benefits, etc. This repository will also be accessible via the AlbaMet NCIS (developed under Sub-Activity 1.2.1.2). As and when LAAPs are developed by municipalities outside the coastal belt (and outside of the ALBAdapt project framework), they, too, will be added to the online repository.

Task 3 – EbA / eco-DRR demonstration measures

During project implementation, 5-10 EbA / eco-DRR demonstration measures, covering a range of different types of climate hazard (e.g. flooding, landslides, erosion, etc.) and sourced from a range of coastal zone LAAPs (i.e. from a range of municipalities), will be implemented with project support. Sourcing the measures from LAAPs will ensure that the measures are well researched, have undergone thorough consultations with local stakeholders, and have been explicitly endorsed as adaptation priorities by the municipal authorities.

Selection of the demonstration measures will be made by the Project Management Unit (PMU) and will be endorsed by the Project Steering Committee (PSC) prior to project support commencing. Transparent and objective selection criteria will be developed during project implementation and applied by the PMU. Indicatively, the selection criteria will include:

- The measure must relate to a nature-based or ecosystem service climate adaptation solution.
- The measure must be included as an adaptation measure in a coastal zone LAAP.
- The measure must directly benefit from, or leverage the improvements to, the NMHS, NFCS or MHEWS achieved through Components 1 and 2 of the ALBAdapt project (e.g. in the form of new or improved hydro-met data or services, strengthened institutional capacities, etc.) and must, in turn, be able to inform future development of, or improvements to, the NMHS, NFCS or MHEWS.
- The measure must not raise any E&S 'red flags': that is, negative risks and impacts that would not be manageable during or after implementation and that would be classified as Category B or A risks. Furthermore, the measure must not affect sites that are legally protected for heritage purposes: i.e. sites of cultural, historical or archaeological significance.
- The measure must have a clear lead institution or coordination structure to facilitate implementation with ALBAdapt project support.
- With a high degree of confidence, the measure can be fully implemented within the duration of the ALBAdapt project.

- The measure must have high replication potential: for instance, because the climate hazard is widespread and/or because the measure is intrinsically replicable – e.g. because it is low-cost or simple to apply.
- Complementary finance: the availability of complementary finance to augment the support provided by the project is not a mandatory requirement, as it is not desirable to discriminate against less affluent municipalities or communities. Moreover, a key objective of the demonstration measures is precisely to build up a granular understanding of the operational facets of implementing NbS, including costs and the level of stakeholder engagement and financial support that can be expected, so that this understanding can inform the design and operational modalities of the ADF financing window that will be established under Sub-Activity 3.2.1.2. Nonetheless, the availability of complementary finance will be positively regarded as an indicator of stakeholder commitment as well as a means of achieving greater climate impact than would otherwise be possible.
- Potential of the measure to simultaneously serve as an FbA pilot under Sub-Activity 2.1.2.2. At least one of the selected measures will serve this role.

The ALBAdapt project will provide technical support to each of the demonstration measures. Support will cover a broad range of activities relevant to implementing the adaptation measures, including (for example) preparatory activities (land preparation, training, etc.); procurement of equipment or services; and monitoring support (e.g. sensors, drones, surveys of local inhabitants, etc.). Project support will be implemented by GIZ (as the Executing Entity); no project budget will be transferred to local stakeholders.

Task 4 – Replication approach

Upon completion of each of the EbA / eco-DRR demonstration measures, the PMU and local stakeholders will co-write a replication report. This will include, *inter-alia*, a lessons-learned section and a cost-benefit analysis, and it will be written from the explicit perspective of seeking to facilitate accelerated, problem-free implementation of similar measures elsewhere in Albania: i.e. outlining key enabling conditions for successful implementation (skill-sets, local stakeholder involvement, data-sets, etc.); identifying challenges and pitfalls, as well as proposed solutions; assessing impacts across individuals and groups (e.g. gender, vulnerable groups, etc.); and describing cost items and budget requirements. These reports will be disseminated by MoTE to municipalities and other stakeholders across Albania, including through the AlbaMet NCIS. The reports will also inform the design of the ADF financing window under Sub-Activity 3.2.1.2.

Sub-Activity 3.2.1.2: Establishing a climate financing window for upscaling EbA / eco-DRR

GCF financial instrument utilised: technical assistance grant

Executing Entity: GIZ

While Albania has a robust financial strategy on climate mitigation and adaptation, including financial needs and potential sources of funding identified in the NAP and NDC, climate finance has not hitherto been secured on a large scale or in a structured manner. The NAP observes that “many countries have adopted a process or pathway-oriented approach to climate finance...whereby a country determines, defines and mobilises the financial and other resources necessary for its transition to a low-emission and climate-resilient development path (Republic of Albania, 2021c).

Sub-Activity 3.2.1.2 will support Albania in this regard by designing and establishing an EbA / eco-DRR financing window within ADF. This will allow future financing of the EbA / eco-DRR measures included in the LAAPs developed under Sub-Activity 3.2.1.1, as well as EbA / eco-DRR measures included in additional LAAPs developed outside the ALBAdapt project framework (i.e. in municipalities not in the coastal belt). Stakeholders, notably municipalities, will be able to submit LAAP-related proposals to ADF that focus primarily on EbA and/or eco-DRR measures, including investment and associated enabling conditions (e.g. relevant capacity building, awareness-raising, data monitoring, etc.).

Under Sub-Activity 3.2.1.2, the ALBAdapt project will assist ADF in the design of the financing window and a complementary resource mobilisation strategy. The financing window will be designed and established during ALBAdapt project implementation. However, project funds will not be used to

capitalise the financing window or to finance the EbA / eco-DRR measures supported by the window. Instead, as the window ‘beds down’, future GCF capitalisation of the window might be envisaged. Such support would be channelled through a separate, future project, provisionally referred to as ALBAdapt Phase 2 (If ALBAdapt Phase 2 is developed as a GCF project, it will be subject to the standard project review and GCF Board approval process).

Task 1 – EbA / eco-DRR financing window design and set-up

The establishment of the financing window will commence with: (i) expert analysis of ADF’s current funding scope, organisation, legal mandate, staff capacities and management processes, including comparative analysis with similar institutions in other countries (notably, existing experience in the region); (ii) experiences and lessons-learned from implementation of the EbA / eco-DRR demonstration measures under Sub-Activity 3.2.1.1; and (iii) analysis of options for financial instruments to capitalise and sustain the financing window, including criteria, governance arrangements and integration with public policy priorities. The analysis will address the following considerations:

Financing window-level:

- Clear definition of the purpose and objective of the window.
- The legal framework (if it is not consistent with ADF’s existing financing channels), which may include drafting an agreement on the governance structure and the decision-making process.
- Creation of bodies, notably a governing committee responsible for overseeing the operations of the financing window, including decision-making, resource allocation and financial management.
- Membership of the governing committee, drawing from, for example, ADF senior management, MoTE, NCPA, NTPA, civil society, donors, etc. A gender-oriented stakeholder, such as the Ministry of Health and Social Protection (responsible for the National Strategy for Gender Equality (Ministry of Health and Social Protection, 2021)) or an NGO, will be included on the governing committee.
- Drafting of a funding and resource mobilisation strategy for the window (see also Task 4).
- Design and set-up of monitoring and reporting systems to track the performance of the window.
- Design and establishment of effective communication channels and coordination mechanisms to facilitate collaboration – information sharing, knowledge exchange and learning opportunities – among stakeholders, including formal links with the AlbaMet NCIS.

Financing window – individual measure-level:

- Development of clear criteria for measure selection and implementation.
- Design of a transparent and inclusive process for measure proposal submissions, evaluation and approval.
- Establishment of mechanisms for monitoring and evaluating measure progress, results and impacts.
- Establishment of financial management systems and procedures at measure level, including budgeting processes, financial reporting mechanisms and auditing procedures.

15. In parallel, stakeholder consultations will be conducted to validate the governance arrangements and the defined criteria in order to ensure country acceptance and ownership.

Task 2 – Stakeholder engagement strategy

The ALBAdapt project, in conjunction with ADF, will design and implement a stakeholder engagement strategy to generate interest and to monitor the ongoing needs of eligible users. Workshops will be held with representatives of counties, municipalities and local administrative units, private sector actors, NGOs, donors and other stakeholders to raise awareness, educate them on how to access the financing window and for what purposes (and under what constraints), and to understand what support (capacity building, operational, etc.) they would require to be able to do so. A support programme to address the key needs of eligible users will be designed and implemented.

Task 3 – ADF capacity building

A capacity building programme for ADF staff to administer the window effectively and efficiently will be designed and implemented. This structured programme will cover climate adaptation, EbA / eco-DRR and co-benefits (including gender), as well as training on how to monitor and assess the performance of such measures (to complement traditional financial performance metrics). As part of this capacity building, the project will conduct a comprehensive gender analysis of ADF's organisation, staff capacities, management processes and communications, and will work with ADF to address identified gender-related needs.

Task 4 – Strategic alignment and resource mobilisation strategy

A range of means and tools will be considered to ensure the sustainability of the financing window, starting with: (i) revision of the ADF Strategic Plan to incorporate climate adaptation measures, (ii) alignment of future planned interventions with NDC and NAP priorities, (iii) diversification of the funding base through new financing streams (including integration of adaptation financing needs into the Medium-Term Budget Process, MTBP), and (iv) strategic communication and donor visibility.

8.4 Alignment with WMO and UNDRR best practices

Table 15: WMO Best-Practice Alignment – NMHS

Component	Characteristics of an Effective NMHS (WMO, 2015b)	ALBAdapt Approach
Functionality	Maintain a continuous, reliable and comprehensive historical record of national weather, climate, water and related environmental data	A reference climate for Albania will be constructed using digitised archive data (from 1953 onwards), combined with approximately 20 newly-installed meteorological stations alongside existing stations (to provide the basis for homogenising past, ongoing and future measurements). [Sub-Activities 1.1.1.2, 1.2.1.2].
	Provide relevant advice on weather, climate, water and related environmental issues for decision-making	The quality and spatial coverage of hydro-met observations will be improved; service provision will be improved and diversified, including involvement of the private sector; the AlbaMet NCIS will be established to systematise data and information storage and flows; the NMHS will be accorded a more central role in government decision-making and support. [Sub-Activities 1.1.1.1, 1.2.1.1, 3.1.1.1, 3.1.1.2]
	Develop and distribute weather forecasts	The quality and diversity of forecasts will be enhanced, with greater focus on user needs, use of cutting-edge modelling techniques / technologies (including those provided by regional and international initiatives) and commencing the transition to IbF and FbA. Distribution will be enhanced through formalised institutional arrangements (including data-sharing) and the AlbaMet NCIS platform. [Sub-Activities 1.1.1.1, 1.1.1.3, 1.2.1.1, 1.2.1.2, 2.1.1.1, 2.1.1.2, 2.1.2.1, 2.1.2.2]
	Provide essential data, information and products necessary for designing / planning, developing and managing infrastructure, settlements and essential sectors such as agriculture, water resources, energy and transport for improving the well-being of societies	The mind-set of the reformed NMHS will be more user-centric, with products and services developed with the needs of specific end-users in mind. This will include NCPA, as the key user of hydro-met data for hazard monitoring, modelling and warning purposes, but also specific economic sectors, such as energy, agriculture and tourism, as well as users defined by geography (e.g. municipalities in the coastal belt) and needs (e.g. vulnerable groups). Private sector provision of climate services will promote innovation, experimentation and diversification of user offerings. Data availability and functionality will be enhanced by the AlbaMet NCIS. [Sub-Activities 1.1.1.1, 1.1.1.2, 1.2.1.1, 1.2.1.2, 3.1.1.1, 3.1.1.2]
	Participate in the development, implementation and operation of	Linkages between the NMHS and the MHEWS will be formalised, with clear institutional roles and responsibilities,

	national multi-hazard early warning systems	data-sharing arrangements, ICT inter-operability, etc. [Sub-Activities 1.1.1.1, 2.1.1.1, 2.1.1.2]
Contribution to sustainable development	Efficient provision and application of weather, climate, water and related environmental services to enable societies to manage the associated risks	Enhanced and diversified climate services will be provided by the NMHS and private sector, coupled with enhanced analytical capabilities and warning systems of the MHEWS; project support is fully aligned with the NDC, NAP, NDRRS and other national climate risk management priorities. [Sub-Activities 1.1.1.1, 2.1.1.1, 2.1.1.2]
Contribution to international efforts	Mutual benefits are gained from cooperative use of the pool of knowledge that has been and is still being created by worldwide sharing of the meteorological, hydrological and related information generated by NMHSs	The Law on Weather, Climate and Hydrological Services will stipulate NMHS (and MHEWS) engagement with international treaties and cooperation frameworks, including with WMO (e.g. alignment with WIGOS) and the EMI. [Sub-Activities 1.1.1.1, 2.1.1.1, 2.1.1.2]
Legislative and institutional framework	The Thirteenth World Meteorological Congress reaffirmed the importance of having national legal instruments that define the mission and mandate of NMHSs to ensure clarity in the definition of their responsibilities and recognition of their contribution to society to facilitate allocation of adequate resources	The legislative and institutional underpinnings of the NMHS will be thoroughly reviewed, revised and formalised in, inter alia, the Law on Weather, Climate and Hydrological Services; revisions to the Law on Climate Change and the Law on Civil Protection (as required); and institutional SOPs. [Sub-Activities 1.1.1.1, 2.1.1.1]
Governance	The organisational structure of NMHSs, aimed at facilitating efficient provision of services to their countries, vary considerably from country to country. With the increasingly broad challenges facing countries and the international community, NMHSs may need to adopt flexible organisational models and management strategies that allow for strengthened interactions with relevant national agencies, as well as international and regional institutions	The deficiencies in the current NMHS model (limited capacity, unclear roles and responsibilities, lack of user-centric focus, limited coordination with other agencies, etc.) will be systematically addressed. Private sector involvement in climate service provision will be supported. Collaboration, coordination and data-sharing will be facilitated by the AlbaMet NCIS. [Sub-Activities 1.1.1.1, 1.2.1.1, 1.2.1.2, 2.1.1.1, 3.1.1.1, 3.1.1.2]
Exploiting technological advances	New and developing technologies and techniques, such as internet delivery of data and products and networking, cloud computing and AI, offer NMHSs the opportunity to expand the availability and use of their products and services	The quality and spatial coverage of hydro-met observations will be improved using new and upgraded observation stations. NMHS data collection, modelling and analysis will be improved through support to, inter alia, the MCH-DMS, forecasting capabilities and the NCIS (which will potentially reside 'in the cloud' on the EWC platform), accompanied by relevant capacity building assistance. [Sub-Activities 1.1.1.2, 1.1.1.3, 1.2.1.1, 1.2.1.2]
Education and training	Priority needs to be given to enhancing skills – of NMHS personnel and of end-users – through education and training to improve the provision, delivery and application of services by NMHSs	Structured capacity building will be provided to the reformed NMHS, to relevant government agencies (e.g. NCPA, NTPA, AMBU, etc.), to municipalities, to the private sector, to vulnerable groups and end-users (e.g. economic sectors, local communities, etc.). Co-development of university / vocational college curricula will help to support workforce sustainability. [Sub-Activities 1.1.1.1, 1.1.1.2, 1.2.1.1, 1.2.1.2, 2.1.1.2, 2.1.2.1, 3.1.1.1]

Table 16: WMO Best-Practice Alignment – NFCS

Component	Characteristics of an Effective NFCS (WMO, 2018c)	ALBAdapt Approach
Functionality	There are five overarching goals of an NFCS: (i) Reducing the vulnerability of society to climate-related hazards through better provision of climate information and services; (ii) advancing key development goals through better provision of climate information and services; (iii) mainstreaming the use of climate information and services in decision-making; (iv) strengthening the engagement of providers and users of climate services; (v) maximising the utility of existing climate service infrastructure	The Albanian NFCS will address all five goals. NFCS development will be fully inclusive and will draw on desk research, international experience and extensive interviews with key (current and potential future) producers and users of hydro-met data and information. [Sub-Activities 1.2.1.1, 1.2.1.2]
	The principal functions of an NFCS are to serve as: (i) a platform for institutional coordination, collaboration and co-production; (ii) a legal framework for collaboration; (iii) a bridge between user needs and available climate services; (iv) a vehicle for scientific coordination; (v) an operational bridge between the NMHS and other relevant national institutions; (vi) a functional chain for linking climate knowledge with action on the ground; (vii) an opportunity for enhancing the contribution of climate science to the development of national policies	The Albanian NFCS will address all seven functions. The NCIS will be compartmentalised (with different user access rights) to facilitate appropriate usage. Components will include, inter alia, an outward-facing NMHS website for the general public, AlbaMet Alert (MHEWS-oriented, administered by NCPA) and an academic research and teaching section for universities and vocational colleges. [Sub-Activities 1.2.1.1, 1.2.1.2]
	The key functional components of an NFCS are: (i) a UIP; (ii) a climate services information system; (iii) observations and monitoring; (iv) research, modelling and prediction; (v) capacity development	The project will support all four functional components: creation of an NCIS and a UIP, NFCS-specific capacity building, an enhanced hydro-met observational network, and strengthened modelling and forecasting capabilities. [Sub-Activities 1.1.1.1, 1.1.1.2, 1.2.1.1, 1.2.1.2, 2.1.1.2]
	The process of developing user-tailored climate services will typically involve the translation of temporal and spatial information about the climate into decision-support tools to suit the needs of specific sector applications, with the means of carrying out the translation underpinned by applied climate research	The Albanian NFCS will support the development of user-tailored climate services through the provision of structured, interrogable, regularly-updated, quality-assured data-sets (many available to users free of charge), building on the project's broader support to a reformed NMHS, a fit-for-purpose MHEWS (including software-based decision support) and private sector involvement in climate service development and provision. [Sub-Activities 1.1.1.1, 1.1.1.2, 1.2.1.1, 1.2.1.2, 2.1.1.2, 2.1.2.1, 3.1.1.1]
Co-production of climate services with users	A core precept is co-production of climate services with users. Co-production is intended to transform climate data into information and then into client-tailored climate services, including relevant forecast-based advisory services and decision-making tools that the client can make use of. This necessitates a process of partnership-building, iterative dialogue and feedback among providers and users of climate services	The mind-set of the reformed NMHS will be more user-centric, with products and services developed with the needs of specific end-users in mind. This will include NCPA, as the key user of hydro-met data for hazard monitoring, modelling and warning purposes, but also specific economic sectors, such as energy, agriculture and tourism, as well as users defined by geography (e.g. municipalities in the coastal belt) and needs (e.g. vulnerable groups). Private sector provision of climate services will promote innovation, experimentation and diversification of user offerings. Data availability and functionality will be

		enhanced by the AlbaMet NCIS. [Sub-Activities 1.1.1.1, 1.1.1.2, 1.2.1.1, 1.2.1.2, 3.1.1.1, 3.1.1.2]
	The effective delivery of user-tailored climate services can only be realised through strong partnerships among NMHSs and user groups, including sectoral experts, government agencies, private sector and academia	The project will support Albanian NMHS collaboration and coordination with other NMHSs in the region (notably through the EUMETNET infrastructure), as well as international initiatives and platforms (such as ECMWF). The design process for the NFCS will be fully inclusive: it will involve the public and private sectors (including institutions representing start-ups and MSMEs) and civil society, and will encompass sectors including agriculture, water management, energy, academic research, healthcare, municipal services, disaster response and the coastal belt. NGOs active in climate change adaptation and disaster response, gender-focused NGOs and NGOs serving vulnerable groups will be involved. [Sub-Activities 1.1.1.1, 1.2.1.1, 1.2.1.2, 2.1.1.1, 2.1.1.2]
Contribution to international efforts	Effective collaboration with global, regional and national stakeholders is supported and promoted by the NFCS	The technical report commissioned by the project to explore NFCS design and governance options will explicitly include consideration of international experiences with NFCS establishment and operationalisation. The project will facilitate exchanges with NFCS personnel from other countries in the region who can provide insights on the strengths and weaknesses of their own NFCS structures. The NFCS will benefit from the enhanced NMHS and MHEWS international collaboration supported by the project – and the NCIS may itself be hosted on the EWC platform. [Sub-Activities 1.1.1.1, 1.2.1.1, 1.2.1.2, 2.1.1.1, 2.1.1.2]
Development process	NMHSs should take stock of national institutions providing climate-related information and major ongoing climate-related programmes and activities in the country. They should also use the list of stakeholders established through the baseline assessment to convene a national stakeholder consultation workshop, and lead a consultation process to establish an NFCS	Detailed stock-takes of the hydro-met institutional architecture in Albania have been undertaken during ALBAdapt project preparation (building on previous studies undertaken by ZAMG, etc.). Further analysis will be undertaken during reform of the NMHS and the MHEWS. The NFCS will build on the reformed and rejuvenated institutional architecture put in place with project support. The design process for the NFCS will be fully inclusive, involving the public and private sectors, civil society, academia and NGOs [Sub-Activities 1.1.1.1, 1.2.1.1, 1.2.1.2, 2.1.1.1, 2.1.1.2]
	A national strategic plan and action plan should be developed (and subsequently endorsed) that captures consensus among key national stakeholders on the needed steps and actions to improve climate service use at the national scale and how to realise such improvements	A broad-based NFCS stakeholder dialogue process involving government entities, private sector representatives, sectoral representatives, NGOs, academic institutions and start-up accelerators will result in an NFCS design and governance structure that commands widespread support. These recommendations will be discussed with line ministries and PMO and will then be officially endorsed by the government. [Sub-Activity 1.2.1.1]
Governance	An NFCS generally has a formal underpinning in the form of a decree or similar legal instrument	The NFCS will be explicitly referenced in the Law on Weather, Climate and Hydrological Services; decrees or other statutory instruments will be issued as needed. [Sub-Activities 1.1.1.1, 1.2.1.1]
	The NFCS should be initiated and led by the country's NMHS. All relevant national stakeholders from the five GFCS component pillars should be engaged by	Subject to stakeholder discussions and agreement during project implementation, the NFCS is expected to be governed by an Executive Committee, consisting of one representative per

	the NMHS, to enable improvements and sustainable delivery of climate services. An NFCS generally has a steering committee at the inter-ministerial level. Countries are encouraged to develop governance structures most suitable to their national circumstances and requirements	member institution. Member institutions will be nominated by national stakeholders during project implementation: they are expected to include public sector, private sector and civil society institutions, including the NMHS. The NMHS will, it is expected, also operate a small secretariat to support the Executive Committee and will be responsible for day-to-day NFCS operations. [Sub-Activity 1.2.1.1]
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Table 17: WMO / UNDRR Best-Practice Alignment – MHEWS

Component	Characteristics of an Effective MHEWS (WMO and UNDRR, 2023)	ALBAadapt Approach
Effectiveness	An EWS should include the following four key and interrelated components: (i) disaster risk knowledge based on systematic collection of data and disaster risk assessments; (ii) detection, monitoring, analysis and forecasting of hazards and possible consequences; (iii) dissemination and communication, by an official source, of authoritative, timely, accurate and actionable warnings, and associated information on likelihood and impact; and (iv) preparedness at all levels to respond to the warnings received	The project addresses all four components. Restructuring and strengthening of the NMHS (including establishment of the AlbaMet NCIS) will serve to improve the flow and quality of hydro-met data that underlies hazard assessments, risk maps, etc. Hazard forecasting (and flood nowcasting) capabilities will be strengthened, including IbF and FbA. The warning system will be streamlined, formalised and extended to include mobile phone warnings. Preparedness of central government, local government, ARC and local communities will be strengthened to improve both pre-hazard anticipatory response and post-hazard reactive response. [Sub-Activities 1.1.1.1, 1.1.1.2, 1.1.1.3, 1.2.1.2, 2.1.1.1, 2.1.1.2, 2.1.2.1, 2.1.2.2]
	An effective MHEWS identifies the most hazardous events and related risks in an interconnected risk scenario. It should have legitimate and agreed inter-institutional plans, SOPs and financing mechanisms for triggering preventive actions to protect lives and assets	The project will support NCPA and other national stakeholders to transform the current system (decentralised and uncoordinated efforts focused on various aspects of hazards, hazard mapping, hazard warnings, etc.) into a systematised, 'joined up' multi-hazard system. New SOPs and QMSs will be developed, endorsed and implemented to govern institutional roles and responsibilities in the framework of the MHEWS, with amendments to existing laws (notably, the Law on Civil Protection) and elements in new laws (the Law on Weather, Climate and Hydrological Services) introduced as required. A five-year MHEWS resources plan will be developed and endorsed by the government. Institutional capabilities to receive, process, interpret and model hazard data, to act on that data and to issue warnings in appropriate time-frames to appropriate user-groups (e.g. spatially-, sectorally- or functionally-defined) will be strengthened. [Sub-Activities 2.1.1.1, 2.1.1.2]
People-Centred	A people-centred MHEWS must be designed and implemented considering the knowledge, capacities and needs of communities at risk. Such communities should become an integral element of the MHEWS, thus enhancing their capacities to act upon warnings	To ensure the MHEWS is people-centred, the design process will incorporate: engagement with a broad range of stakeholders (public sector, municipalities, private sector, ARC, civil society, academia, NGOs, etc.); integration of vulnerable groups' views (including an understanding of each group's distinctive needs with respect to hazards and their hazard responses); surveys, consultations and workshops to assess the best communication channels to reach communities and vulnerable groups; and a public awareness campaign. [Sub-Activities 2.1.1.1, 2.1.1.2]

	Early warnings must be disseminated through reliable and trusted channels and shared in accessible formats. For warnings to result in consistent and effective actions, they must be inclusive, understandable, interpretable and actionable by non-technical people	The project will work with national stakeholders to: rationalise the (currently fragmented) warning system to improve data consistency and quality, avoid unnecessary duplication of efforts (with a central role for the AlbaMet Alert platform, as well as formalisation of NEBS) and disseminate warnings through mobile devices; introduce objectivity and consistency to warning issuance decisions through the use of a centralised decision support tool; define thresholds for different hazard-types and identify data gaps for further threshold development; develop warning performance benchmarks (notably, relating to timeliness, geographical relevance and the rate of false positives); and develop a MeteoAlarm integration roadmap. [Sub-Activities 2.1.1.1, 2.1.1.2]
Operation-alisation	CAP is the international standard format for emergency alerting and public warning, designed for all hazards	All warnings issued through AlbaMet Alert will eventually use CAP, meaning that NCPA can activate multiple warning communication channels with a single input, thereby considerably reducing the cost and complexity of managing a multi-media warning system. [Sub-Activities 2.1.1.1, 2.1.1.2]
Governance	MHEWS governance frameworks should specify the roles and responsibilities of the different actors, their relationships and coordination mechanisms, decision-making chains, SOPs and communication flows	Subject to stakeholder discussions and agreement during project implementation, it is expected that the MHEWS will be organised in the form of a virtual centre that brings together core relevant institutions, is overseen by an Executive Committee and is served by a small secretariat (1-2 full-time-equivalent staff) hosted by NCPA. Once the MHEWS is operational, additional institutions will be able join on an ongoing basis as, for example, the MHEWS expands the sectoral or functional scope of its operations. Institutional roles in the MHEWS will be formalised through SOPs. [Sub-Activities 2.1.1.1, 2.1.1.2]
	Accountability mechanisms, implementing periodic assessments and inspections, ensure fulfilment of the objectives and effectiveness of a MHEWS	A set of agreed performance indicators and targets for each MHEWS institution, accompanied by agreed institutional mechanisms – staffing, internal processes, reporting, etc. – to monitor institutional compliance with MHEWS requirements will be drafted. They will be administered by the MHEWS secretariat and will be reported to the Executive Committee on an annual basis. [Sub-Activities 2.1.1.1, 2.1.1.2]
Financing	As MHEWS are perceived as a public good, the related costs are, in most cases, covered by national and local public service institutions. Responsibilities for establishing, operating and financing MHEWS rest with national and local authorities. Some countries rely on the private sector to maximise benefits	The project will analyse the potential for institutionalising long-term funding mechanisms for the MHEWS from NCPA's parent ministry (the Ministry of Defence), from NCPA itself, from other line ministries and institutions with MHEWS roles, and for including MHEWS funding within the 4% DRR budgets that municipalities are legally required to maintain. Discussions with relevant stakeholders will be held in conjunction with PMO and MoFE to ensure high-level policy alignment and prioritisation. The project will also analyse the potential for mobilising non-government sources of finance, such as from international donors and development partners, IFRC, etc. On the basis of stakeholder discussions and analysis, the project will develop a five-year MHEWS resources plan that is endorsed by the government and accompanied by a formal replenishment process. The project's support to the private sector climate services ecosystem may also directly benefit the MHEWS if the developed services or products are related to, or support, early warnings or hazard preparedness. [Sub-Activities 2.1.1.1, 2.1.1.2, 3.1.1.1, 3.1.1.2]
	Recognised principles to drive effective and innovative financing of MHEWS include:	The project acknowledges and adopts these principles: the entire value chain will be addressed in an inclusive, multi-hazard manner; forecast-based action will be supported;

	improving the whole value chain in an inclusive manner; financing early action through people-centred, risk-informed approaches; adopting multi-hazard programmes; and promoting the private sector and the academic community to play roles	and the private sector and the academic community will be fully consulted and engaged. [Sub-Activities 2.1.1.1, 2.1.1.2, 2.1.2.1, 2.1.2.2]
Early action	Components of the early warning-early action chain should be embedded into regional, national and local DRM systems, plans and regulations, to strengthen impact and sustainability	The MHEWS will be established in close collaboration with the government and will be fully aligned with NCPA's mandate (as described in the Law on Civil Protection) and with municipalities' DRR / emergency response duties in order to address priorities identified in the NDC, NAP and the NDRRS. The architecture and functioning of the MHEWS will be formalised in an official MHEWS Policy. The project-supported TSCDs will be mainstreamed into the well-established TSD process, and the resulting LAAPs will be explicitly linked to municipalities' LAPs and DRR / emergency response plans. [Sub-Activities 2.1.1.1, 2.1.1.2, 3.2.1.1]
	In recent years, MHEWS have started incorporating the notion of IbF, aiming to enhance the benefits of early warning efforts, and linking them with anticipatory actions	The project will support the MHEWS to begin the process of moving towards IbF, in part as an enabling condition for FbA. [Sub-Activities 2.1.1.1, 2.1.1.2, 2.1.2.1, 2.1.2.2]

9. Project governance and implementation arrangements

9.1 Accredited Entity

In its capacity as AE, GIZ will assume oversight responsibility of the project, as defined in the Accreditation Master Agreement (AMA) between GCF and GIZ (AE). As AE, GIZ will administer project proceeds on behalf of the GCF and will provide oversight, guidance, and quality assurance of NCPA as EE through its relevant head office units.

In order to implement the project, GIZ AE will enter into the following legal arrangements:

- The commission by the German Federal Ministry for Economic Cooperation and Development (BMZ) for the implementation of the GCF project.
- The GCF will transfer proceeds based on the Funded Activity Agreement (FAA) to GIZ.
- Co-financing agreements with SDC and SECO.
- A grant agreement (i.e. subsidiary agreement) with NCPA (as Executing Entity) based on GIZ's standard operating procedures for grant agreements. This grant agreement will also secure the co-financing of the Government of the Republic of Albania channeled through NCPA.
- An internal task assignment from GIZ (AE) to GIZ (EE) for the implementation of the project.

9.2 Governance and Management

As visualised in *Figure 39*, project steering and management will be ensured by a Project Steering Committee (PSC) and a Project Management Committee (PMC), both assuming complementary roles. Responsible mainly for political orientation and oversight, members of the **Project Steering Committee** will include relevant government institutions and key project partners, along with representatives of the key project financiers – BMZ, JICA and SDC / SECO – as well as GIZ in its role as AE. To ensure transparency and balanced participation of different stakeholders, the PSC will also be attended by invited non-voting members, including:

- i. JICA;
- ii. donors and projects active in the hydro-met and civil protection sectors, to facilitate information-sharing and coordination;
- iii. local government (counties and municipalities);
- iv. private sector representatives, including trade / sectoral associations; and
- v. NGOs and CSOs, including at least one that offers a gender-based perspective and at least one that represents vulnerable groups.

The PSC will have at least one planned meeting per year in addition to ad hoc meetings that can be held as necessary. Decisions of the PSC will be taken by consensus.

Based on the guidance and decisions of the PSC, the **Project Management Committee** will serve as the main body for management and implementation of the project. The PMC will serve as a bridge between the political orientation of the project provided by the PSC and the day-to-day management of the project provided by the Project Management Unit (PMU). The PMC will hold documented quarterly meetings where project progress and emerging issues will be discussed and addressed. If needed, thematic working groups may be established to facilitate in-depth coordination of cross-cutting activities, such as those related to safeguards, gender or interventions at municipality level.

Additionally, the PMC will have the following responsibilities:

- Implementing the decisions and recommendations of the PSC.
- Providing oversight of the PMU.
- Coordinating and ensuring timely execution of activities by each Executing Entity as outlined in the Annual Operating Plan, regularly updating the PSC and fostering a common understanding between the two Executing Entities regarding the theory of change and its integration across all project activities.

- Supervising technical and budgetary project progress, and aligning with approved plans, budgets and indicators.
- Promptly mobilising technical expertise from Executing Entities and other stakeholders upon identification of project implementation issues.
- Facilitating harmonious collaboration with stakeholders for each of the project components and identifying the tasks and additional requirements that must be addressed in relation to the project.
- Facilitating information flow from the project beneficiaries to the PSC.
- Monitoring the implementation and adherence to Social and Environmental Safeguards and gender policies, notably the Environmental and Social Action Plan, the Gender Action Plan and the Stakeholder Engagement Plan.
- Promoting inter-institutional and inter-sectoral coordination and collaborating with civil society.
- Overseeing the progress of indicators managed by each Executing Entity in the monitoring system .
- Assessing and consolidating insights and experiences from the project.

Member institutions of the PMC will include:

- NCPA and GIZ: Executing Entities.
- MoTE: a key national project partner, both as the ministry responsible for climate change and in its role as NDA.
- The institution serving as the NMHS: currently, this is IGEO.

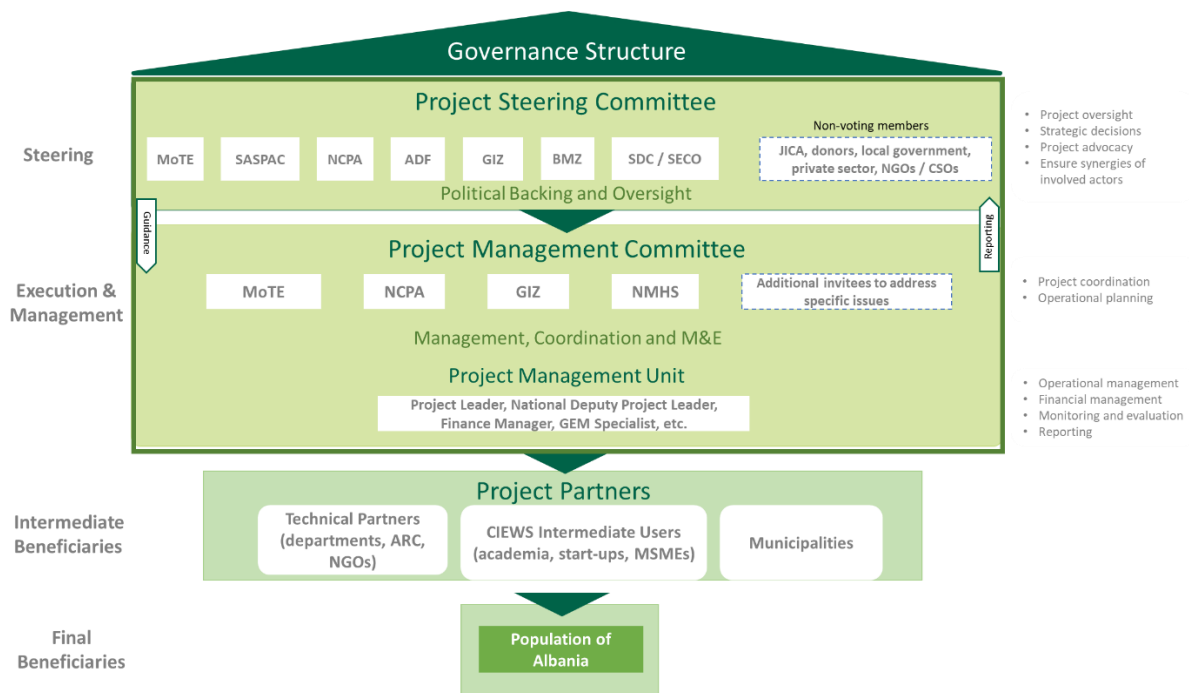
As and when necessary or desirable, extended PMC meetings can also be organised, involving PMC members and additional invitees – from the public and private sectors and from civil society – to address specific technical, geographical or sectoral issues.

Responsible mainly for political orientation and oversight, members of the **Project Steering Committee** will include relevant government institutions and key project partners (MoTE, SASPAC, NCPA and ADF) along with representatives of the key project financiers – BMZ and SDC / SECO – as well as GIZ in its role as AE. To ensure transparency and balanced participation of different stakeholders, the PSC will also be attended by invited non-voting members, including: (i) JICA, (ii) other donors and projects active in the hydro-met and civil protection sectors, to facilitate information-sharing and coordination; (iii) local government (counties and municipalities); (iv) private sector representatives, including trade / sectoral associations; and (v) NGOs and CSOs, including at least one that offers a gender-based perspective and at least one that represents vulnerable groups. The PSC will have at least one planned meeting per year in addition to ad hoc meetings that can be held as necessary. Key responsibilities of the PSC will be to:

- Provide overall guidance for project implementation.
- Provide feedback and validation of annual work plans, annual reports and project evaluations.
- Ensure project progress and coherence with the (evolving) international and national policy context.
- Stay informed of project adherence with the Environmental and Social Action Plan (ESAP), the Gender Action Plan (GAP) and the Stakeholder Engagement Plan (SEP).
- Support the coordination of project activities across different line ministries and between the private and public sectors and civil society.

The **Project Management Unit** (PMU) will consist of a dedicated team of professionals led by a Project Leader and including (inter alia) a National Deputy Project Leader, a Finance Manager, a Gender, ESS and M&E (GEM) Specialist, a Communications Specialist and technical advisors.

Figure 39: Governance structure



Source: Own elaboration

9.3 National Designated Authority

The Ministry of Environment and Tourism will be the political partner of the project, since it has the mandate to promote climate change mitigation and adaptation policy and measures and coordinates the integration of environmental and climate change issues into different sectors.

9.4 Implementation Arrangements

The project will be implemented in line with the Implementation Agreement agreed between the GoA and GIZ and coordinated with the Country Portfolio approved by the BMZ, the GoA and the GIZ. The project is in line with the GIZ entity work programme and the Albania country work programme both agreed with the GCF. The project will be implemented through different entities at national level (such as IGEO; NCPA, AKPT AMBU, including some of the Albanian universities, mentioned before), including the local governments in selected municipalities of the lowland coastal belt. The project will work also with consultants/ SMES/MSMES and NGOs (intermediaries) for the development of CIS. For a detailed understanding of the engagement with stakeholders and political partners, please see Annex 2e for the Stakeholder Engagement Plan (Table 18).

Table 18: Management and implementing partners

Category	Partner	Project Role
Political partners	Prime Minister's Office (PMO)	PMO exercises executive power and chairs meetings of the Council of Ministers. PMO will serve as a member of the Project Steering Committee to advise and direct the ALBAdapt project and to ensure coordinated government support. A range of PMO roles and responsibilities intersect with specific elements of the ALBAdapt project, including PMO's responsibility for the Smart Specialisation Roadmap, its 'parent institution' role vis-à-vis ASIG and its involvement in NEBS. In conjunction with MoFE, PMO will support the project to facilitate inter-ministerial discussions.
	Ministry of Tourism and the Environment (MoTE)	MoTE is responsible for matters relating to the environment, climate change and the sustainable management of natural resources. MoTE is the lead institution for the National Climate Change Strategy and serves as the GCF NDA. MoTE will serve as a member of the Project Steering

Category	Partner	Project Role
Key national stakeholders		Committee and the Project Management Committee to ensure smooth project implementation and alignment with the GCF Country Programme. MoTE will also co-lead (with NTPA) the Territorial Stakeholder Climate Dialogues under Sub-Activity 3.2.1.1.
	State Agency for Strategic Programming and Aid Coordination (SASPAC)	SASPAC is responsible for the coordination of development programmes and projects, and monitors implementation of the National Strategy for Development and Integration (NSDI). SASPAC will serve as a member of the Project Steering Committee to ensure the ALBAdapt project's alignment with government priorities and with baseline projects.
	Ministry of Finance and Economy (MoFE)	MoFE, in conjunction with PMO, will support the project to facilitate inter-ministerial discussions, notably in the context of funding for the NMHS (Sub-Activity 1.1.1.1) and the MHEWS (Sub-Activity 2.1.1.1).
	Institute of Geosciences (IGEO)	IGEO, a unit of the Polytechnic University of Tirana (UPT), serves as Albania's NMHS. A central focus of the ALBAdapt project is to reform and strengthen the NMHS to improve data collection, processing and quality, to enhance collaboration and data-sharing with other institutions (domestically and internationally), to expand the provision of services to stakeholders, and to ensure alignment with international standards.
	Military Meteorological Service (MMS)	MMS provides weather forecasts to military and civilian users. MMS will contribute to the ALBAdapt project (primarily in Activity 1.1.1), through formalisation and deepening of cooperation and collaboration with the NMHS and Albcontrol.
	Albcontrol (formerly the National Air Traffic Agency)	Albcontrol manages and controls the airspace of Albania. It operates automated weather observing systems at Tirana and Kukës airports, and produces daily and weekly weather forecasts. Albcontrol will contribute to Activity 1.1.1 through formalisation and deepening of cooperation and collaboration with the NMHS and MMS.
	Water Resources Management Agency (AMBU)	AMBU is responsible for the good governance of water resources and the sustainability of relevant ecosystems. Restructuring and strengthening of the NMHS, establishment of the NFCS and enhancement of the MHEWS (including formalisation of AMBU's role vis-à-vis each of these structures) will assist AMBU to take early and timely decisions to optimise water resources and to ensure they are more resilient to climate change impacts, particularly water-related hazards in coastal areas; it will also ensure AMBU's hydrological monitoring and flood risk mapping activities are brought within the joined-up framework of the NMHS and MHEWS.
	National Territorial Planning Agency (NTPA)	NTPA is the principal institution responsible for territorial planning and development. It coordinates planning at local and central levels to ensure alignment. It is also responsible for the Integrated Cross-Sectoral Plan for the Coastal Belt. NTPA's roles and responsibilities in the framework of the MHEWS will be delineated and formalised with support from the project. NTPA will benefit from project-supported hazard impact modelling and FbA capacity building. NTPA will also coordinate, in conjunction with MoTE, the Territorial Stakeholder Climate Dialogue (TSCD) process leading to Local Adaptation Action Plan (LAAP) development in coastal belt municipalities (Sub-Activity 3.2.1.1).
	Albanian Authority for Geographical Information (ASIG)	ASIG is responsible for surveying, mapping and land-use registration. It maintains a sophisticated public digital map of Albania that incorporates many 'layers' (topography, geology, land-use, etc.) – but not, currently, natural hazards. The ALBAdapt project will, under Sub-Activity 1.2.1.2, work with ASIG to design the AlbaMet NCIS and facilitate two-way data exchange with the MHEWS to incorporate hazard information into ASIG products and to enrich MHEWS hazard assessment activities.
	National Agency for Information Society (AKSHI)	AKSHI is the government institution responsible for digital data and content relating to government duties. AKSHI will support the policy and legal aspects of the NMHS, NFCS (particularly the AlbaMet NCIS) and the MHEWS from the perspective of data generation, storage, sharing and usage rights.
	Audio-visual Media Authority (AMA)	AMA is the supervisory and regulatory authority for broadcasting (TV and radio). AMA will work closely with the project to formalise the functioning

Category	Partner	Project Role
		of the National Emergency Broadcast System (NEBS) (Sub-Activity 2.1.1.1).
	Electronic and Postal Communications Authority (AKEP)	AKEP is the telecommunications regulator. AKEP will work closely with the project and with the two Albanian mobile network operators – Vodafone and One Albania – to design and implement a mobile phone alerts system within the framework of AlbaMet Alert (Sub-Activities 2.1.1.1, 2.1.1.2).
	Albanian Development Fund (ADF)	ADF provides financial assistance to municipalities and counties in the form of (inter alia) grants, loans and guarantees to improve local infrastructure, public services and institutional capacities. ADF will assist in the design and establishment of a financing window – housed in ADF – to support EbA / eco-DRR measures included in municipal LAAPs (Sub-Activity 3.2.1.2). ADF will also assist the project to develop a resource mobilisation strategy for the financing window. Window capitalisation and operationalisation will commence in ALBAdapt Phase 2.
	Albanian Red Cross (ARC)	ARC, an independent volunteer organisation and a member of the International Red Cross and Red Crescent Movement, provides humanitarian assistance across Albania. It plays a key role in Albania's civil protection system and works closely with the government. Based on its experience and expertise, ARC will support the ALBAdapt project in a number of areas: advising on the structure, governance and operational modalities of the MHEWS, including inclusivity aspects (Sub-Activity 2.1.1.1); advising on the design and operations of the AlbaMet Alert platform, including two-way communication elements (Sub-Activity 2.1.1.1); supporting the early warning awareness and capacities of local communities in the coastal belt (Sub-Activities 2.1.1.2, 2.1.2.2); assisting with a technical study on linking early warnings with Red Cross FbA / FbF requirements (Sub-Activity 2.1.1.2); and receiving FbA capacity building support (Sub-Activity 2.1.2.1).
	Local government units (LGUs)	Municipalities and counties will be consulted closely regarding the designs and functioning of the NMHS, NFCS and MHEWS, for which they are considered key end-users (Sub-Activities 1.1.1.1, 1.1.1.2, 1.2.1.1, 1.2.1.2). Municipalities and counties will be integral stakeholders in the functioning of the UIP (e.g. in the form of an annual climate forum) (Sub-Activity 1.2.1.2). Two-way communication with the AlbaMet Alert platform will be enabled for municipalities and counties (Sub-Activity 2.1.1.1). Coastal belt municipalities will benefit from capacity building support related to the MHEWS and the AlbaMet Alert platform and will assist with awareness-raising campaigns for coastal belt communities (Sub-Activity 2.1.1.2). Coastal belt municipalities will benefit from FbA capacity building and will participate in the FbA Community of Practice (Sub-Activity 2.1.2.1); 3 coastal belt municipalities will host FbA pilot projects. Emergency management plans will be developed for flood-risk schools in the coastal municipalities (Sub-Activity 2.1.1.2). As potential users of commercial climate services, municipalities will be involved in business ideation (Sub-Activity 3.1.1.1). LAAPs will be co-developed for all coastal belt municipalities (Sub-Activity 3.2.1.1); 5-10 EbA / eco-DRR measures will be implemented in coastal belt municipalities (Sub-Activity 3.2.1.1).
	Albanian Investment Development Agency (AIDA)	AIDA, under the Ministry of Finance and Economy, focuses on enhancing the competitiveness of the private sector, strengthening Albania's export potential, and promoting foreign direct investment in Albania. AIDA has identified MSMEs as a strategic priority and is expanding its support accordingly. AIDA will work with the ALBAdapt project under Sub-Activity 3.1.1.2 to develop scoring criteria for climate service business ideas to ensure alignment with government innovation priorities.
	Urban Research Institute (URI)	URI is a national CSO that conducts research, develops analysis and proposes solutions to social and economic issues, with a special focus on climate change. URI will provide technical assistance relating to EbA / eco-DRR, notably in the context of the demonstration measure replication reports (Sub-Activity 3.2.1.1).
	Polis University	Polis University, in cooperation with other universities, will co-develop elective taught modules on meteorology, hydrology and climatology as

Category	Partner	Project Role
		part of existing degree programmes (Sub-Activity 1.1.1.1) and will be consulted on academic needs with regard to the NFCS and the AlbaMet NCIS platform (Sub-Activity 1.1.1.2).
	Incubators / accelerators	University-based incubators (e.g. Metropolitan University, Marin Barleti University, Epoka University, Polis University), universities located in the coastal belt with planned / nascent incubators (e.g. Shkoder, Elbasan) and non-university incubators (e.g. Oficina, Yunus Social Business, TechSpace) will benefit from enhanced awareness and understanding of climate services as a potential business opportunity and will be invited to join an innovation community for advancing climate entrepreneurship in Albania (Sub-Activity 3.1.1.1). Under Sub-Activity 3.1.1.2, 3 Albanian incubators will be selected on the basis of transparent criteria (to be developed during project implementation) to participate in targeted incubation support – in effect, an ‘incubation of incubators’ approach. Where feasible, the incubator selection criteria will place weight on geographical diversity (favouring incubators outside Tirana) and gender opportunities (incubators with proven gender strengths and track-records).
	Women Founders Network Albania (NFWA)	NFWA is a CSO that brings together advanced women entrepreneurs and aspiring founders in Albania to network and benefit from training. WFNA offers mentoring programmes and is developing an incubator / accelerator-based support model. WFNA will benefit from enhanced awareness and understanding of climate services as a potential business opportunity and will be invited to join an innovation community for advancing climate entrepreneurship in Albania (Sub-Activity 3.1.1.1). WFNA will provide the ALBAdapt project with an extensive pre-existing network of women entrepreneurs who can be reached and informed of project support.
Key international stakeholders	World Meteorological Organisation (WMO)	WMO will contribute to and facilitate the restructuring of hydro-met and early warning services: (i) indirectly, by providing technical standards and best-practices relating to, inter alia, observation networks, NMHS design, NFCS design and MHEWS design; and (ii) directly, by supporting NMHS capacity building and engagement with international initiatives (Sub-Activities 1.1.1.1, 1.1.1.2), climate time-series homogenisation (Sub-Activity 1.2.1.1) and MHEWS engagement with international initiatives (Sub-Activity 2.1.1.1).
	Japan International Cooperation Agency (JICA)	The ALBAdapt project will coordinate with JICA to integrate wildfire warnings into the MHEWS (Sub-Activity 2.1.1.1).
	Swiss partners: SDC / SECO / MeteoSwiss	Swiss partners, composed of the Swiss Development Cooperation (SDC), the State Secretariat for Economic Affairs (SECO) and the Federal Office of Meteorology and Climatology (MeteoSwiss), will support the project. SECO and SDC will provide co-finance to the project: SECO for Component 3 and SDC for Components 1 and 2. MeteoSwiss will provide technical assistance relating to the NMHS, NFCS and MHEWS.

10. Performance against GCF Investment Criteria and Policies

10.1 Impact potential

10.1.1 Core Indicator 2 – ARA 1: Direct and Indirect Beneficiaries Reached

Direct Beneficiaries

Target: 700,951 individuals, corresponding to 90% of the coastal population (i.e. people living in the 12 coastal municipalities).

Such individuals will be covered by the multi-hazard early warning system (MHEWS) and will additionally benefit from project-supported preparedness actions, such as local adaptation action plan (LAAPs), capacity building programmes, forecast-based action (FbA) pilots, school emergency plans, ecosystem-based adaptation (EbA) / ecosystem-based disaster risk reduction (eco-DRR) measures, etc. The figure of 90% is chosen as a conservative estimate of the population that will receive such benefits: i.e. 10% of the coastal population is assumed (i) to be incapable of receiving early warnings through broadcast media (TV and radio), the internet or mobile devices, and/or (ii) to be unwilling to adopt any form of precautionary action or behavioural change as a result of receiving warnings, receiving awareness-raising or capacity building support, or as a result of improvements to municipality or community readiness (e.g. disaster risk reduction (DRR) and emergency plans, improved communication channels, improved hazard response, etc.). It should be emphasised that the 10% estimate of individuals unable or unwilling to take precautionary action is, for reasons of conservativeness, set deliberately high. Conversely, the 90% beneficiaries estimate is considered to be highly conservative.

Indirect Beneficiaries

Target: 1.82 million individuals, corresponding to 90% of the remaining national population: i.e. 90% of individuals living in all other municipalities.

These individuals will benefit from national structures and systems – such as the national meteorological and hydrological service (NMHS), the national framework for climate services (NFCS) and the MHEWS – put in place with project support, but they are assumed not to benefit directly because ‘on the ground’ project interventions (such as capacity building, LAAP development, FbA pilots, etc.) are not targeted at them. Again, the 90% figure is adopted as a highly conservative estimate, to exclude individuals who somehow evade any project adaptation benefits (Table 19).

Table 19: ARA 1 beneficiaries

Area	Population		Project Beneficiaries		
	Women	Men	Women (90% of total)	Men (90% of total)	Women and Men (90% of total)
<i>Coastal Municipalities</i>					
Divjakë	16,974	17,280	15,277	15,552	30,829
Durrës	86,576	88,534	77,918	79,681	157,599
Fier	59,788	60,867	53,809	54,780	108,590
Himarë	2,862	2,876	2,576	2,588	5,164
Kavajë	20,318	19,776	18,286	17,798	36,085
Konispol	4,113	4,132	3,702	3,719	7,421
Kurbin	23,342	22,949	21,008	20,654	41,662
Lezhë	33,096	32,537	29,786	29,283	59,070
Rrogozhinë	11,224	10,924	10,102	9,832	19,933
Sarandë	10,090	10,137	9,081	9,123	18,204
Shkodër	69,520	66,092	62,568	59,483	122,051
Vlorë	52,289	52,538	47,060	47,284	94,344

Coastal Total (direct beneficiaries)	390,192	388,642	351,173	349,778	700,951
<i>Rest of the Country</i>					
All other municipalities (indirect beneficiaries)	1,015,937	1,009,980	914,343	908,982	1,823,325

Source: Own elaboration

10.1.2 Supplementary 2.4 – Beneficiaries (Female / Male) Covered by New or Improved EWS

GCF Supplementary Indicator 2.4 on early warning systems defines beneficiaries as individuals residing within an area covered by an early warning system supported by GCF-funded interventions and which can receive early warning information. A fully functional EWS is defined by the Sendai Framework as consisting of four key elements (see Table 20). Thus, calculation of Supplementary Indicator 2.4 involves two considerations: (i) whether the project-supported EWS can be considered ‘fully functional’ in the context of the Sendai definition, and (ii) the population coverage of the EWS (GCF, 2022). With regard to the first consideration, the project will lift the Albanian early warning system from the current situation of low functionality to one of high functionality. Thus, for the purposes of calculating Supplementary Indicator 2.4, the EWS can, indeed, be considered fully functional.

With regard to the second consideration, this refers to individuals who receive or will receive early warning information. The estimate of project impact is based on the project target to establish a multi-modal alert system (AlbaMet Alert), spanning television, radio, internet and mobile telecommunications. Albanian citizens already receive warnings through television, radio and internet, albeit warnings that are of inferior quality, slower, less standardised and considerably more institutionally fragmented than those that the ALBAdapt project will enable. Warnings disseminated through the mobile telecommunications network will, however, be a genuinely novel output of the project. Therefore, to adopt a (highly) conservative estimate of the beneficiaries covered by the ‘new or improved EWS’, only the coverage of mobile warnings will be considered.

Mobile phone penetration in Albania is 122%, meaning an average of 1.22 mobile phones per capita (Datareportal, 2023). Network coverage of Vodafone is 99.7% of the population and 99.4% of Albanian territory, and 98.9% (population) and 98.6% (territory) for One Mobile (OpenSignal, 2023). Both mobile phone penetration and network coverage therefore suggest close to universal reach for mobile warnings. However, for reasons of conservativeness, 90% population reach is assumed. Supplementary Indicator 2.4 therefore has a value of 2.5 million beneficiaries, consisting of 1.25 million men and 1.25 million women.

Table 20: Beneficiaries covered by a new or improved EWS

Population in Coastal and Non-Coastal Municipalities			
Municipalities	Total	Female	Male
Coastal	778,834	390,192	388,642
Non-Coastal	2,025,917	1,015,937	1,009,980
TOTAL	2,804,751	1,406,129	1,398,622
90%	2,524,276	1,265,516	1,258,760

Source: Own elaboration

10.2 Supplementary Indicator 3.1 – Change in expected losses of economic assets due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention

Target: Euro 5.1 million per year avoided climate damage losses

GCF Supplementary Indicator 3.1 estimates losses in relation to the functional geographical area associated with a GCF-funded project. In the case of the ALBAdapt project, which will put in place a national Climate Information and Early Warning System (CIEWS), the geographical area relates to the entirety of Albania.

As stated in the GCF IRRMF Results Handbook, the value of this indicator is considered to be a rough approximation due to the uncertainties in quantification and challenges associated with data availability. Also in line with the methodology outlined in the Handbook, historical data and third-party (World Bank) cost-benefit analysis is used to estimate the value of the indicator.

Estimation of Indicator 3.1 for the ALBAdapt project utilises the project's economic modelling (Annex 10). Not only does this ensure internal consistency of project assumptions and expectations, it ensures that the indicator estimation is grounded in robust research from credible sources.

The economic benefits arising from the restructuring of the CIEWS stem primarily from avoiding the damage costs associated with climate hazards. The IMF estimates that natural disaster losses in Albania averaged ~Euro 18.8 million per year in the period 1980-2021 (IMF, 2022a). The World Bank estimates natural disaster losses of ~Euro 22.4 million per year (World Bank, 2008). The NAP provides an annual estimate of ~Euro 35 million (Republic of Albania, 2021c). Other sources provide considerably higher estimates (World Bank, 2019). The economic analysis uses a consensus estimate of Euro 25.7 million as the annual damage stemming from climate-induced hazards. This is considered to be a conservative damage rate, as it disregards the fact that the frequency and severity of climate hazards are expected to increase in the future (Republic of Albania, 2022a).

The World Bank estimates that a functional CIEWS in South-Eastern Europe can be expected to avoid approximately 20% of damage costs arising from climate hazards – i.e. Euro 5.1 million per year for Albania (World Bank, 2012). This is, therefore, considered the end-of-project target value for Indicator 3.1.

During project implementation, further detailed economic modelling will be undertaken, incorporating updated information, recent additions to the scientific literature and empirical data from project activities. If the target value for the indicator is revised as a result, the re-estimated figure will be reported to the GCF via annual reporting (as per the guidance in the IMRF Results Handbook).

10.3 Sustainable Development

10.3.1 Development co-benefits

Two co-benefits are included in the project logical framework, accompanied by indicators and targets:

- *Co-benefit 1: Increase in quality of life due to non-climate hazard warnings:* the institutional capacities and systems put in place with project support for climate-related hazard early warnings (e.g. modelling and analysis capabilities, decision support tool, warnings disseminated through mobile devices, etc.) can be extended, at limited cost, by national stakeholders to include non-climate hazards, such as earthquakes and air quality.¹ This is considered a co-benefit of the project's focus on climate-related hazards and early warnings.
- *Co-benefit 2: Gender-equitable participation in climate innovation:* The project's ideation support (Sub-Activity 3.1.1.1) will generate a portfolio of at least 30 climate service business

¹ The NMHS of neighbouring Bosnia and Herzegovina, for example, routinely measures PM₁₀, PM_{2.5}, ozone, sulphur dioxide, carbon monoxide, NO_x and hydrogen sulphide. See: Federal Hydro-Meteorological Institute of Bosnia and Herzegovina (2023), [Air Quality Monitoring and Informing in Federation of BiH](#)

ideas. At least one-third of these business ideas will be from women entrepreneurs (or organisations representing women).

10.3.2 Additional co-benefits of the project

The ALBAdapt project is supportive of the Sustainable Development Goals, especially SDG 13 (climate action). Furthermore, the project aligns with additional SDGs through the following project interventions:

- Climate change: Goals 2, 6, 8, 11, 13, 15 and 17;
- Early warning: Goals 1, 2, 3, 6, 9, 11 and 17;
- Training and capacity building: Goals 4, 9, 12 and 17;
- Nature-based solutions (NbS): Goals 2, 3, 6, 11, 13, 14, 15 and 17;

Environmental: The ALBAdapt project strongly supports the implementation of the Paris Agreement, which calls for “strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making.”

One of seven global targets of the Sendai Framework is to “substantially increase the availability of, and access to, multi-hazard early warning systems and disaster risk information and assessments to people by 2030.” Priority 4, which focuses on enhancing disaster preparedness for effective response and to ‘build back better’ in recovery, rehabilitation and reconstruction, stresses the need “to invest in, develop, maintain and strengthen people-centred multi-hazard, multi-sectoral forecasting and early warning systems, disaster risk and emergency communications mechanisms, social technologies and hazard-monitoring telecommunications systems; develop such systems through a participatory process; tailor them to the needs of users, including social and cultural requirements, in particular gender; promote the application of simple and low-cost early warning equipment and facilities; and broaden release channels for natural disaster early warning information.”

The collection and provision of data, including monitoring of atmospheric parameters and also river flows, will create the necessary elements for the development of environmental indicators and robust early warning systems. Additionally, the project’s support to nature-based solutions (EbA / eco-DRR) will serve to conserve biodiversity and enhance carbon sequestration. The improved hydro-met monitoring network, forecasting capabilities and early warning system could also, in the future and outside of the ALBAdapt project framework, be extended to incorporate air quality (pollution) monitoring, forecasting and alerts (Federal Hydro-Meteorological Institute of Bosnia and Herzegovina, 2023).

Social: The ALBAdapt project will help to avoid loss of life and social infrastructure. The project will improve the knowledge and understanding of climate risks and hazards among local communities and planners, and will thereby empower communities to make informed decisions about climate disaster preparedness, choice of land use and livelihoods. Particular attention will be paid to securing women’s access to climate risk information and to addressing the needs of climate-vulnerable groups. The MHEWS can also, as a co-benefit of project support, integrate and improve non-climate hazard warnings, such as those for earthquakes and landslides.

Economic: At the national level, the project will support policies and measures to address climate-related hazards and will thereby reduce economic damage. The project will contribute to the improved use of public funds for hydro-met observations and disaster preparedness and recovery, as well as catalyse additional injections of private sector investment into climate services that will contribute to reduced climate risks in different sectors. At the municipal level, the project will reduce losses of assets and livelihoods from climate-related hazards, reducing the vulnerability of municipalities and increasing their ability to plan for, and invest in, climate-resilient development.

In the agricultural sector (for example), the average gross value added per worker in the EU (and, indeed, in the OECD) is more than 4 times the average level in Albania (Eurostat, 2023). Considerable opportunities exist to deploy improved climate data and knowledge to narrow this gap. Furthermore, in the agricultural sector, withdrawals of freshwater in Albania are currently 39.5%, compared with an EU average of 29.7%; all other South-East European economies use less than the EU average (OECD, 2018b). With rainfall expected to decrease due to climate change, using climate information more effectively will be essential to sustaining and increasing crop and livestock yields while reducing the expense of inputs. Optimisation of routine crop selection, better timing of fertilizer application and pest

and disease control, and mitigation of frost damage are among other benefits of improved collection and utilisation of climate data.

Gender-Sensitive Development Benefits: Albania is a signatory of the Sendai Framework, which calls for stronger participation of women and their leadership in disaster risk reduction decision-making processes, as well as the collection and use of sex- and age-disaggregated data to inform policy formulation. Albania does not currently produce climate-relevant sex-disaggregated data on any meaningful scale. For example, the flagship statistics bulletin on gender issues in Albania, published by the national statistics agency, INSTAT, 'Women and Men in Albania', does not provide any gender-disaggregated data on natural disasters, emergencies, relief or the climate sector (INSTAT, 2021). The ALBAdapt project will address this gap through comprehensive gender-disaggregated socio-economic vulnerability studies. In addition, the project will integrate gender into all relevant activities, including the project's support to innovative climate service development; multi-hazard early warning regulations, mechanisms and protocols; and the implementation of municipality-based risk reduction measures.

10.4 Effectiveness and Efficiency

10.4.1 Cost Effectiveness

The economic analysis (including methodology, assumptions and calculations) is detailed in Annex 10. A brief summary is provided here.

The benefits arising from the restructuring or establishment of a CIEWS stem from: (i) avoiding the costs associated with climate hazards, and (ii) productivity gains by climate-sensitive sectors as they integrate improved hydro-met information into their everyday operations (Hallegate, 2012). CIEWS costs stem from: (i) the capital cost of establishing / improving the CIEWS, and (ii) annual operating costs.

Under the central scenario of 20% avoided damage costs and 0.1% sectoral productivity gains, and using a social discount rate of 5%, the economic net present value (ENPV) of the CIEWS that will be put in place by the ALBAdapt project is estimated to be Euro 59.2 million. Under the conservative scenario of 10% avoided damage costs and 0.1% sectoral productivity gains, the ENPV remains clearly positive (Euro 18.3 million), even under a 10% social discount rate. The ENPV estimates for the three modelled scenarios (conservative, central and optimistic) are considered conservative, as they are all based on historical damage costs rather than future (higher) projected damage costs.

10.4.2 Needs of Recipients

Albania already ranks highest in terms of overall disaster risk amongst European countries, due to very high exposure to extreme weather and climate-related events – a situation that is being further exacerbated by climate change (USAID, 2016). Albania is ranked 82 (out of 191 countries) – and number 1 in Europe – on the World Risk Index of natural disasters and climate change (Bündnis Entwicklung Hilft, 2022), and 80 (out of 181 countries) on the ND-GAIN Index of climate vulnerability, making it the most climate-vulnerable country in Europe (University of Notre Dame, 2020). On the INFORM Climate Change Risk Index, Albania is second highest ranked in Europe (UN OCHA, 2023). Since 2017, at least six extreme events in Albania have been mapped by the Copernicus Emergency Management System (EMS), including two wildfires, three flood events and one earthquake.

In its most recent Article IV consultations with the Government of Albania, the IMF notes “Albania’s large share of agriculture, the concentration of its vital infrastructure, population and economic activity (notably tourism) along the coastal plain, and the high reliance on rainfall to generate electricity make it vulnerable to climate change risks. The number and frequency of climate change-induced natural disasters have increased in the last two decades and the impact is being increasingly felt, with each disaster causing damages on the order of 1.3% of GDP and affecting a considerable share of the population” (IMF, 2022b).

10.5 Country Ownership

The ALBAdapt project is aligned with the Revised NDC, the NAP, national policies and strategies (notably, the National Climate Change Strategy, the National Strategy for Development and European Integration, the National Disaster Risk Reduction Strategy and the Integrated Cross-Sectoral Plan for the Coastal Belt), the 4th National Communication to the UNFCCC and the Technology Needs

Assessment. The National Strategy for Development and European Integration (NSDEI), for example, explicitly identifies the need for institutional reform of the hydro-met sector and the need for a national platform for climate information and services. The ALBAdapt GCF project is included as Strategic Project (SP) 11 in the National Disaster Risk Reduction Action Plan (NDRRAP). The project is fully country-driven and aligned with Albanian laws, strategies and action plans including:

- Adaptation Priority Actions (PAs) of the National Climate Change Strategy (NCCS) and the adaptation priorities set out in Albania's Revised NDC (2020);
- Operationalization and implementation of the recent 'Law on Climate Change' (2020);
- Strengthen the implementation of the 'Law on Civil Protection' (2019);
- The Integrated Cross-Sectoral Plan for the Coastal Belt (ICSP, 2017);
- The General National Spatial Plan 2015-2030 (GNP);
- The GoA's efforts to reform the National Meteorological and Hydrological Service (NMHS). IGEO at the Polytechnic University of Tirana is Albania's National Meteorological and Hydrological Service (NMHS);
- Inter Sectoral Agricultural and Rural Development Strategy (2014-2020), considering among others the need for adaptation to climate change;
- The second National Strategy for Development and Integration (NSDI-II, 2015-2020) (Republic of Albania - Council of Ministers, 2016), the National Territorial Plan (NTP) 'Albania 2030'. All of them are cross-sectoral strategies, addressing climate change adaptation;
- The Albanian National Forestry Policy 2019-2030 is potentially an entry point for a sustained EbA upscaling strategy. The purpose is to attempt to strengthen the sector, turning it into its natural equilibrium and contributing to the nation's economy as a tool for rural development and poverty alleviation;
- National Strategic Preparedness and Response Plan (SPRP) issued in February 2020 and updated in May 2020;
- SDGs: Goals 1, 2, 3, 4, 5, 6, 9, 11, 13, 14, 15, 17;
- The project is included in Albania's GCF Country Programme. Letters of support from key government institutions, including the NDA.

The disclosure of information will encompass various aspects related to project updates, progress and outcomes, communicated through diverse formats such as reports, newsletters and interactive presentations. With the support of the GCF-GIZ readiness project, 'NDA Strengthening and Direct Access Process Support, an NDA webpage is being developed for GCF projects hosted in Albania. This will serve as a key information channel for ALBAdapt project stakeholders and the general public. Additional digital platforms, including the AlbaMet NCIS, project partners' websites, social media and e-mail newsletters, will be utilised to disseminate information efficiently and promptly. To ensure effective communication (including with stakeholders who do not typically use internet-based platforms), methods such as workshops, community meetings and training sessions will also be employed, allowing for interactive dialogue and feedback. These approaches aim to cater to the diverse needs and preferences of the wide range of stakeholder groups involved in project activities.

10.6 Rationale for GCF involvement and for the use of grants

The project goal is to support the generating of useable and publicly accessible CI. Weather and climate data produced by a public institution being a public good, the project entails no direct revenue-generation or cost-recovery. However, the project aims to develop and strengthen the climate service value chain towards the end users of services and products. This means that weather and climate data increases in value as it is processed and refined in order to meet the purpose and use case, e.g., climate proofing of agricultural irrigation. If the value chain operates well, investments in producing CI, i.e., by the state (data generated by IGEO) will result in societal benefits, such as improved irrigation that can withstand extreme events, like floods. In order to ensure that CI is used appropriately, a high level of engagement and co-creation is needed at each stage of the value chain. The nature of engagement between the provider and the user has strong implications for the success of information exchange and information uptake.

To date, interventions by the government and development partners in the field of climate risk management have been sporadic, fragmented, and insufficient. A few relatively limited and specialised project activities and studies have focused on certain aspects of climate adaptation and disaster risk management; they have generally not been coordinated and they have been limited to promoting change only in their field of activity. GCF involvement is critical to consolidate, scale-up, systematise and institutionalise these earlier and ongoing efforts, based on a solid information base. A holistic approach at scale is needed, one that addresses financial, regulatory, and capacity gaps, and deploys appropriate policy and financial instruments to achieve genuinely transformational change. Without GCF support, Albania's climate services and risk management system will not be able to effectively tackle the projected negative impacts of climate change on people and on key economic sectors.

The GCF involvement is critical to consolidate, scale-up, systematize and institutionalize these earlier and ongoing efforts of the government and development partners in addressing climate-related extreme events based on a solid information base. A holistic approach at scale is needed, that complements ongoing efforts, addresses financial, regulatory and capacity gaps and promotes instruments that carry the potential for transformational change. Without that, Albania's climate services and risk management system will not be able to effectively tackle the projected negative impacts of climate change on peoples' wellbeing as well as on key economic sectors, i.e., agriculture and tourism, and to pursue a climate resilient pathway.

On average, the government of Albania spends approximately Euro two to three million per year on disaster risk reduction, plus an additional Euro one to three million on recovery and compensation. This is only a fraction of average annual disaster losses (EUR 55 million (World Bank, 2021)) and is symptomatic of the fact that Albania is simply unable to finance the required transformational change on its own – not to mention its lack of technical capacity.

Before Albania was hit by a severe earthquake in 2019 and prior to the on-going Covid-19 pandemic, considerable progress had been made regarding the enhancement of the country's public finances. Its relatively high level of public debt fell from 73.3% of GDP in 2016 to 67.8% of GDP in 2019 (IMF, 2020a). For 2020, however, the twin crisis (earthquake recovery and Covid-19) substantially weakened the outlook for the state of Albania's public finances and the IMF estimates that government debt will rise above 80% of GDP in 2020 (IMF, 2020b). As a result, Albania will experience the largest absolute percentage increase in public debt compared to other countries on the Balkan peninsula. Moreover, a recent assessment by the WB reveals that extreme poverty in Albania could double in the short term, assuming self-employed people lose 100% if their income and wage employees lose 50% in affected sectors. Poverty could increase from 40% (yearly average) to 44% (based on the two scenarios) which is equivalent to the situation back in 2012 and 2005. WB's projections show that even under optimistic scenarios, the Albanian economy would contract by five percent during 2020, creating further pressure on public debt and fiscal vulnerability. All this will have severe consequences on government spending, including for climate resilient development and green recovery.

There is limited capacity in the country for concessional debt financing due to the very high national debt of more than 80% (81.3% as per WB analysis June 2020). Therefore, a loan by the GCF or another entity is not a feasible option. In the Law no 147-2015 for the Budget Organic Law of 2016 the government decided to condition (international) borrowing due to the very high levels of debt and set ambitious goals for decreasing debt to 45% of GDP by 2021. This conditions the request or acceptance of loans, limiting this option to areas of highest national priority.

This proposed GCF project is in a unique position to make a difference by providing sufficient volumes of grant funding and promoting broad cross-sectoral awareness and approaches that support a long-lasting paradigm shift towards a resilient development path. Proposed approaches that demonstrate how efforts in CCA do pay off in the long run, need to be incentivized with grants. Most of the funds requested in this project will be used to deliver and strengthen the delivery of public services, enabling government institutions to prepare the population for extreme hydrometeorological events and protect them from adverse consequences. This excludes the rationale of loan financing, as there is no income generated from which to service the debt.

The project will yield adaptation benefits that reduce the impacts of floods and droughts on the Balkans' (and Europe's) most at risk country. It also complies with the GCF's objective to invest in climate resilient development in most vulnerable societies.

10.7 Sustainability and Exit Strategy

The ALBAdapt project is assessed as having high sustainability potential, which, in turn, forms the basis of its exit strategy: sustained GCF impact is assured beyond the project's implementation period. GCF grant financing will:

- Strengthen the capacities of the institutions involved in collecting and processing hydro-met data in Albania and, equally crucially, fundamentally transform the institutional underpinnings of the NMHS to enhance clarity of roles and responsibilities, and to facilitate information exchange in a truly 'joined up' system.
- Begin the process of mobilising private sector involvement in the provision of climate services, thereby partially detaching service provision from government budget constraints and introducing market discipline (user-oriented focus, dynamic adjustment, profit-seeking motivation) into the hydro-met sector.
- Improve the usability and usefulness of the hydro-met and early warning systems, thereby cementing their importance to policy-makers, local communities and end-users.

10.8 Specific Elements of the Sustainability Strategy

Institutional and Regulatory Frameworks:

- Institutional reform: A detailed institutional design of a rejuvenated or restructured NMHS will be drafted and endorsed by the responsible institutions of the Albanian government (Sub-Activity 1.1.1.1).
- Regulatory reform: With project support, a draft Law on Weather, Climate and Hydrological Services will be developed to formalise the design of the rejuvenated or restructured NMHS, its roles and responsibilities, and inter-institutional coordination arrangements – including NCPA in relation to the MHEWS. The Law will also formalise the role of the NFCS (Sub-Activity 1.1.1.1). Furthermore, a MHEWS Policy will be developed that, inter alia, defines the architecture, institutional roles, responsibilities and functions of a 'joined-up' MHEWS – augmented by institutional SOPs and, where necessary, amendments to the Laws on Civil Protection and Climate Change (Sub-Activities 2.1.1.1 and 2.1.1.2).

Human Capital:

- NMHS capacity building: The project will co-develop and implement a multi-year, multi-dimensional capacity development programme for the NMHS (Sub-Activities 1.1.1.2, 1.1.1.3), based on the new institutional duties and functions derived from the Law on Weather, Climate and Hydrological Services. The programme will work in conjunction with national stakeholders and one or more international partners. Additionally, the project will support specialised training workshops, on-the-job training and mentoring provided by international counterparts in other NMHSs as well as from technical specialists.
- NFCS partners: In order to ensure that the NFCS advances beyond an attractive concept 'on paper' and becomes an operational reality that serves to improve the provision of meteorological, hydrological and climate services by the public and private sectors to a range of end-users, a capacity building package, oriented around online and physical workshops and training materials, will be developed (Sub-Activity 1.2.1.1).
- Academic: Building the capacity of the education system to support the future supply of suitably qualified skilled staff for the hydro-met sector is vital for the ongoing sustainability of the NMHS and the climate services ecosystem. Universities and vocational colleges, notably Tirana Polytechnic University, Polis University, Epoka University and others, will be supported in the development of new elective taught modules on meteorology, hydrology and climatology that students can select (on a voluntary basis) as part of their bachelor's and master's degrees in relevant subjects (primarily physics and earth sciences) (Sub-Activity 1.1.1.1). By project-end, the expectation is that, subject to module take-up and relevant government approvals, the universities will have gathered sufficient experience, and the modules will have become sufficiently established / mainstreamed, that each subject become a separate degree course in its own right, potentially at master's level first before later extending to bachelor's level.

- MHEWS: Based on a capacity assessment of the key MHEWS actors undertaken during project implementation (Sub-Activity 2.1.1.1), the project will develop a systematic capacity building programme (Sub-Activity 2.1.1.2).
- Last mile: The project will strengthen the MHEWS-related capabilities of coastal belt municipalities – for example, building their in-house capabilities to engage with local communities (including vulnerable groups) and to formulate / update local hazard management plans (pre- and post-hazard event). This work will be conducted in collaboration with ARC, which has a long track-record of working with municipalities and local communities (Sub-Activity 2.1.1.2). This work will also be closely coordinated with the TSCDs and LAAPs (Sub-Activity 3.2.1.1), such that the capacity building provided to municipalities addresses: (i) specific gaps in their ability to design and formulate LAAPs, as well as (ii) their ability to subsequently implement or coordinate the adaptation investments included in the LAAPs.

Stakeholder Engagement and Beneficiary Ownership:

- Stakeholder engagement and beneficiary ownership are key to ensuring project sustainability because they help to build support for the project and ensure that the project meets the needs of the people it is intended to benefit. As a result, the project has been prepared and designed in the context of multiple rounds of extensive stakeholder consultations and will continuously engage with stakeholders during project implementation.
 - Stakeholder engagement and consultations during project preparation: Annex 2e presents a summary of the stakeholder consultations.
 - Comprehensive stakeholder engagement action plan: Annex 2e also presents a detailed, budgeted engagement plan that will be executed during project implementation and a summary of the roles of project stakeholders.

Financial Sustainability:

- Albania currently has no financial plan for the NMHS, for climate information services or for climate action in support of long-term disaster risk reduction. Financial sustainability is a critical element of the overall sustainability plan of the project. As the CIEWS – consisting of the NMHS, the NFCS and the MHEWS – is essentially a public good, the principal source of financing will be the state budget. The private sector will provide value-added products and services to target user groups (e.g. particular sectors, such as energy generators and farmers).
 - The regulatory framework: The ALBAdapt project will ensure that the new legal framework, provided by the Law on Weather, Climate and Hydrological Services, covers defined elements of NMHS staffing, operations and maintenance costs as contributions from the state budget. The Law will also encourage the NMHS to supplement its income and expand its range of services beyond the legally prescribed minimum service levels. Further, the Law will establish the legal basis for the NFCS, which will catalyse private sector engagement with, and investment in, climate services.
 - Reduction of costs: There are a number of ways to achieve financial sustainability, and one is through reduced cost. This reduction of cost is embedded into the project design and implementation through several elements, including:
 - Observation network design and procurement: The number of observation stations and the quality / type of station will have an impact on the network's sustainability. The project will take into consideration these aspects when designing and procuring observation stations, including economies of scale (procuring equipment at scale rather than piecemeal), equipment guarantees and quality, etc.
 - Partnerships and collaboration: the project will promote: (i) the establishment of partnerships and participation in regional initiatives and networks that can provide free-of-charge data, forecasts and information, and (ii) formal arrangements with private sector actors on free dissemination of information.
 - Rationalisation of operations: the current hydro-met and early warning systems are fragmented across multiple institutions and lack proper coordination and data-

sharing practices. Overlapping institutional mandates and redundancy and duplication of efforts are widespread. The project will unify, rationalise and streamline CIEWS operations, thereby generating considerable operational efficiencies (as well as improved service quality and availability).

- Software and hardware: Wherever possible, the project will use open-source software and hardware.
- Operations and maintenance of investments: The project will invest in infrastructure and assets that are essential for the delivery of climate services. The government will be responsible for the O&M costs of the NMHS. However, as part of the on-the-job training during the three first years after installation of the equipment (stations, alert system, etc.), the O&M cost will be covered by the project. Subsequently, the Government of Albania will assume its responsibility in this regard. The Government of Albania's confirmed co-financing to the project of Euro 2.5 million underlines its strong commitment to the project's successful implementation and its goals. Further dedicated financial commitments for the long-term O&M costs are foreseen to be included in the Law on Weather, Climate and Hydrological Services that will be developed with project support.
- Domestic resources mobilisation: Through knowledge products, the project will improve awareness and knowledge of the usability and usefulness of the hydro-met and early warning systems, thereby cementing their importance to policy-makers. This sensitisation will be accompanied by technical support to incorporate the allocation of budget to the CIEWS sector into the annual budget process, the medium-term budget framework and other public finance instruments (including ADF operations).
- Business strategy: The ALBAdapt project will work with the NMHS to develop a business strategy that is aligned with the opportunities and limitations imposed by the Law on Weather, Climate and Hydrological Services, that reflects in-house technical capabilities (current and future) and that serves particular market needs (e.g. in sectors such as agriculture, tourism or water management).
- Market development: The ALBAdapt project will incentivise the commercial use of the improved NMHS and MHEWS data streams unlocked by Components 1 and 2. Specifically, Sub-Activity 3.1.1.1 will focus on climate business ideation: i.e. development of a set of 30 high-potential climate service / product business ideas. Three of these ideas will then receive further incubation support under Sub-Activity 3.1.1.2. Market development, and specifically the promotion of private sector climate service providers, will spur innovation, nimbleness and a customer-centric mind-set: all features that are noticeably lacking in the current environment.

Furthermore, successful implementation of the ALBAdapt project will put in place enduring frameworks and capacities, notably the ADF EbA / eco-DRR financing window (Sub-Activity 3.2.1.2), that will form the bedrock of the subsequent – second – phase of the project, ALBAdapt Phase 2, which will scale-up nature-based adaptation investment in Albania.

11. Project Risks Analysis

For a detailed approach and overview on the Risk Analysis, please review the submitted Annex 7 (Risk assessment and management), Annex 4 (Gender Assessment and Action Plan) and Annex 12 (Environmental and Social Action Plan).

12. Engagement with Government Partners in Project Preparation

In 2019, a call for project ideas was opened by the Albanian NDA with the aim of bringing together all interested parties to form a CP for the GCF. A GIZ project development team was established and the project forms part of the approved GCF Entity Work Programme of GIZ. During March-April 2020, a series of meetings and presentations were organised, which resulted in a consolidated GCF CP, including the project idea for support to the MHEWS and climate services. The NDA approached GIZ to develop the GCF project concept. A GIZ project development team was established and the project forms part of the approved GCF Entity Work Programme. Between 2021 and 2022, after extensive research and consultations with various stakeholders, and in coordination with the GCF Secretariat, the concept note was meticulously refined. It was collectively determined that the Simplified Approval Process (SAP) modality was the most appropriate approach for the ALBAdapt project. This decision was influenced by the project's low-risk profile and relatively modest budget request. With the NDA's endorsement, GIZ, in collaboration with national stakeholders and international experts, dedicated the period from 2022 to 2023 to develop the detailed GCF SAP funding proposal.

Throughout the project preparation phase, an impressive total of more than 80 official meetings took place. These meetings encompassed a wide range of formats, including bilateral discussions and consultation workshops, involving over 25 participants. The stakeholder pool was quite diverse, consisting of government institutions at both central and local levels, representatives from the private sector, non-governmental organizations (NGOs), civil society organizations, universities, and donors. Notably, the gender representation in these meetings was well-balanced, with 52% female participants and 48% male attendees. For a comprehensive breakdown of the meetings held during project preparation, including specific dates, the list of participants, gender demographics, meeting minutes, and, in some instances, visual documentation, please refer to Annex 2e. The SEP is the result of a collaborative effort between the Ministry of Tourism and Environment (MoTE) and GIZ Albania in partnership with numerous national stakeholders. Its purpose is to ensure transparent communication and coordination among all parties affected by and interested in the stakeholder engagement process that will be executed throughout the project's lifecycle. The primary goal of this SEP is to streamline and facilitate decision-making processes concerning project implementation while actively involving all stakeholders in a timely manner. It also seeks to provide channels through which stakeholders can voice their opinions and concerns, thereby influencing project decisions. The SEP is designed to be applicable to all planned project activities and is an integral component of the project's environmental and social performance, as well as its design and execution. It's worth noting that the SEP is a dynamic document that will be periodically updated as the ALBAdapt project advances.

The ALBAdapt project will adhere to the requirements stipulated in the GCF Information Disclosure Policy and to the GCF's Environmental and Social (E&S) Policy. Information disclosure encompasses various aspects related to project updates, progress, and outcomes, conveyed through diverse means like reports, newsletters, and interactive presentations. With the support of the GCF-GIZ readiness project, 'NDA Strengthening and Direct Access Process Support', an NDA webpage dedicated to GCF projects hosted in Albania is currently under development. This webpage will serve as a vital information conduit for stakeholders and the general public interested in the ALBAdapt project. In addition to the NDA webpage, digital platforms including the AlbaMet National Climate Information System (NCIS), the websites of project partners, social media channels, and email newsletters will be effectively employed to ensure swift and efficient information dissemination. This approach aims to cater to diverse preferences, ensuring that all stakeholders, including those who may not regularly use internet-based platforms, have access to project updates and relevant information. Complementing these digital channels, in-person methods such as workshops, community meetings, and training sessions will be employed to foster interactive dialogues and receive feedback. This comprehensive approach is designed to meet the varying needs and preferences of the extensive array of stakeholder groups involved in project activities.

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Appendix

Table 21: Donors and their projects in the field of climate change and disaster risk reduction

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
European Union				
EU funded (IPA II) ProNews – Programme for Improving National Early Warning System and flood prevention in Albania Duration: 2017-2021 http://www.pronewsprogramme.eu/	<p>The overall objective of PRO NEWS is to ensure increased resilience to floods by strengthening National Early Warning System of Albania and improving disaster prevention in line with EU Good Practices.</p> <p>Main outcomes:</p> <ul style="list-style-type: none"> • Legal and Institutional development for an improved early warning system, flood management and civil protection by assessing the current institutional and legal framework and strengthening the capacity of national and local authorities to develop civil protection plans • Development of a regional flood hazard maps following the EU Floods Directive • Development of national flood forecasting and warning system and integration into EFAS incl. operational hydrological model for early warning for the entire country (and transnational river basins), modernizing the meteorological infrastructures and improving the IT network • Design of national public awareness campaigns based on EU National Civil Protection good practices for improving the awareness and the resilience of relevant target groups • Support Albania in preparing for membership to the EU Civil Protection Mechanism (EUCPM), incl. trainings and exchange of experts 		<p>Overall: GIZ was heavily involved with EUD in Tiranë before the project was tendered out. There was an interest from our side to enter in the competition. That time there were some concerns shared with the responsible officer from our side as follows: a) time frame of the project implementation (36 months) was too tight. b) no of tasks for the available budget very ambitious c) needs of the beneficiaries not properly assessed.</p> <p>GIZ decided not to enter in the competition, but a partner status was requested by the EUD due to the close link with our project. We requested to be part of the steering committee of the project (with no voting rights). The project had a lot of obstacles, and its implementation has been extended 2 times (was supposed to be finalized by end of 2018 but still not finalized)</p> <p>1. Implementation of component one went smoothly and with good results.</p> <p>The activities planned were widely based on the needs of the beneficiary (that time the General Directory for Civil Protection)</p> <p>The involvement of the beneficiary in project implementation was high.</p> <p>Activities implemented through a local CSO with good</p>	<p>Significant complementarity and potential overlaps with regards to all outcomes, i.e. institutional development and reform of the NMHS, CI product development in the area of floods</p>

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
			<p>understanding of the local situation and strong working relations with the local and regional structures.</p> <p>2. Implementation of component two was considered to some extent as satisfactory by the beneficiary (AMBU). There were delays on obtaining necessary data for the development of the hydrological model, thus production of maps for the rest of Albanian river basins (Drin was left out as GIZ was preparing the ASPFR and the FHRM) The Preliminary Flood risk assessment went smoothly and on time. Prep. of hazardous maps are finalized and shared with AMBU) in shape files, but the involvement of AMBU has been very limited. Measures made for the hydraulic models (if they are developed at all) not shared with AMBU. There was no training delivered at all on the usage of the models</p> <p>3. This component was the least progress one. There has been continues disputes and fights among IGEO and CIMA foundation (one of the implementing consortia partners). No ownership from the beneficiary, No progressive involvement of the beneficiary from the beginning leading thus in mistrust. Very little budget allocated for renovation of the stations (still no</p>	

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
			done) Ownership of the stations not clear from the beginning and stays with the NCPA – a mode selected by EUD to stay that way due to the limited financial capacities of IGEO to ensure maintenance of the investment. No working cooperation between IGEO and CIMA and thus the development of the national Flood Forecast system was not progressed at all.	
EU Horizon2020 funded – BRIGAIID Duration: 2016-2020 https://brigaid.eu/ (see also related projects: https://brigaid.eu/new_related-projects/)	<p>BRIGAIID is a 4-year project (2016-2020) under EU Horizon2020 aimed to effectively bridge the gap between innovators and end-users in resilience to floods, droughts and extreme weather.</p> <p>The project:</p> <ul style="list-style-type: none"> • brings together innovators and end-users in so-called Communities of Innovation (Albania was an operational test site), resulting in increased opportunities for market-uptake • contributes to the development of technological and performance standards for adaptation options by providing a Test and Implementation Framework (TIF) and test facilities throughout Europe • improves innovation capacity and the integration of new knowledge by establishing an innovators network • strengthens the competitiveness and growth of companies with the support of a dedicated business team • aims to develop business models and market outreach to launch innovations to the market and secure investments in innovations beyond the project's lifetime 	<p>BRIGAIID has helped to develop a strong community of ministries, NGOs, companies and investors in Albania. The community is organised by the NTPA of Albania. A concrete innovation stemming from BRIGAIID is ArboDroughtStress, a tool to monitor drought stress of fruit trees.</p>	<p>Key lessons learned:</p> <ul style="list-style-type: none"> • Efforts have been given to the technical readiness but neglecting the social acceptance (market readiness) • The need for common language and terminology used by the different stakeholders. • Establishes Key performance indicators for the categories (the reliability of a structural innovation (e.g., a flood barrier) will be very different from that of a technological innovation (e.g., a flood warning system) of innovations early in the process • None of the chosen innovations were nature-based, limiting any potential “testing”, it will particularly be important to select innovations that not only come from the different hazards but also span the range of potential categories of innovations • Innovation needs to be elaborated starting with research on climate issues; as such, it can be innovating in a sustainable way 	<p>Very similar to the incubator idea of the GCF project, lessons from BRIGAIID can inform further project design; the project should build upon this initiative.</p> <p>The lack of testing of the nature-based solution may be an area of attention</p>

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
			<p>and such innovation is to be reachable by all categories.</p> <ul style="list-style-type: none"> • Innovate to compensate the lack of human and financial capacities and increase of interest of relevant institutions, so that each stakeholder becomes a beneficiary 	
<p>EU funded (IPA II) 3 WATCH OUT Budget: 979.400,00 EUR Duration: 2018-2020 https://3watchout.italy-albania-montenegro.eu/</p>	<p>The main goal of the project is to facilitate an integrated and multi- sectoral approach to environmental resources, strongly anchored in local territories and landscapes, in order to carry out joint actions for risk prevention. The project aims to define a trilateral cooperation model – between Italy, Albania and Montenegro – in the field of civil protection, in order to share experiences and skills related to the prevention of hydrogeological, seismic and fire risks. This model defines rules for cross border cooperation in case of emergency in one of the involved countries, identifying the necessary measures to take, in order to develop a joint risk management system.</p> <p>8.4.2.1 Main Outputs:</p> <ul style="list-style-type: none"> • Model of risk analysis • Pilot actions for reduction of risks • Trilateral model of civil protection 	<ul style="list-style-type: none"> • Webinar dedicated aiming to define, the exercise scenario and the sharing of the WebGIS platform. • Webinar related to the design of the exercise scenario, the cartography produced and the technical sheets for the field exercise. • Pilot project for the scientific aspects to monitor the growth states of the planted essences. • The table-top exercise (TTX) tested an intervention model on the territory based on cooperation and the correct sharing of roles and tasks, as well as to verify actually available and feasible resources in case of real emergency. • Special equipment procured: Fire protection and rescue equipment, water quality measurement, 		

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
		<p>and water flow measurement tools and instruments were presented, as well as an unmanned air vehicle - a drone.</p> <ul style="list-style-type: none"> • The exercise organized with simulate a seismic event. The main objective of the exercise was testing the communication flows between regional and local authorities in order to make the system of civil protection more efficient in a national, European and cross-border context. • sensors set-up in the Albanian Lezha Municipality, Shengjin and Lac will provide early warnings about the flooding risk. 		
<p>EU i-ALARMS -Ionian-Adriatic earLy wARning Monitoring System https://greece-albania.eu/projects/ionian-adriatic-early-warning-monitoring-system Duration: 2020-2022</p>	<p>Development of an operational tool and the assessment of a unique state-of-the-art Early Warning System (EWS) organized according to the nature of the local bi-lateral natural hazards. It is based on historical and new hydro-meteorological and fire forest observations and modelling systems. The weather and fire danger forecasting is one of the most powerful tools in order to manage the prevision and initiate firefighting engagements. Climate changes, especially in the last decade, are accompanied by major hydro-meteorological and fire events, like intense convective storms and wildland fires.</p>	<p>Two Training seminar organized, concerning public services and bodies participating in the Civil Protection of the Municipality for the use of the early warning platform for extreme weather events developed.</p>		

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
	<p>Project Partners:</p> <ul style="list-style-type: none"> • Pb (P1) University of Ioannina – Research Committee / Department of Physics • Pb2 National Observatory of Athens • Pb3 Municipality of Corfu • Pb4 Municipality of Vlorë • Pb5 Aarhus Information Centre Vlorë 			
<p>EU</p> <p>The Erasmus + Knowledge FOr Resilient soCiEty (K-FORCE) project</p> <p>http://kforce.uns.ac.rs/events</p> <p>2016-2019</p>	<p>Fosters modernization, accessibility and internationalization in DRM and fire safety engineering in Western Balkan countries. The project aims to support the integration of DRR and climate change knowledge into university level curricula.</p> <p>The K-Force project – Knowledge FOr Resilient soCiEty is an Erasmus+ project with 16 partners from predominantly the west Balkan countries.</p> <p>The K-FORCE project aimed to improve capability for regional cooperation in risk prevention and response and to ensure national professional resources and regional capacities in order to build regional-based disaster preparedness and a culture of safety and resilience at all levels according to National and EU Integration Strategies.</p> <p>In order to achieve this, K-FORCE project will create effective, contemporary and sustainable Study Programs in the field of Disaster Risk Management and Fire Safety Engineering (DRM&FSE), see more details about the project here.</p> <p>K-FORCE project aimed to provide the basis for the design and curriculum development of the Master programs and to ensure that the quality in educational</p>	<ul style="list-style-type: none"> • Define directions for development of Master programmes (Analyse DRM&FSE MPs in EU and WBC) Develop new DRM&FSE MPs Curricula) • Define directions for development of PhD programme (Assess WB needs and EU trends in DRM&FSE PhD; Develop PhD Curriculum) • Improve teaching methodologies and embed the ICT in learning material (Pilot the new MPs and PhD learning material, evaluation and fine tuning) • Implementation of Master Programmes (Accredit Master programmes; Enroll the Master students; Activate the flexible ICT learning platform) • Implementation of Lifelong learning courses for 	<p>Implementation of PhD Programme</p>	

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
	activities are at the level of best international standards.	practitioners (Analyse the WBC needs for LLL courses; LLL courses preparation and implementation) e.g.University of Tiranë organized two LLL courses on: Disaster Risk Modeling and Risk Assessment, with a total number of participants 165 and total number of certificates issued, 108; EPOKA University organized three LLL courses on: Disaster Risk Modeling, Fire engineering and Fire Evacuation modelling. Total number of participants: 204. Total number of certificates issued: 204		
EU The Programme for Prevention, Preparedness and Response to Floods in the Western Balkans and Turkey http://ipafloods.ipacivilprotection.eu 2015-2016	Implements regional and national flood prevention and flood risk management in line with the EU Floods Directive for improved river basin management and development of civil protection mechanisms in Albania, Bosnia and Herzegovina, Croatia, Kosovo, North Macedonia, Montenegro, Serbia and Turkey. The project aims to establish a regional approach to flood risk reduction Specific objective 1: To increase beneficiary countries' capability to develop effective national civil protection systems and collaborate in a coherent manner in dealing with floods at regional and European level (prevention,	Contribution to developing effective national civil protection systems.		

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
	<p>preparedness and response). Specific objective 2: To support beneficiary countries in becoming better prepared to cope with the challenges posed by approximation to and implementation of the EU Floods Directive.</p> <p>Expected Results</p> <ol style="list-style-type: none"> 1. Operational multinational civil protection modules for flood response that are able to operate regionally and through the UCPM 2. Improved capacity of beneficiary countries to deal with the requirements of the EU Floods Directive and to address flood prevention. <p>This improvement will be based on 3 key outputs of the action:</p> <ul style="list-style-type: none"> • Capacity building on EUFD • Guidelines and good practices for implementation of EUFD • Roadmap for Flood Risk Management 			
<p>EU Balkans and Europe for Development of resilience initiatives (BE DRIN) 01.10.2015 – 01-10.2017 http://www.bedrin.eu</p>	<p>The objective of the BE DRIN - Balkans and Europe for Development of Resilience Initiatives project, taking place within the Drin river basin, is to enhance volunteer management capacities to ensure compliance with the standards and procedures of EU Aid Volunteers (EUAV) Initiative and to facilitate EUAV certification.</p> <p>The project also aims to strengthen the Balkan Hosting Organizations' capability to respond to humanitarian crisis through the effective impact of the EU Aid Volunteers' work on the ground, in the field of hydrologic disaster risk management, preparedness and response.</p>	<ul style="list-style-type: none"> • Training of trainers- Medical Emergency Management, Flood Management, Water, Sanitation and Hygiene issues, Roles and Procedures, Communication 		

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
	<p>The project is led by the Italian Civil Protection Department and involves other ten partners.</p> <p>The EU Aid Volunteers Initiative brings together volunteers and organisations from different countries, in joint action, providing practical support in the provision of humanitarian aid and contributing to the strengthening of local capacity and resilience of disaster-affected communities.</p>	<p>Management, Planning Lessons, Exercise and Course Management</p> <ul style="list-style-type: none"> • Basic training on technical knowledge and know-how for emergency management at tactical and operational levels; to provide capacity on how to interact with international organizations particularly in case of deployment of capacity building or Disaster Risk Reduction teams. • Four Practical exercise related to the set-up of an emergency shelter area, a non-food items 		

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
		<p>distribution point, the raising of water barriers and the simulated emergency evacuation of tourists trapped in a bus crash, in addition to a search and rescue action of a missing person.</p> <ul style="list-style-type: none"> • 3 international assessment teams worked to define procedures for long term deployments, identifying potential risks (both in town and along the river) and defining a plan of action for future disaster risk reduction activities. • EU AID Volunteer Certification 		
World Bank				

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
Albania Water Resources and Irrigation Project Additional Financing World Bank Project: Albania Water Resources and Irrigation Project Additional Financing - P162786 Duration: 2018-2020	The Additional Financing (AF) will provide support to scale up the WRIP and include additional investments and activities to increase the impact of the original Project.			
Environmental Services World Bank Project: ENVIRONMENTAL SERVICES - P130492	The Project Development Objective (PDO) is to support sustainable land management practices and increase communities' monetary and non-monetary benefits in targeted Project areas which are mainly in erosion prone rural upland areas. This PDO is to be achieved through the support of alternative livelihoods and provision of environmental services and through sustainable utilization of wood and pasture products in the long term			
Water Resources and Irrigation Project https://projects.worldbank.org/en/projects-operations/project-detail/P121186?lang=en&tab=overview Budget: US\$ 45 million Additional financing: US\$ 26,75 million (World Bank Project : Albania Water Resources and Irrigation Project Additional Financing - P162786) Duration: 2013-2018 Latest progress report: http://documents1.worldbank.org/curated/en/3662415952	<p>The objective of the Water Resources and Irrigation Project for Albania is</p> <ul style="list-style-type: none"> to establish the strategic framework to manage water resources at the national level and at the level of the Drin-Bura and Semani River basins; and to improve, in a sustainable manner, the performance of Selected Irrigation Systems. <p>The Additional Financing will provide support to scale up the WRIP and include additional investments and activities to increase the impact of the original Project</p>		40 hydro and meteo stations are procured in the frame of this project (2014). Digitalization of 20 years of hydrological data and ten years meteo data are also done. The main beneficiary of this subcomponent was that time General directorate for Civil Protection instead of direct involvement of IGEO. <ul style="list-style-type: none"> *The stations were never officially handed over to IGEO even though they had access to the data; No maintenance costs were planed neither by the General Directorate for Civil Emergencies nor IGEO. 	Need to check to what extent information on climate-related risks was taken into account in infrastructure planning

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
81244531/pdf/Disclosable-Version-of-the-ISR-Water-Resources-and-Irrigation-Project-P121186-Sequence-No-15.pdf			<ul style="list-style-type: none"> • No involvement of IGEO staff during the station's procurement process; • No staff involvement during the stations mounting around Albania. (IGEO staff did not knew the places where the stations were placed); • Digitalization of the data was not followed up with a quality check process; • Data were not made public/ transparent, - it was only in 2020 IGEO shared with AMBU the digitalized data to be included in the water cadastre; • No unified database is used for the digitised data as well as the on line data coming from the existing stations; • Very little effort put to the CD of the staff 	
<p>Improving Disaster Risk and Loss Information in Albania World Bank / GFDRR</p> <p>Duration 2020-2022 US\$ 500K</p>	<p>The main objective of the project is to help improve the management, accessibility and collection of multi-hazard risk information for better-informed disaster risk management (DRM) decision-making. The project is at an early stage and its focus is not exclusively – or even primarily – on climate-induced hazards.</p>			<p>The GCF project will coordinate with this GFDRR project to expand knowledge base of hazard risks and vulnerability.</p>

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
German Development Cooperation				
GIZ – BMZ funded Adaptation to Climate Change through Transboundary Flood Risk Management in the Western Balkans https://www.giz.de/en/worldwide/29000.html	<ul style="list-style-type: none"> • 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 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 		<ul style="list-style-type: none"> • No of stations very limited (ten in Albania) • IGEO not able to provide regular maintenance and monitoring of the stations • The MCH database implemented for the Flood Forecasting System is a good example of establishing a unified database, but it should be populated with data from other stations in the country (either manual or automatic) *no of qualified staff is very limited especially in the field of meteorology. * no technicians, no budget available for measurements 	Will potentially serve as the anchor project for the GCF project
The recently approved global project NDC Assist (funded by the German government and implemented by GIZ) will support MoFE in doing the CC mainstreaming into the public financing.				
Swedish Development Cooperation				
SIDA 'EU for Innovation' and 'Challenge Fund' funded by the European Union with additional support from the BMZ as well as the Swedish International Development Cooperation Agency (Sida) Budget : EUR 7.539.238 (EU contribution: EUR 6.600.000,	SIDA is one of the most prominent donors in the country financing environmental projects. Environment and climate are one of the three priority funding areas in the country. SIDA is also implementing partner of the 'EU for Innovation' The project aims to strengthen the eco-system for innovation and start-up promotion in Albania.	The overall number and proportion of innovative sustainable start-ups with high growth potential remains low. *The innovation system in Albania is highly fragmented, with few linkages between science and private sector and weak innovation support	The overall number and proportion of innovative sustainable start-ups with high growth potential remains low. • The innovation system in Albania is highly fragmented, with few linkages between science and private sector and weak innovation support infrastructure.	Clear link to the incubator idea of the GCF project; a lot to learn and build on

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German contribution: EUR 719.238 EUR; Swedish contribution: EUR 220.000).	<p>The project focused in developing three distinct result areas:</p> <ul style="list-style-type: none"> • Strengthening the capacity for innovation • Building linkages within the Albanian innovation ecosystem and internationally • Funding innovative start-ups and innovation support providers 	<p>infrastructure.</p> <p>*Universities are only slowly picking up the current trend not only to provide employees for traditional industries but also to train students to set up their own businesses</p>	<ul style="list-style-type: none"> • Universities are only slowly picking up the current trend not only to provide employees for traditional industries but also to train students to set up their own businesses 	
Swiss Cooperation				
Swiss Development Cooperation	<p>Switzerland is supporting Albania in the development of a democratic society and a competitive economy with the aim of helping to advance Albania's integration into Europe. Switzerland's support is focused on local governance, economic development and healthcare as well as urban infrastructure and energy.</p> <p>Existing project on energy efficiency. SDC is looking into expanding its development cooperation portfolio into the DRR sector after the earthquake of 2019.</p>			
Swiss State Secretariat for Economic Affairs (SECO)	<p>Potential interest in investing EUR 2-3 million into GCF project</p> <p>In terms of design, needs to make a link to the economic development</p>			
Austrian Development Cooperation				
<p>EU Support to Integrated Water Management in Albania" (EUSIWM)</p> <p>Duration: 2018 - 2021</p>	<p>Main objective of the Integrated Water Management component: to strengthen capacities for managing the sector in line with EU policies and to consolidate earlier efforts in that direction. This project supports Albania in transposing the EU WFD and in preparing river basin management plans (RBMPs for Mati, Ishem and Erzen basins.</p> <p>Focus on/ expected results:</p> <ul style="list-style-type: none"> • Water Legislation Framework • River Basin Management (RBM) Plans • Institutional Capacity at river basin level 			

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GCF project idea: Promoting Climate-Resilient IWRM in Albania	<ul style="list-style-type: none"> Economic Analysis of water extraction and water use <p>The main results/recommendations of the Consultants include:</p> <ul style="list-style-type: none"> Focus on drought management (the river basins Ishem-Erzen, Shkumbini, Semani and Vjosa seem to have a medium to high drought risk); Hydrometeorological data gathering at river basin level is needed to inform individual drought measures. "No-regret" green/ecosystem-based infrastructure investment measures should be included in the GCF project. Examples include the rehabilitation of multi-purpose dams, improved water loss management and watershed-management at e.g. Bovilla lake. Individual investment measures (to be appraised during the funding proposal stage) should be complemented by a grant scheme to incentivize the installation of water efficient appliances for different water users. Further improving the water governance: Institutional reform in water management, gradually introducing a climate-responsive tariff system (e.g. for water abstraction) and exploring the set-up of a water adaptation fund. 	n/a	n/a	Great potential for complementarity but also overlap, and even competition for GCF funds; synergies: apply development of CI (supported by GIZ) services to the water sector (supported by ADA)
GCF Green Cities Facility / EBRD https://www.ebrdgreencities.com/our-cities/Tiranë/ Duration: 2018-2034	<p>Green Cities Project implemented by the European Bank for Reconstruction and Development (EBRD). The total amount of the project is US\$ 306.4 million and aims to minimize the environmental impact and maximize opportunities to improve and support the natural environment. The Green Cities Project in Albania will invest US\$ 11.5 million and will focus on: the</p>	<p>Having finalised the Global Call to Action against Poverty (GCAP) in April 2018, Tiranë now has a plan to address environmental issues faced by the city such as air pollution, urban growth, renewable energy and recycling.</p>		

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
	energy sector and the water and wastewater sector.	<p>The city's GCAP supports implementing an integrated public transport system with low-emission buses, constructing green corridors and creating legislation to protect green spaces. It also promotes an energy-efficiency programme for municipal buildings, as well as mechanisms to incentivise investment in energy-efficient technologies, household waste collection and recycling centres.</p> <p>Tiranë is actively implementing policy actions and investments as outlined in the GCAP to improve environmental quality and revitalise the urban landscape.</p>		
GCF Enhancement of NDC implemented by URI www.uri.org.al/ Duration: 2020-2021	The project "Enhancement of the existing NDC" is part of the Readiness and Preparatory Support program of the GCF for the GoA, coordinated through the Ministry of Tourism and Environment (MoTE), the NDA for the Fund and main beneficiary of the project, and implemented from Urban Research Institute (URI), Delivery Partner of the Ministry. The goal of the project is to advance the funding and implementation of national mitigation and adaptation policies and measures towards low emission sectoral development, contributing to the objective of the Paris Agreement, to which Albania is Party.			

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
Japan International Cooperation Agency				
Focus: Forest Fire Early Warning (planned) Around 3 million				Contribution to GCF project
United Nations				
United Nations Development Program (UNDP) Adaptation planning support for Albania through UNDP, funded by GCF https://www.greenclimate.fund/document/adaptation-planning-support-albania-through-undp Duration:2019-2024	<p>The project is designed to help the GoA increase its capacity to address the country's climate change vulnerabilities. It will support Albania to develop a national plan for CCA through:</p> <ul style="list-style-type: none"> • The strengthening of a national mandate, strategy and steering mechanism that focuses on assessing and addressing capacity gaps; • The development of a NAP Strategy action plan document and its implementation plan; • And the development of financing, monitoring and evaluation strategy to ensure that capacities and funding options are institutionalized for the long-term sustainability of adaptation planning beyond the life of the project. <p>The main beneficiaries in this first cycle of NAP development are the MoTE, the National Environment Protection Agency, and the Albania Institute of Geosciences, Energy, Water and Environment (IGEO). Indirect or secondary beneficiaries include other ministries and local governments receiving capacity development support (within the priority sectors listed above), as well as all other entities associated with CCA in Albania such as academia, NGOs, civil society organizations, and private companies.</p>			CIS is a precondition for successful NAP implementation
UNDP National Communication				

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UNDP Project on Disaster Risk Reduction (? planned)	2020 SDC prepared idea on how to support GoA in DRR, this has fed into UNDPs idea.			
UNDP Flood Protection Infrastructure https://www.al.undp.org/content/albania/en/home/operations/projects/democratic_governance/eu-flood-protection-infrastructure-project-.html	Building back better flood protection infrastructure. Strengthen resilience and disaster risk preparedness and prevention in southeast Albania in line with the post-disaster needs assessment following the February 2015 floods. This project presents entry points on data collection and sharing, as well as scaling up opportunities under the NAP process for flood risk reduction activities			
GCF				
Readiness programmes	<p>The first GCF readiness project amounting 300.000 \$ was approved in 2016. It aimed at strengthening the capacities of the NDA as well as supporting a participatory process for the development of the CP</p> <p>The second GCF readiness project is designed to help the GoA increase its capacity to address the country's climate change vulnerabilities. It is approved in 2019 with UNDP as the AE with a budget of US\$ 2,997,907. The project will support Albania to develop a national plan for CCA through:</p> <ul style="list-style-type: none"> • The strengthening of a national mandate, strategy and steering mechanism that focuses on assessing and addressing capacity gaps; • The development of a NAP Strategy action plan document and its implementation plan and; • 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. 			

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
	In beginning of 2021 the third readiness support Preparatory Support program on the "Enhancement of the existing NDC" started. The goal of the project is to advance the funding and implementation of national mitigation and adaptation policies and measures towards low emission sectoral development, contributing to the objective of the Paris Agreement, to which Albania is Party. GIZ is at the moment preparing a Readiness Proposal for the assessment and support of national entities for the GCF direct access accreditation.			
Adaptation Fund				
Integrated climate-resilient transboundary flood risk management in the Drin River basin in the Western Balkans (Albania, the Former Yugoslav Republic of Macedonia, Montenegro) https://www.adaptation-fund.org/project/integrated-climate-resilient-transboundary-flood-risk-management-drin-river-basin-western-balkans-albania-former-yugoslav-republic-macedonia-montenegro/	The objective of the project is to assist the riparian countries in the implementation of 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	https://www.adaptation-fund.org/project/integrated-climate-resilient-transboundary-flood-risk-management-drin-river-basin-western-balkans-albania-former-yugoslav-republic-macedonia-montenegro/		Significant complementarity and potential overlaps with regards to flood early warning and risk management
U.S. Agency for International Development / The Office of U.S. Foreign Disaster Assistance (USAID/OFDA)				
Funded by USAID /OFDA / WB / EU / GFDRR/ South-East-European Multi-Hazard Early Warning Advisory System (SEE-MHEWS) https://public.wmo.int/en/projects/see-mhews-a	The SEE-MHEWS-A project will benefit the National Meteorological and Hydrological Services of WMO Members from the region - that is Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Greece, Hungary, Israel, Jordan, Lebanon, North Macedonia, Republic of Moldova, Montenegro, Romania, Serbia, Slovenia, Turkey and Ukraine.			

Donor/ agency and project	Goals and expected results	Achievements	Challenges / remaining gaps in the project's area of action	Links and complementarity with the GCF project
	<p>The Project Steering Committee, composed of the Directors of the NMHSs of the WMO Member States listed above, will manage the advisory system developed under the project. SEE-MHEWS-A will provide operational forecasters with effective and tested tools for forecasting hazardous weather events and their possible impacts in order to improve the accuracy of warnings and their relevance to stakeholders and users. On a single virtual platform, the system will collect existing information, products and tools for the provision of accurate forecasts and warnings to support hazard-related decision-making by national authorities.</p>			