ANNEX C1: Twinning Fiche

Project title: Strengthening hydrometeorological and climate services in Azerbaijan

Beneficiary administration: National Hydrometeorological Service (NHMS) under the Ministry of Ecology and Natural Resources (MENR)

Twinning Reference: AZ/20/ENI/EN/01/21 (AZ 62)

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EU funded project

TWINNING TOOL

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1 Basic Information

1.1 **Programme:** Multiannual[1]Action Programme 2019-2020

For UK applicants: *Please be aware that following the entry into force of the EU-UK Withdrawal Agreement[1] on 1 February 2020 and in particular Articles 127(6), 137 and 138, the references to natural or legal persons residing or established in a Member State of the European Union and to goods originating from an eligible country, as defined under Regulation (EU) No 236/2014[2] and Annex IV of the ACP-EU Partnership Agreement[3], are to be understood as including natural or legal persons residing or established in, and to goods originating from, the United Kingdom[4]. Those persons and goods are therefore eligible under this call.*

1.2 Twinning Sector

Environment (EN)

1.3 EU funded budget

EUR 1,500,000

1.4 Sustainable Development Goals (SDGs)

The objectives specified in this project are in line with the 2030 Agenda for Sustainable Development and contribute to the achievement of Sustainable Development Goals (SDGs) and targets, in particular, Goal 13 – climate action and its Target 13.1 – Strengthen resilience and adaptive capacity to ***climate-related hazards and natural disasters*** in all countries.

2 Objectives

2.1 Overall Objective(s)

Resilience and adaptive capacity of Azerbaijan, its people and economic sectors to climate-related hazards and natural disasters enhanced.

2.2 Specific objective(s)

Service delivery capacity of the National Hydrometeorological Service (NHMS) improved in line with international standards and best practices to meet national needs.

2.3 National Development Plan/Cooperation agreement/Association Agreement/Sector reform strategy and related Action Plans

2.3.1 Action Document for Partnership Priorities Facility (PPF)

The framework for EU-Azerbaijan relations is set by *the Partnership and Cooperation Agreement (PCA)* in force since 1999. In February 2017, negotiations were launched on a comprehensive new agreement between the EU and Azerbaijan, which is to replace the PCA.

On 28 September 2018, the EU-Azerbaijan Partnership Priorities were endorsed by the EU-Azerbaijan Cooperation Council to guide bilateral cooperation in four key areas: (i) economic development and market opportunities; (ii**)** *strengthening institutions and good governance*; (iii) connectivity, energy, environment and climate action; and iv) mobility and people-to-people contacts. EU provides assistance to these areas in the framework of Annual Action Programs 2018-2020. The *Single Support Framework for Azerbaijan for 2018-2020*, as the programming document of EU bilateral assistance under the European Neighbourhood Instrument (ENI), is based on these Partnership Priorities.

[1] Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community

[2] Regulation (EU) No 236/2014 of the European Parliament and of the Council of 11 March 2014 laying down common rules and procedures for the implementation of the Union's instruments for financing external action.

[3] Annex IV to the ACP-EU Partnership Agreement, as revised by Decision 1/2014 of the ACP-EU Council of Ministers (OJ L196/40, 3.7.2014)

[4] Iincluding the Overseas Countries and Territories having special relations with the United Kingdom, as laid down in Part Four and Annex II of the TFEU.

EU cooperation with Azerbaijan supports the country's reform agenda in particular in the areas of economic diversification, *sustainable growth* and social development, good governance and rule of law, and the country's connection to the EU through enhanced connectivity, mobility and people-to-people contacts. EU support is funded through the ENI for the period of 2014-2020.

Support to the reform efforts undertaken by Azerbaijan through (i) strengthening the institutional and administrative capacity and (ii) reinforcing the policy development of selected state institutions involved in the implementation of the Partnership Priorities is also the main focus of the *Multiannual Action Programme 2019-2020 under which this Twinning is funded.*

The Partnership Priorities also support the objectives of the 2030 Agenda for Sustainable Development, including the 17 United Nations (UN) SDGs, the implementation of the 2015 Paris Agreement on Climate Change and Azerbaijan's commitments to address issues of climate change, environmental degradation, poverty and inequality.

This Twinning project intervention will contribute to the implementation of reforms under priority area 3 – Connectivity, energy, ***environment and climate action*** *as well as main policy objectives of the Eastern Partnership policy beyond 2020 Reinforcing Resilience – an Eastern Partnership (EaP) that delivers for all, in particular, Policy objective 4.3 –* ***Together towards environmental and climate resilience****.*[5]

The **National Hydrometeorological Service (NHMS)** under the **Ministry of Ecology and Natural Resources (MENR)**[6] is the government institution, which is envisaged as the principal direct recipient of targeted support under the project.

2.3.2 National Policy Development Programmes/Plans

Link to Azerbaijan 2030: National Priorities for Socio-Economic Development[7]

In February 2020, Azerbaijan has adopted five national priorities for socio-economic development until 2030. Priority No 5 recognizes the impact of climate change on socio-economic development and calls for a clean environment and "green growth" to both mitigate and adapt to climate change.[8]

As stipulated under priority 5, the country must maintain a quality and clean environment and ensure the efficient use of resources. "The focus should be on comprehensive solutions to environmental problems that have existed for many years and sustainable development in this area. The risks to the environment from economic and demographic growth must be reduced and the ecological environment must be balanced with economic growth".

Considering the significant impact of hydrometeorological and climate events on the planning and implementation of socio-economic activities, high quality hydrometeorological and climate services providing historical and real time observational data with advanced forecasting and early warning ability as well as long term climate predictions are needed to sustain economic development in Azerbaijan and protect its people from weather, water and climate change induced hazards. Therefore, improvement of hydrometeorological and climate services particularly forecasting and multi-hazard early warning system will further serve to balance between economic growth and environment quality.

Link to the other related strategies and relevant state programmes

Environmental protection and sustainable use of natural resources as well as addressing of natural disasters are reflected in several state programmes and roadmaps:

- *Strategic Roadmap on production and processing of agricultural products in the Republic of Azerbaijan*[9] sets out the short term (2020), mid-term (2025) and long-term (2030 and beyond) reform agenda of the government to diversify the economy and move towards a private sector led growth model. Environmental protection, sustainable use of natural resources and management of effects of natural factors on agriculture are among nine priorities of the roadmap.

[5] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020JC0007
[6] http://eco.gov.az/az/hidrometeorologiya/fealiyyet-istiqametleri
[7] Joint Communication to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, Eastern Partnership policy beyond 2020 Reinforcing Resilience - an Eastern Partnership that delivers for all (https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020JC0007&from=EN)
[8] https://president.az/articles/50474
[9] Approved by the presidential decree on 6 December 2016 (https://azertag.az/store/files/Strateji_yol_xeritesi/strateji_yol_xeritesi_kend_teserrufati_mehsullarinin_istehsalina_ve_emalina_dair.pdf)

- *State Programme on Development of Earth Remote Sensing Services in the Republic of Azerbaijan for 2019-2022*[10] aims to support the socio-economic and technological development of the country through the use of satellite surveillance services in various fields.
- *National Strategy on Improvement of Solid Waste Management in the Republic of Azerbaijan for 2018-2022*[11] addresses issues related to environmental protection, public health protection through optimization of waste collection and transportation system as well as modernization and reconstruction of solid waste management.
- *National Strategy for the Efficient Use of Water Resources and Action Plan* for its implementation, developed with the technical support of the Organization for Economic Cooperation and Development (OECD). The strategy envisages the implementation of short-term (2021-2026), medium-term (2027-2032) and long-term (2032-2038) goals.
- *Draft Socio-economic development strategy for 2021-2025: High Quality Environment* Modernization of hydrometeorological observation system, improvement of the early warning system as well as data analysis and archiving system will be one of the main focus area of the strategy.

Considering that implementation of the energy policy requires hydrometeorological data and services, the project will also support implementation of the energy policy by providing services for renewable energy generation with wind power, solar power and hydro power plants.

2.3.3 The climate policy, which is directly related to the hydrometeorological services will be supported by the project activities. International Conventions ratified by Azerbaijan

Azerbaijan has ratified and is a party to numerous international environmental conventions and agreements, including those are related to hydrometeorology and climate change. The full list of international environmental conventions and agreements ratified by Azerbaijan is attached in *Annex 2*. These conventions and agreements, and related programmes and plans shall be taken into consideration while preparing the project document, particularly updating the legislative framework and reorganization of the National Hydrometeorological Service (NHMS).

3 Description

3.1 Background and justification

3.1.1 Country profile

The Republic of Azerbaijan with a total area of 86,600 square km is a country located at the boundary of Eastern Europe and Western Asia. It is a part of the Caucasus region, and is bounded by the Caspian Sea to the east, Russia to the north, Georgia to the northwest, Armenia and Turkey to the west, and Iran to the south. Baku is the capital and largest city. The Nakhchivan Autonomous Republic of Azerbaijan in the southwest is separated from the rest of the country by Armenia.

The economy of the country is driven mainly by oil and gas production, chemicals and petrochemicals, metallurgy, mechanical engineering, textiles and the agri-food industry.

Hydrometeorological and climate situation

Natural disasters originating from hydrometeorological hazards have regularly impacted a high percentage of the territory of the country. According to Azerbaijan's Technology Needs Assessment (TNA) for the United Nations Framework Convention on Climate Change (UNFCCC)[12], the incidence of flood events increased drastically from just two events in 1999 to a peak of 27 events in 2003 and 22 events in 2008 causing significant cost.[13] As another example, in 2003 and 2010, there were floods in the Kura and Araz rivers. The 2003 flood alone affected 30,000 people, resulting in EUR 62 million in damages.[14] In order to eliminate and reduce potential future damages, the Government spent up to USD 400 million.[15] Landslides, debris flows, and mudflows have destroyed irrigation systems, agricultural

[10] http://www.e-qanun.az/framework/40724
[11] Approved by the presidential decree on 1 November 2018 (http://www.e-qanun.az/framework/40445)
[12] Azerbaijan's Technology Needs Assessment report for UNFCCC: http://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TNR_CRE/e9067c6e3b97459989b2196f12155ad5/99b521f6c47a46828ec8da459add5095.pdf
[13] Azerbaijan's Second National Communication report to the UNFCCC: https://unfccc.int/resource/docs/natc/azenc2.pdf
[14] https://www.adb.org/sites/default/files/publication/707466/climate-risk-country-profile-azerbaijan.pdf
[15] Climate Technology Centre & Network: https://www.ctc-n.org/sites/www.ctc-n.org/files/request/ctcn_technicalassistance_azerbaijan.pdf

facilities, and road infrastructure. Floods are among the most frequent and destructive disasters and have been the source of fatalities and millions of euros worth of economic loss.

High temperature and heatwaves are the other important hazards affecting whole country. Climate predictions show that climate change will increase impact of these hazards particularly on human health and energy sector towards 2090.[16]

Rising temperatures and lower average rainfall lead already to water stress and increasing the risk of extended drought and soil degradation. Furthermore, the Caspian Sea ecosystem is a closed basin with level amongst others governed by the flows from its contributing rivers. Any large increase of inflow could raise the level of the Caspian Sea, as has happened in the past, and result in coastal flooding in Azerbaijan.

Global climate change in recent years has increased the frequency and intensity of hazardous hydrometeorological events (floods, hurricanes, storms, droughts, heatwaves etc.), further actualized hydrometeorological activities, and set important tasks for the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan. Reliable and timely provided well-prepared hydrometeorological forecasts and warnings, as well as seasonal predictions and climate projections are crucial to assist with emergency management, routine operations, and for longer-term disaster risk reduction strategy planning.

3.1.2 Current scope of hydrometeorological and climate services provided by the NHMS

The National Hydrometeorological Service (NHMS) is the primary public source for weather, climate and water information, forecasts and warnings, and relevant services for public and main economic sectors in Azerbaijan in accordance with Law on Hydrometeorological Activities, approved by the presidential decree on 17 April 1998.[17]

The NMHS operates an observation network consisting of two main components - meteorological observation network and hydrological observation network, including in-situ observing systems and remote sensing observing systems. The Hydrometeorological Forecasts Office (Bureau) of the NHMS prepares and issues short-range, medium-range and long-range weather forecasts, hydrological forecasts of water discharge in rivers, and early warnings against hydrometeorological and climate hazards. TURKMETCAP software is the main tool of forecasting process for data collection, processing, visualisation, archiving and dissemination of the data from several sources including national observation network, Global Telecommunication System (GTS) of the World Meteorological Organization, satellites of European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), Numerical Weather Prediction (NWP) model outputs.

Information on daily observations and weather forecasts, as well as warnings for floods, mudflows, and actual water content observed in rivers are continuously posted on the website of the MENR, (www.eco.gov.az), while information on the short-range weather forecasts and warnings of hazardous hydrometeorological conditions are shared with the government agencies, relevant organizations and especially the Ministry of Emergency Situations by fax and e-mail.

The details of the observing network structure, services delivered by the NHMS, including Information and Communication Technology (ICT) system in use as well as developments are given in Annex 3.

3.1.3 Challenges to be addressed

Service delivery capacity

Despite significant improvements in the technical infrastructure, particularly in observation network and ICT systems in recent years, current technical capacities and staff capabilities do not allow the NHMS to produce, manage, translate and transmit timely, accurate and efficient hydrometeorological data and information to stakeholders and end users. For example, the NHMS cannot make the best use of NWP as well as hydrological and agrometeorological forecasting models that are available from the world's leading weather and climate forecasting centres, e.g. the European Centre for Medium-Range Weather Forecasts (ECMWF)[18]. Due to lack of technical capacities for analysis, modelling, and forecasting the NHMS cannot:

- prepare forecasts of high temporal and spatial resolution;
- prepare impact based and probabilistic forecasts;

[16] https://www.adb.org/sites/default/files/publication/707466/climate-risk-country-profile-azerbaijan.pdf
[17] http://www.e-qanun.az/framework/3290
[18] https://www.ecmwf.int/

- assess and use of snow cover (snow depth, density and water equivalent in snow) information in hydrometeorological forecasts;
- set up accurate water balances and planning for water resources allocations, river basin water management, and prognoses of future conditions due to lack of simulation models for water resources systems;
- evaluate the effects of climate change on rainfall and streamflow by deterministic models driven with plausible climate change scenarios;
- prepare precise climate change scenarios to predict changes of air temperature, precipitation and other climatic elements according to these scenarios.

Although the NHMS provides some warnings against hazards, the NHMS does not have a systematic multi-hazard early warning system for major hazards, e.g. drought, landslides, windstorms, hailstorms.

There is no electronic library or national bank of hydrometeorological and climate data open to everyone. The existing hydrometeorological data of the NHMS are open to public agencies for official use whilst access to such data for private sector use is fee based.[19] A more differentiated approach following government open data policy could be explored to encourage business development in this sector and limiting fee based services to value added products provided by the NHMS.

One of the most important challenges faced by NHMS is insufficient visibility and awareness at government and local community level of the value of meteorological and hydrological services provided by it for public safety and for weather-, climate-, and water-sensitive economic development. Enhancing this visibility and awareness of the good work performed already requires an upgrade of its communication strategy and skills. In addition, service levels need to be further enhanced by addressing the above identified shortcomings.

Legal base

The primary law regulating the sector's activities is the Law on Hydrometeorological activities. This Law determines the legal basis for conducting observations, research and work of active impact on atmospheric processes, developments, use and protection of data by hydrometeorology and monitoring of the environment in the Republic of Azerbaijan. However, it does not fully support the modern approach towards hydrometeorological data use. Data policy for provision of data to users, regulations for service delivery within the scope of the modern service delivery strategy, commercialization of certain services, compliance with the international standards and regulations, partnerships with public and private agencies are missing or not clearly defined in existing legislation.

More detailed information on the legal acts regulating hydrometeorological activities in Azerbaijan is given in Annex 4.

The NHMS and MENR have therefore concluded that a review and harmonization of the Law on hydrometeorological activities to EU legislation regarding hydrometeorological and climate services is required to enable the NHMS to better fulfil and widen its mission.

Applicable union acquis together with other international regulations and guidelines are defined in section 3.4 with a list submitted in Annex 5.

Institutional capacity and organizational structure

The NHMS consists of central and regional units as described in Annex 6. A brief analysis of the existing organisational structure and the use of existing resources showed that the functions and tasks of the central and regional units are not well defined, and do not answer to requirements for provision of high quality services: For example, it was observed that operation and maintenance of the observing network is centralised which increases the operational costs and decreases efficiency, and regional units do not have sufficient capacity to prepare local forecasts and warnings, and communicate with local government authorities.

Moreover, departments responsible for strategic planning and development as well as education and training are missing. There is a strong need to revise organisation and strengthen capacities of some departments such as Forecasting and Warnings, Research and Development as well as Operation and Maintenance.

According to NHMS human resource statistics (*see Annex 6 for details*) more than half of the staff have a university degree while the remainder has high school or technical school degrees. These education levels of university and high school degrees respond in principle to the criteria of the World Meteorological Organization (WMO) for meteorologists/hydrologists and meteorological/hydrological

[19] http://www.e-qanun.az/framework/4876/

technicians respectively. However, staff education and skill levels to meet competency requirements of the WMO particularly for aviation meteorological services and some other tasks remains to be assessed.

Cooperation and exchanging the data and experiences with the neighbouring and other relevant National Meteorological and Hydrological Services, and involving in regional and global projects are essential and indispensable activities for improving the service delivery capacity of the NHMS.

An indicative list with capacity building requirements already identified is submitted in Annex 7.

a) Technical gaps

Main technical shortcomings of the NHMS are related to the need of application of modern approaches in the complete hydrometeorological and climate services value chain: from technology and techniques for observation, and data management to data analysis and forecasting as well as the products dissemination to users.

Data collection, analysis and processing

At present, making observations, data management, analysis and forecast issuance are carried out using semi-automatized observation and ICT systems. The existing systems do not have sufficient capacity for fully automated processes and infrastructure for collecting, processing, visualising, archiving and disseminating of data and products. Lack of an integrated ICT system comprising an advanced data collection system, a database management system, a weather forecasting system, a multi-hazard early warning system, and a communication and dissemination system is one of the major gaps of technical infrastructure of the NHMS.

Modelling and forecasting

In addition to the general weather forecasts provided to the public, meteorological services often provide a range of more specialized products tailored to different users, and a number of these are potentially of use in hydrological modelling. Examples include short-range quantitative precipitation forecasts (QPF) for flood forecasting purposes and water supply operations, seasonal meteorological forecasts for drought and agricultural applications, and air temperature, precipitation, pressure and other meteorological variables to be used as inputs for general and tailored forecasts. However, due to low technical capacity and lack of sufficient number of qualified experts in the field of meteorological forecasting, including now casting utilization of NWP models, and statistical methods as well as forecast verification, the NHMS is not able to fulfil its mandates for weather forecasts effectively.

The purpose-made and impact based forecast products appropriate to the users, and to decide how best to disseminate that information in time to be useful are not available in the existing service delivery of the NHMS. Due to lack of tools and decision-making techniques used in flood warning, pollution alert, reservoir control and other applications as well as problems related to visualisation of the information, the NHMS cannot provide decision makers with timely and accurate information for immediate response.

Commercial services

Currently, the NHMS is providing certain paid services based on the order of the Cabinet of Ministers "On approval of payment rates and rules for the use of information on hydrometeorology and environmental monitoring"[20], which gives it some autonomy in its financial and human resources management. However, the revenues gained from the commercial activities are still very small and the NHMS is keen on growing the business. The NHMS is willing to widen such services to meet the needs of various sectors linked to weather and climate services (transport, agriculture, construction, fishing, energy, tourism, health, insurance, etc.). But, there is no well-developed commercialization and marketing strategy of the NHMS including potential market analysis as well as availability and development of the commercial products and services.

3.2 Ongoing reforms

To ensure safety of the population and their property against hydrometeorological and climate hazards as well as to enhance the efficient use of hydrometeorological and climate services by various sectors of the economy in the country, a number of efforts has been taken by the Government of Azerbaijan in recent years.

To this end, the president issued a decree on 16 December 2020 on the establishment of the NHMS The NHMS was to amalgamate the services of the National Environmental Monitoring Department, the National Hydrometeorology Department, the Hydrometeorological Research Institute, the Metrology and Standardization Centre and the Environmental Laboratory Centre of the MENR. The purpose of the

[20] http://www.e-qanun.az/framework/6302

reorganization of these services under the roof of the NHMS was to streamline and better coordinate their meteorological and climate related functions and resources.

3.3 Linked activities

The EU supports several water, environment and climate related programmes and projects in EaP countries at regional level. These include the ongoing EU4 Environment, EU4 Climate, the third phase of the regional programme for prevention, preparedness and response to natural and man-made disasters (PPRD East 3) and the completed Water Initiative + and Shared Environmental Information Services (SEIS) II. These serve amongst others:

- to contribute to climate change mitigation and adaptation and to the development towards a low-emissions and climate-resilient economy in line with the Paris Agreement;
- to improve the management of water resources, in particular transboundary rivers, developing tools to improve the quality of water in the long term, and its availability for all;
- to strengthen national Early Warning Systems and develop stronger national analytical capabilities for national multi-risk assessments and further strengthen the national capabilities for disaster loss assessment;
- to continue to implement the principles and practices of the Shared Environmental Information System;
- to improve their convergence with European legislation and regulations that contribute to improved air quality and strengthen implementation and compliance, as well as to improve the implementation of multilateral environmental agreements.

A follow-up project to the completed WI+ and SEIS II "EU4Environment programme in the Eastern Partnership countries – Water Resources and Environmental Data" is expected to start in early 2022.

At the bilateral level, EU Twinning support to Azerbaijan having ended in 2019 aimed at strengthening environmental monitoring systems ensuring provision of high quality information that supports strategic environmental policy planning and compliance control.

Moreover, aiming to integrate water resources management in the Kura river basin to address the water-energy-food-ecosystem security nexus, the United Nations Development Programme (UNDP) supported Azerbaijan to implement the Strategic Action Program (SAP) for the Kura River Basin in partnership with the Governments of Georgia and Azerbaijan.

The Green Climate Fund (GCF) in partnership with the United Nation Development Programme (UNDP) supports the Government of Azerbaijan in facilitating the development of a National Adaptation Plan (NAP) and the improved climate change adaptation actions in Azerbaijan in three priority sectors identified by the Ministry of Ecology and Natural Resources (MENR) through stakeholder consultations: water, agriculture and coastal areas.

Detailed information on EU and other donors' activities in the sector is given in Annex 8.

Coordination with other on-going EU interventions and other donors' activities, in particular, EU4Climate projects (developing NDC update) and UNDP GCF (developing NAP) should be ensured to better coordinate donor activities in the field as well as to avoid any further overlapping and duplication. Moreover, future update of NDC of Azerbaijan (expected by the end of this year), National Adaptation Strategy should be consulted by project leaders and the beneficiary, to guide the scope of possible competences needed for the beneficiary to handle the future workload linked to implementation of the above mentioned documents.

3.4 List of applicable Union acquis/standards/norms

There are several directives, regulations, recommended practices and guidelines of the EU, WMO and ICAO regarding the provision of weather, climate and water related services against which Azerbaijan wishes to align its legislative and implementation framework (listed in *Annex 5*)

These include making observations, preparing and issuing forecasts and warnings, flood risk management, civil protection, climate, climate change mitigation and adaptation, air navigation services, open data policy and staff competency requirements. These shall be considered during the implementation of the project for the improvement of service delivery capacity of the NHMS.

3.5 Components and results per component

The following project components and results shall support the achievement of overall and specific objective of this Twinning.

Component 1: Strengthening the strategic, legal and institutional framework for sustainable and effective provision of hydrometeorological and climate services

This component is designed to assess the legal framework and identify the evolving needs for regulating the implementation of the NHMS' mandate, its organization and prerogatives in the organization, conducting of hydrometeorological and climate observations, preparation and dissemination of forecasts and meteorological and hydrological warnings as well as to propose new texts or amendments aligned with international standards, including general meteorological standards and recommended practices defined by the WMO.

Reviewing existing and establishing of a new strategic framework for effective hydrometeorological and climate services will facilitate the integration of hydrometeorological and climate services in key policies, strategies, plans and will therefore provide a foundation for the uptake of hydrometeorological and climate information in decision-making. It will allow to provide government authorities and decision makers in Azerbaijan with a strategic framework for improvements in the hydrometeorology and multi-hazard early warning system (MHEWS) to deliver socio-economic benefits to the population, safeguard their lives, livelihoods, and property as well as support and protect economic investments for sustainable of economic development.

Moreover, reorganization of the National Hydrometeorological Service (NHMS) that allow to *perform its tasks more efficiently will be supported under this component.*

All mentioned above, including an optimised organisational set-up will facilitate sustainable service provision in the long term beyond the project's implementation period.

Result 1: National legislation regulating provision of hydrometeorological and climate services aligned with EU acquis and WMO standards and recommended practices

Result 2: Strategic framework established to further improve effective hydrometeorological and climate services

Result 3: Reorganisation of the National Hydrometeorological Service (NHMS) supported considering EU and international best practice examples

Component 2: Improving technical, operational and communication capacities of the NHMS

The aim of this component is to improve the technical and operational capacity of the NHMS for a better meteorological, hydrological and climate service delivery.

Observations are the essential and indispensable inputs of any process for preparation of all meteorological, hydrological and climate related products and services. The component will provide guidance and improve the capacity for redesign, establishment and proper operation of the observation network strongly needed for the provision of high quality services for the Azerbaijan community.

Weather and hydrological forecasts and warnings, and climate predictions as the basic and well-known services of the NHMS have vital importance for planning and implementation of the activities of economic sectors, disaster management, protection of lives and properties, supporting the decision-making processes for many applications.

The component will improve the forecasting capacity by ensuring better utilization of NWP models from the ECMWF or other international organizations, using nowcasting models for very short range forecasting, new methods and technologies for forecasting processes including applications of agrometeorological forecast models.

The component will also set up practical solutions to improve internal and external communication and coordination capacity of the NHMS for the delivery of hydrometeorological and climate services for better management of natural disasters.

Furthermore, the component will provide guidelines for an ICT system, including system design and technical specification, with the capability of data collection, product generation, database management, visualisation, archiving and dissemination functions which is an essential component of the service delivery mechanism.

To better respond to corresponding needs of both the public and private sectors with well-developed commercialised services, demand-based services will be improved and the service delivery scope will be expanded. To this end NHMS capacity for needs assessment/market research and market-oriented product development will be enhanced. This implies expanding the supply of services to sectors increasingly affected by weather, climate and water such as transport, agriculture, construction, fishing, energy, tourism, health, insurance, etc. The project will undertake market research as regards these sectors' requirements to guide the development of corresponding new products. The project will also develop and initiate the implementation of a strategy for commercializing some of these services as may be applicable and including a corresponding marketing strategy.

Support the NHMS to explore and identify priority areas in hydrometeorological and climate issues that require cooperation at the regional and global scale as well as development of the regional and international cooperation and coordination roadmap will strengthen cooperation capacity in meteorology, hydrology and climate services, and improve the visibility of the NHMS in international platforms.

Result 4: Technical and operational capacities of the NHMS improved for better provision of meteorological, hydrological and climate observations, and data management

Result 5: Automation of the forecasting, early warning and information dissemination systems enhanced

Result 6: Internal and external communication and coordination capacity of the NHMS strengthened

Result 7: Demand-based and commercialised service delivery capacity of the NHMS strengthened

Component 3: Human resource development
The aim of this component is to equip NHMS' staff with enhanced professional knowledge and skills necessary to better conduct hydrometeorological observations, preparation and dissemination of forecasts.

The component will focus on building capacity of the main beneficiary and relevant stakeholders in new techniques and methodologies, in particular as regards weather forecasting, early warnings, climate service production, database management, commercialization.

A list of indicative (but not necessarily complete) areas is provided in Annex 4.

Result 8: Hydrometeorological and climate services delivery capacity of NHMS staff strengthened

3.6 Means/input from the EU Member State Partner Administration(s)

The project will be implemented in the form of a Twinning Grant Contract between the final beneficiary country and an EU Member State(s). The implementation of the project requires one Project Leader (PL) with responsibility for the overall coordination of project activities and one Resident Twinning Adviser (RTA) to manage the implementation of project activities, three Component Leaders (CL) and a pool of short-term experts (STEs) within the limits of the budget. It is essential that the team has sufficiently broad expertise to cover all areas included in the project description.

Proposals submitted by Member States shall be concise and focused on the strategy and methodology and an indicative timetable underpinning this, the administrative model suggested, the quality of the expertise to be mobilised and clearly show the administrative structure and capacity of the Member State entities. Proposals shall be detailed enough to respond adequately to the Twinning Fiche, but are not expected to contain a fully elaborated project. They shall contain enough detail about the strategy and methodology and indicate the sequencing and mention key activities during the implementation of the project to ensure the achievement of overall and specific objectives and mandatory results/outputs.

The interested Member State(s) (MS) shall include in their proposal the Curriculum Vitae (CVs) of the designated Project Leader (PL) and the Resident Twinning Advisor (RTA), as well as the CVs of the potentially designated Component Leaders (CLs).

The Twinning project will be implemented in close cooperation between the partners aiming to achieve the mandatory results in a sustainable manner.

The set of proposed activities will be further developed with the Twinning partners when drafting the initial work plan and successive rolling work plans every three months, keeping in mind that the final list of activities will be decided upon in cooperation with the Twinning partner. The components are closely inter-linked and need to be sequenced accordingly.

3.6.1 *Profile and tasks of the PL*

The PL will be responsible for the overall planning and implementation of the thrust of the MS inputs in this Twinning project and will ensure the achievement of the mandatory results.

The PL is expected to be able to devote sufficient time per month from his home country to assess the progress of the project and attend the steering committee meetings.

In cooperation with the Beneficiary Country Project Leader appointed by the Beneficiaries, she/he will be responsible to coordinate the Project's steering committee (PSC), which includes the RTA and representative of the Programme Administration Office (PAO) and the Office of the EU Representative.

The Project Leader shall be a senior staff member at an EU Member State public (governmental) body.

Minimum requirements for the PL's profile are:

- University degree in a field relevant to the assignment or equivalent professional experience of eight years;
- Minimum of three years of specific experience relevant to the assignment;
- Very good spoken and written English (at least level 2 on a scale of 1 [excellent] to 5 [basic]);

Advantages:

- Previous experience in managing multi-disciplinary and multinational teams and ideally including in Twinning projects;
- Azerbaijani, Turkish or Russian language skills.

Main tasks:

- To supervise and coordinate the overall project preparation;
- To supervise, guide and monitor project implementation towards timely achievement of project results;
- To liaise with the Beneficiary Country (BC) administration at the political level;
- To ensure timely availability of expertise;
- To prepare the project progress report with the support of the RTA;
- To co-chair the project steering committees.

3.6.2 *Profile and tasks of the RTA*

The Resident Twinning Adviser (RTA) will be based in Azerbaijan to provide full-time input and advice to the project for its entire duration. She/he will be in charge of day-to-day project implementation and coordination of project activities according to a predetermined work plan and liaise with CLs. She/he should co-ordinate the project and have a certain level of understanding of all the components.

Minimum requirements for the RTA's profile are:

- University degree relevant to the assignment or equivalent professional experience of 8 years;
- Minimum of three years of specific experience relevant to the assignment;
- Very good spoken and written English (at least level 2 on a scale of 1 [excellent] to 5 [basic]);

Advantages:

- Previous work experience in EU MS hydrometeorological and/or climate service or similar;
- Previous experience in similar international capacity building projects in the sector and ideally in Twinning projects;
- Azerbaijani, Turkish or Russian language skills.

Main tasks:

- To coordinate and assure project implementation and implementation of all project activities;
- To prepare the initial and subsequent work plans and project progress reports, together with the PL;
- To assure the coherence and continuity of the successive inputs and the on-going progress;
- To coordinate the activities of all team members in line with the work plan;
- To assess continuously project progress to assure its timely implementation;
- To prepare the material for regular monitoring and reporting;
- To liaise with MS and BC PLs and maintain regular contact with the BC;
- To provide technical advice, support and assistance to the beneficiary institution in the areas specified in the work plan;
- To liaise with the European Union Delegation (EUD) Project Manager;
- To liaise with other relevant institutions in Azerbaijan and with other relevant projects.

The RTA will be supported by an assistant that will handle administrative arrangements for conferences, training, seminars, etc. including provision of interpreters and the ensuring of translations.

A full-time interpreter/translator may also be recruited in Azerbaijan and be funded by the project. She/he will perform most of the required interpretation/translation services. Additional interpretation may be procured and funded by the project under special circumstances such as simultaneous interpretation.

3.6.3 *Profile and tasks of Component Leaders:*

The CLs will work in close cooperation with the RTA and the beneficiary administration in order to meet the mandatory results. Their main task is to plan and coordinate the activities under their respective areas of responsibility in collaboration with the partner institutions.

Minimum requirements for the Component Leaders' profile are:

- University degree closely related to the assignment for which the expert is proposed or equivalent professional experience of 8 years;
- Minimum of three years of specific experience relevant to the assignment;
- Very good spoken and written English (at least level 2 on a scale of 1 [excellent] to 5 [basic].

Advantages:

- Previous experience in similar capacity building projects in the sector and ideally in Twinning projects;
- Azerbaijani, Turkish or Russian language skills.

Main tasks:

- To provide component coordination, guidance and monitoring in close cooperation with the BC component leader, RTA and RTA counterpart;
- Preparation of Terms of Reference (ToR) for short term expert missions relevant to their component and overseeing the implementation of STE missions;
- Continually monitoring objective achievements related to their component and comparing actual progress with the specified benchmarks and time-frame;
- Support the RTA in the preparation of the interim, quarterly and final reports related to their component;
- To provide practical expertise and technical advice, as well as coaching to the relevant staff in the Beneficiary administration for the execution of activities relevant for their project components;
- To analyse policies and practices in the thematic area relevant to their respective component;
- To support drafting of action plans, training plans, studies;
- To prepare and conduct training programs, to facilitate stakeholders' dialog;
- To draft technical documents relevant to their component's results in close cooperation with the BC counterparts;
- To suggest improvements of relevant procedures and systems.

3.6.4 *Profile and tasks of other short-term experts:*

STEs should be identified by the PL/RTA and will be agreed upon with the Beneficiary Administration during the negotiation phase of the Twinning contract following these indicative (but not exclusive) areas:

- Legal expertise in the field of hydrometeorology and climatology;
- Institution development in the field of hydrometeorological and climate services provision;
- Numerical Weather Prediction;
- Weather forecasting expert (s) tailored to various sectors of the national economy identified by the beneficiary;
- Computer programming and database development applied to the meteorological field;
- ICT Expert on hydrometeorological and climate applications;
- Specialist in weather observing systems;
- Communication specialist in the field of meteorology, hydrology and climatology;
- Early Warning System (EWS) / Natural Disaster Management;
- Institutional cooperation in the field of meteorology, hydrology and climatology;
- Marketing /Sales in the field of hydrometeorological and climate services provision;
- Cost accounting with the ability to develop a model with an Excel / Access;
- Human Resources (HR) Management.

Minimum requirements for the profile are:

- University degree relevant to the assignment or equivalent professional experience of 8 years;
- Minimum of three years of specific experience relevant to the assignment;
- Very good spoken and written English (at least level 2 on a scale of 1 [excellent] to 5 [basic]).

Advantages:

- Previous experience in similar capacity building projects in the sector and ideally Twinning projects;
- Azerbaijani, Turkish or Russian language skills

Main tasks:

- To provide advice, expertise and/or coaching to relevant staff of the Beneficiary administration for the execution of specified project activities;
- To plan and deliver capacity building activities (workshops/seminars/training sessions/study tours);
- To suggest improvements to relevant procedures and systems including suggestions for the revision of the regulatory framework;

- To provide support in drafting action plans and roadmaps;
- To report on the results of the missions;
- To liaise with RTA and BC counterparts.

4 Budget

Maximum Budget available for the Twinning Grant is *EUR 1,500,000*.

5 Implementation Arrangements

5.1 Implementing Agency responsible for tendering, contracting and accounting (AO/CFCU/PAO/European Union Delegation/Office)

The Delegation of the European Union to the Republic of Azerbaijan (EUD) in Baku, Azerbaijan will be responsible for the tendering, contracting, payments and financial reporting. EUD will work in close co-operation with the Beneficiary.

The persons in charge of the project at the EUD are:

Mr. Victor BOJKOV
Head of Cooperation
Tel. +994 12 497 20 63 (ext. 853)
Victor BOJKOV@eeas.europa.eu

Mr. Rainer FREUND
Programme Manager
Tel. +994 12 497 20 63 (ext.846)
Rainer.Freund@eeas.europa.eu

Mrs. Lucia di TROIA
Head of Contracts, Audit and Finance
Tel. +994 12 497 20 63 (ext.830)
DELEGATION-AZERBAIJAN-FCA-SECTION@eeas.europa.eu

5.2 Institutional framework

The National Hydrometeorological Service under the Ministry of Ecology and Natural Resources is the main beneficiary of the project..

The structure of the MENR and NHMS is given in Annex 6.

5.3 Counterparts in the Beneficiary administration

The PL and RTA counterpart will be staff of the Beneficiary administration and will be actively involved in the management and coordination of the project.

5.3.1 Contact person:

For the Programme Administration Office in Azerbaijan (PAO)

Inara Mustafayeva Acting Director of PAO
Acting Head of the Department on Cooperation with International organizations
Ministry of Economy
Government House, Uzeyir Hajibayli Str. 84, Baku, AZ 1000 Azerbaijan
inara.mustafayeva@economy.gov.az

Mrs Narmin Alasgarova, PAO Manager
Head of Division on Cooperation with EU
Department on Cooperation with International organizations
Ministry of Economy
Government House, Uzeyir Hajibayli Str. 84, Baku, AZ 1000 Azerbaijan
narmin.alasgarova@economy.gov.az

For the direct beneficiary administration:

Mrs Tahmina Gafarova

Deputy Head of Hydrometeorological Centre
Baku city, Heydar Aliyev avenue 10
tahmina.qafarova@eco.gov.az

5.3.2 PL counterpart

Mrs Umayra Taghiyeva
Head of National Hydrometeorological Service, NHMS
Baku city, Heydar Aliyev avenue 10
umayra.taghiyeva@eco.gov.az

5.3.3 RTA counterpart

Mr Cavid Huseynov
Head of Hydrometeorological Measures Centre, NHMS
Baku city, Heydar Aliyev avenue 10
javid_huseynov@eco.gov.az

6 Duration of the project

Execution period of the project shall be *27 months (24 months of implementation + 3 months closure period).*

7 Management and reporting

7.1 Language

The official language of the project is the one used as contract language under the instrument (English). All formal communications regarding the project, including interim and final reports, shall be produced in the language of the contract.

7.2 Project Steering Committee

A project steering committee (PSC) shall oversee the implementation of the project. The main duties of the PSC include verification of the progress and achievements via-à-vis the mandatory results/outputs chain (from mandatory results/outputs per component to impact), ensuring good coordination among the actors, finalising the interim reports and discuss the updated work plan. Other details concerning the establishment and functioning of the PSC are described in the Twinning Manual.

7.3 Reporting

All reports shall have a narrative section and a financial section. They shall include as a minimum the information detailed in section 5.5.2 (interim reports) and 5.5.3 (final report) of the Twinning Manual. Reports need to go beyond activities and inputs. Two types of reports are foreseen in the framework of a Twining project: interim quarterly reports and a final report. An interim quarterly report shall be presented for discussion at each meeting of the PSC. The narrative part shall primarily take stock of the progress and achievements via-à-vis the mandatory results and provide precise recommendations and corrective measures to be decided by in order to ensure the further progress.

8 Sustainability

The sustainability of achievements of this project will be assured by the adoption of best practices and solutions at the system level, thus preparing the grounds for Azerbaijani enhanced compliance with the selected EU Acquis and specifically best European practices in the field of hydrometeorological and climate services provision. New policy directions, strategies and practices will be proposed by the project. In their development a participatory and facilitative approach will be used in order to create ownership of the process and the results. Involvement of all relevant stakeholders will assure that the developed policy options have adequate acceptance among national partners. Mechanisms for communication and dialog between the public institutions and international organisations introduced by the project are meant to be a lasting contribution of the project to the policy issues related to hydrometeorology and climate services provision in Azerbaijan.

The sustainability of mandatory results is best ensured when policy and legislative proposals are backed up by at least basic impact assessments (regulatory, fiscal) and if they are achieved in consultation with

both internal and external stakeholders (inter-ministerial and public consultations), as required by Beneficiary country legislation. Sufficient time will be allocated to preparatory work during the project to avoid fast-track legislative procedures that could jeopardize implementation and compliance with future legislation.

The sustainability of achievements is also dependent on the commitment of the Beneficiary administration. Sufficient number of personnel from the Beneficiary administration will be assigned to work on the implementation of the project. Capacity building of staff will be reinforced by the development of manuals and guidelines which will be translated in the local language. The training materials in both English and Azerbaijani languages will be at the Beneficiary's disposal to multiply and/or scale up the training and/or to update it, should the need arise. Project interventions are meant to reach the level of management practices in the relevant institutions and every-day procedures which should ensure that the results of the project last beyond the project's timeframe.

9 Crosscutting issues (equal opportunity, environment, climate etc…)

Equal opportunity in the project will be assured in accordance with EU standards and equal opportunity policies. Equal treatment of women and men will be observed in the project staffing, implementation and management. In particular, attention to the equality principle will be given to the selection of personnel for training and capacity building activities.

The project implementers will maintain statistics in this regard and report on them. The principle of implementation of this Twinning project is based on a paperless work environment. This means, in particular, minimising paper use during project implementation by the maximum feasible use of e-mails and, if available, project web-site and/or project electronic data base for cooperation between partners. Documents are automatically saved in electronic format.

Relevant project information and all communication and visibility materials must be updated and approved by the EU Delegation through the EU's project communication database 'EUDIGITOOL'. All visibility and communication material will be kept up to date throughout the lifetime of the project. The use of the 'EUDIGITOOL' approval system is a mandatory requirement.

10 Conditionality and sequencing

There is no conditionality set for this project as the external conditions for achieving the results of this intervention are present - the Beneficiary has demonstrated a commitment in the development of this project.

11 Indicators for performance measurement

The indicators for measuring success of project implementation are linked to the Mandatory Results / Components that have been outlined above in Section 3.5. The logical framework, including indicators, will be revisited during the inception period of the project. The workplan which will be composed in collaboration with the MS and NHMS will further specify the indicators.

Key performance indicators by mandatory results are outlined below:

Result 1 – National legislation regulating provision of hydrometeorological and climate services aligned with EU acquis and WMO standards and recommended practices*:*

- Report on analysis of current Law on Hydrometeorological activities and related legislation as regards its consistency with relevant provisions contained in other AZ laws; as regards gaps when compared with relevant EU and WMO standards and recommended practices as well as in regard to responding to national needs;
- Draft new Primary Law on hydrometeorological activities and other related legislative acts, regulating hydrometeorological and climate services;
- Number of staff[21] trained on international conventions and regulations related to meteorology, hydrology and climate.

Result 2 – Strategic framework established to further improve effective hydrometeorological and climate services*:*

- Report on analysis of current policy and development strategy, inclusion of hydrometeorological and climate services in key policies and strategic plans as well as functionality of the various elements of multi-hazard early warning system;

[21] Minimum indicative target number of trained legal, strategy and organization development staff is 10, as identified in Annex 1 (Logical framework matrix)

- A strategic roadmap and action plan with short-, medium- and long-term targets and activities, including proposed investments for the improvement of the NHMS' capacity and the establishment of a multi-hazard early warning system based on the best EU and international practices;
- Implementation of action plan commenced.

Result 3 – Reorganisation of the National Hydrometeorological Service (NHMS) supported considering EU and international best practice examples:

- Report on assessment on the central and regional units of the NHMS including assigned tasks, technical and human capacities, gaps and challenges, and recommendations for its optimisation for a better service delivery ensuring effective use of resources;
- Proposal on a new optimised organisational structure(s) and restructuring plan with well-defined roles and responsibilities for the new / upgraded structures as well as job profiles and job descriptions for various positions;
- Awareness of NHMS[22] raised on WMO standards, regulations and recommendations and EU best practices with regard to organisational set up as well as roles and responsibilities of the National Hydrometeorological Service providers.

Result 4 – Technical and operational capacities of the NHMS improved for better provision of meteorological, hydrological and climate observations, and data management:

- Analytical report on the adequacy of the existing observation network, including methods used for observations, data collection practices and capabilities, spatial coverage gaps considering river basins, and detailed recommendations for alignment with best applicable standards and practices;
- A detailed roadmap for upgrading of the observation network with concrete targets including relevant technical specifications and cost estimates of the proposed observing systems;
- Operation and maintenance strategy developed for proposed enhanced observing network and related ICT systems;
- A proposal for a single centralised low cost or no cost freeware Database Management System for hydrometeorological, climate and environment data developed based on open source database management software;
- Number of staff[23] trained and skilled with new methods and technologies to better operate and maintain observation network.

Result 5 – Automation of the forecasting, early warning and information dissemination systems enhanced:

- Report on the assessment of existing capabilities and capacities for general weather forecasts, hydrological forecasts, early warnings against hydrometeorological hazards and long-term climate predictions with recommendations for alignment with best applicable standards and practices;
- A concept note that includes verification methods and new methodologies for improvement of forecasting capabilities using automatic supportive tools;
- Number of improved (or newly developed) written/documented and tested methodologies[24] for meteorological, hydrological and agrometeorological forecasting including agrometeorological applications such as seeding and harvest time estimation, cultivation activities, frost warnings;
- Improved impact based and probabilistic forecasting method;
- A written guideline for the establishment and efficient operation of the Multi-Hazard Early Warning System (MHEWS) in Azerbaijan;
- Written methodological guidelines to assess and forecast water levels in rivers to minimise flood impact developed and in use;
- A manual of Numerical Weather Prediction procedures, data assimilation and using automation tools of forecasting production in line with relevant regulatory and guidance documents of the WMO (e.g. manual on GDPFS);
- Number of applied well known numeric weather prediction models[25] together with data assimilation procedures, as well as post processing system;

[22] Minimum indicative number of NHMS staff is 100, as identified in Annex 1 (Logical framework matrix)

[23] Minimum indicative total target number of trained data management staff, data analysists, and maintenance staff is 45, as identified in Annex 1 (Logical framework matrix)

[24] Minimum indicative number of improved/newly developed documented and tested methodologies is 3, as identified in Annex 1 (Logical framework matrix)

[25] Minimum indicative number of applied well known numeric weather prediction models is 3, as identified in Annex 1 (Logical framework matrix)

- Standard Operating Procedures (SOP) for the management of early warnings, elaborated, accepted and implemented by the BA;
- Adapted hydrological forecasting models and techniques including flood forecasting, and implementation of dissemination software (based on GIS-Web technologies);
- Number of staff[26] trained on new forecasting methods, techniques and numerical weather prediction models.

***Result 6 – Internal and external communication and coordination capacity of the NHMS strengthened**:*

- A communication and dissemination strategy for weather, water and climate information to targeted users;
- A set of mechanisms for user engagement i.e. to obtain feedback on user requirements and user satisfaction with the services;
- Awareness of relevant NHMS staff increased on regional and international hydrometeorological and climate organisations
- Explored and identified priority areas for the regional and international cooperation;
- Draft regional and international cooperation and coordination roadmap.

***Result 7 – Demand based and commercialised service delivery capacity of the NHMS strengthened**:*

- Strategy and action plan to guide the development of new meteorological, hydrological and climate related products identified by project's market research;
- Strategy and action plan for marketing and sales of meteorological, hydrological and climate services;
- Manual on conducting marketing services in the field of meteorology, hydrology and climatology;
- Proposal for determining costs and prices for such products;
- Operational know-how in marketing and sales techniques transferred to the NHMS.

***Result 8 – Hydrometeorological and climate services delivery capacity of NHMS staff strengthened**:*

- Report on analysis of training needs, including but not necessarily limited to the following: weather, climate and hydrological forecasters (at least 35), data management staff (at least 10) and data analysists (at least 10), maintenance (at least 25), marketing (at least 5) and communication staff (at least 5), legal, strategy and organisation development staff (at least 10);
- Training Programme to be implemented as training of trainers with detailed curricula for the above group of NHMS staff involved in hydrometeorological and climate services endorsed by the NHMS;
- Training packages, approved by the head of the NHMS;
- % of (at least 100) staff gained knowledge and new skills with regard to forecasting / multi-hazard early warnings / hydrological warnings / climate predictions / database management / operation and maintenance / communication / commercialization.

12 Facilities available

The Beneficiary commits itself to deliver the following facilities:

- Adequately equipped office space for the RTA and the RTA's assistants for the entire duration of the secondment;
- Supply of an office room including access to computer, telephone, internet, printer, photocopier;
- Adequate conditions for the STEs to perform their work while on missions;
- Provide suitable venues for the meetings and training sessions that will be held under the project;
- Availability of staff that will be involved during the implementation of the Twinning project;
- Full coordination and transparency are expected among all key players involved.

[26] Minimum indicative number of trained forecasters is 35, as identified in Annex 1 (Logical framework matrix)

Abbreviations

ACP	African, Caribbean and Pacific
BA	Beneficiary Administration
BC	Beneficiary Country
CCA	Climate Change Adaptation
CFCU	Central Financing and Contracting Unit
CL	Component Leader
CV	Curriculum Vitae
EaP	Eastern Partnership
ECMWF	European Centre for Medium-Range Weather Forecasts
EEA	European Environment Agency
EN	Environment Sector
ENI	European Neighbourhood Instrument
ENP	European Neighbourhood Policy
ENPI	European Neighbourhood and Partnership Instrument
EU	European Union
EUD	European Union Delegation
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EUWI	European Union Water Initiative
EWS	Early Warning System
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GoA	Government of Azerbaijan
GTS	Global Telecommunication System
ICAO	International Civil Aviation Organization
ICT	Information and Communication Technology
ISO	International Organization for Standardization
IWRM	Integrated Water Resource Management
LEDS	Low-Emission Development Strategy
MENR	Ministry of Ecology and Natural Resources
MHEWS	Multi-Hazard Early Warning System
MS	Member State
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NHMS	National Hydrometeorological Service
NWP	Numerical Weather Prediction
OECD	Organization for Economic Cooperation and Development
PAO	Programme Administration Office
PCA	Partnership and Cooperation Agreement
PL	Project Leader
PPF	Partnership Priorities Facility
PSC	Project Steering Committee
QPE	Quantitative Precipitation Estimation
QPF	Quantitative Precipitation Forecasts
RMDCN	Regional Meteorological Data Communication Network

RTA	Resident Twinning Adviser
SAP	Strategic Action Program
SDG	Sustainable Development Goal
SEIS	Shared Environmental Information System
STE	Short-Term Expert
TNA	Technology Needs Assessment
ToR	Terms of Reference
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development
VSAT	Very Small Aperture Terminal
WFD	Water Framework Directive
WISE	Water Information System for Europe
WMO	World Meteorological Organization

ANNEXES TO PROJECT FICHE

Annex 1: Simplified Logical framework matrix as per Annex C1a

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
Overall Objective	Resilience and adaptive capacity of Azerbaijan, its people and economic sectors to climate-related hazards and natural disasters enhanced	Decrease in economic losses from weather, climate and water induced disasters *baseline – 0 (2021); target – 10% (2024)*	▪National disaster management reports ▪State Statistics Committee		
		Decrease in the number of deaths, missing persons and directly affected persons from weather, climate and water induced disasters per 100,000 population *baseline – 17.1 (2019); target – 10 (2024)*	▪National disaster management reports ▪State Statistics Committee		
Specific (Project) Objective(s)	Service delivery capacity of the National Hydrometeorological Service (NHMS) improved in line with international standards and best practices to meet national needs	Increased users' satisfaction rate with the services of the NHMS *(baseline – 0; target – 80%)*	▪Government reports ▪User satisfaction statistics of the NHMS ▪Mass media	▪Unstable political environment impacting the implementation of the project ▪Limited access of the users to the services of the NHMS ▪Lack of efficient and sustainable communication mechanisms to understand user needs ▪Lack of sufficient human and material	▪Political willingness and continuous commitment of national authorities ▪Effective monitoring of the project ▪Sufficient internal resources of the main beneficiary for participation in twinning activities ▪Government has national climate
		Increase in revenue received from the commercial services *(baseline – 0; target – 20%)*	▪Government reports ▪Annual budget statistics of the NHMS		
		Number of tailored services and products available to the interested parties *(baseline – 0; target – 10)*	▪Government reports ▪Project reports ▪Services and products inventory list of the NHMS		

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
		Increased number of cooperation with private agencies within the scope of Public Private Partnership *(baseline – 0; target – 3)*	▪Government reports ▪Project reports	resource at the main beneficiary ▪High staff turnover ▪Difficulties and delays related in adoption of the related new/amended legislative acts ▪Language problem of the staff for training given by the foreign experts ▪Lack of sufficient awareness among the sectors on climate change and climate services	change adaptation strategy
Component 1: Strengthening the strategic, legal and institutional framework for sustainable and effective provision of hydrometeorological and climate services					
Mandatory results/outputs by components	**Result 1:** National legislation regulating provision of hydrometeorological and climate services aligned with EU acquis and WMO standards and recommended practices	Report on analysis of current Law on Hydrometeorological activities and related legislation as regards its consistency with relevant provisions contained in other AZ laws; as regards gaps when compared with relevant EU and WMO standards and recommended practices as well as in regard to responding to national needs *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Assessment report on the legislation including the gaps and needs to update	▪Insufficient experience of employees in drafting specific legal amendments, regulatory and supervisory documents ▪Lack of commitment and support from different authorities	▪Political willingness to establish strategic development framework for the provision of the sustainable and effective hydrometeorological and climate services

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
		Draft new Primary Law on hydrometeorological activities and other related legislative acts, regulating hydrometeorological and climate services *(baseline – 0; target – 10)*	▪ Project technical and progress reports ▪ A legislative framework proposed for updating the existing legislation ▪ List of validated legal acts ▪ Mass media	and stakeholders for existing status analysis and updates of legislation ▪ Slow progress on the adaptation, approval and implementation of the proposed legislation updates	▪ Approval of amendments and new legislation is at least partly achieved ▪ Efficient coordination with relevant public administrations legislative committees ▪ Availability, attendance and stability of participants in twinning activities
		Number of staff trained on international conventions and regulations related to meteorology, hydrology and climate *(baseline – 0; target – 10)*	▪ Project technical and progress reports		
	Result 2: Strategic framework established to further improve effective hydrometeorological and climate services	Report on analysis of current policy and development strategy, inclusion of hydrometeorological and climate services in key policies and strategic plans as well as functionality of the various elements of multi-hazard early warning system *(baseline – 0; target – 1)*	▪ Assessment report ▪ Project technical and progress reports ▪ Government reports ▪ Mass media		
		A strategic roadmap and action plan with short-, medium- and long- term targets and activities, including proposed investments for the improvement of the NHMS' capacity and the establishment of a multi-hazard early warning system based on the best EU and international practices *(baseline – 0; target – 1)*	▪ A roadmap with achievable targets and applicable activities ▪ Project technical and progress reports ▪ Government reports ▪ Mass media	▪ Insufficient resources to adapt and implement the proposed restructuring process ▪ Unpreparedness of the NHMS for organizational restructuring	▪ Well understanding of the needs for restructuring by the decision makers ▪ Willingness, commitment and determination in the management of the

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
		Implementation of action plan commenced *(baseline – 0; target – 1)*	▪ Government reports on implementation of the action plan		beneficiary institutions for restructuring ▪ Availability, attendance and stability of participants in twinning activities
	Result 3: Reorganisation of the National Hydrometeorological Service (NHMS) supported considering EU and international best practice examples	Report on assessment on the central and regional units of the NHMS including assigned tasks, technical and human capacities, gaps and challenges, and recommendations for its optimisation for a better service delivery ensuring effective use of resources *(baseline – 0; target – 1)*	▪ Assessment report on the organizational structure and institutional capacity ▪ Project technical and progress reports ▪ Government reports	▪ Insufficient resources to adapt and implement the proposed restructuring process ▪ Unpreparedness of the NHMS for organizational restructuring	▪ Well understanding of the needs for restructuring by the decision makers ▪ Willingness, commitment and determination in the management of the beneficiary institutions for restructuring ▪ Availability, attendance and stability of participants in twinning activities
		Proposal on a new optimised organisational structure(s) and restructuring plan with well-defined roles and responsibilities for the new / upgraded structures as well as job profiles and job descriptions for various positions *(baseline – 0; target – 1)*	▪ Project technical and progress reports ▪ Proposal on new organisational structure		
		Awareness of NHMS raised on WMO standards, regulations and recommendations and EU best practices with regard to organisational set up as well as roles and responsibilities of the National Hydrometeorological Service providers *(baseline – 0; target – 100)*	▪ Project technical and progress reports		
Component 2: Improving technical, operational and communication capacities of the NHMS					

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
Mandatory results/outputs by components	**Result 4**: Technical and operational capacities of the NHMS improved for better provision of meteorological, hydrological and climate observations, and data management	Analytical report on the adequacy of the existing observation network, including methods used for observations, data collection practices and capabilities, spatial coverage gaps considering river basins, and detailed recommendations for alignment with best applicable standards and practices *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the developed assessment report	▪Low absorption capacity of the NHMS to absorb project deliverables ▪Resistance to change and development ▪Limited commitment from the managers/ high level decision-makers of the beneficiary institutions and relevant personnel to participate in the activities of the project ▪Lack of sufficient data to make a precise assessment on the technical and operational capacities	▪Willingness, commitment and determination of the beneficiary institutions to strengthen hydrometeorological and climate services provision ▪Government provides support to make available adequate technical, financial and human resources for implementation of the project activities ▪Availability, attendance and stability of participants in twinning activities
		A detailed roadmap for upgrading of the observation network with concrete targets including relevant technical specifications and cost estimates of the proposed observing systems *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the endorsed roadmap		
		Operation and maintenance strategy developed for proposed enhanced observing network and related ICT systems *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Endorsed strategy		
		A proposal for a single centralised low cost or no cost freeware Database Management System for hydrometeorological, climate and environment data developed based on open source database management software *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪A database in use and related reports		
		Number of staff trained and skilled with new methods and technologies to better operate and maintain observation network *(baseline – 0; target – 45)*	▪Project technical and progress reports		

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
	Result 5: Automation of the forecasting, early warning and information dissemination systems enhanced	Report on the assessment of existing capabilities and capacities for general weather forecasts, hydrological forecasts, early warnings against hydrometeorological hazards and long-term climate predictions with recommendations for alignment with best applicable standards and practices *(baseline – 0; target – 1)*	▪ Project technical and progress reports ▪ Copy of the endorsed assessment report	▪ Lack of support and willingness from the NHMS staff for improvement of the forecasting capabilities ▪ Resistance to change and development ▪ Limited commitment from the managers/ high level decision-makers of the beneficiary institutions and relevant personnel to participate in the activities of the project ▪ Lack of sufficient data to make a precise assessment on the forecasting capabilities ▪ Lack of good communication and cooperation with relevant users particularly with agricultural sector ▪ Lack of sufficient capacity of the staff to adapt and use the new methods and tools	▪ Willingness, commitment and determination of the beneficiary institutions to strengthen hydrometeorological and climate services provision ▪ Government provides support to make available adequate technical, financial and human resources for implementation of the project activities ▪ Availability, attendance and stability of participants in twinning activities
		A concept note that includes verification methods and new methodologies for improvement of forecasting capabilities using automatic supportive tools *(baseline – 0; target – 1)*	▪ Project technical and progress reports ▪ Copy of endorsed concept note		
		Number of improved (or newly developed) written/documented and tested methodologies for meteorological, hydrological and agrometeorological forecasting including agrometeorological applications such as seeding and harvest time estimation, cultivation activities, frost warnings *(baseline – 0; target – 3)*	▪ Project technical and progress reports ▪ Deliverable for the list of the methodologies		
		Improved impact based and probabilistic forecasting method *(baseline – 0; target – 1)*	▪ Project technical and progress reports ▪ Copy of the developed methodology		

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
		A written guideline for the establishment and efficient operation of the Multi-Hazard Early Warning System (MHEWS) in Azerbaijan *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪A guideline prepared for MHEWS		
		Written methodological guidelines to assess and forecast water levels in rivers to minimise floods impact developed and in use *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the methodological guidelines		
		A manual of Numerical Weather Prediction procedures, data assimilation and using automation tools of forecasting production in line with relevant regulatory and guidance documents of the WMO (e.g. manual on GDPFS) *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the endorsed manual		
		Number of applied well known numeric weather prediction models together with data assimilation procedures, as well as post processing system *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Applied models in use		
		Standard Operations Procedures (SOP) for the management of early warnings, elaborated and accepted by the BA *(baseline – 0; target – XX)*	▪Project technical and progress reports ▪Copies of the SOPs		
		Adapted hydrological forecasting models and techniques including flood forecasting, and implementation of dissemination software (based on GIS-Web technologies) *(baseline – 0; target – 2)*	▪Project technical and progress reports ▪Models and techniques in use		

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
		Number of staff trained on new forecasting methods, techniques and numerical weather prediction models *(baseline – 0; target – 35)*	▪Project technical and progress reports		
	Result 6: Internal and external communication and coordination capacity of the NHMS strengthened	A communication and dissemination strategy for weather, water and climate information to targeted users *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the endorsed strategy	▪Lack of sufficient awareness of the targeted groups to involve in the process ▪Lack of sufficient communication between public and private agencies	▪Willingness and determination of the NHMS management for communication and coordination with internal and external entities ▪Availability of the legislation allowing partnership between public and private agencies ▪Availability, attendance and stability of participants in twinning activities
		A set of mechanisms for user engagement i.e. to obtain feedback on user requirements and user satisfaction with the services *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Mechanisms available for users		
	Result 7: Demand-based and commercialised service delivery capacity of the NHMS strengthened	A strategy and an action plan to guide the development of new meteorological, hydrological and climate related products identified by project's market research *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the strategy and action plan	▪Third parties are not cooperative nor interested by new products. ▪Low visibility and awareness of NHMS and its products among the economic sectors and community	▪The internal resources required for a market study are mobilized ▪Effective coordination between the financial and functional departments of the BA ▪Availability, attendance and stability
		Strategy and action plan for marketing and sales of meteorological, hydrological and climate services *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the strategy and action plan		

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
		Manual on conducting marketing services in the field of meteorology, hydrology and climatology *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪Copy of the manual	▪Insufficient quality of the services to meet user requirements ▪Availability of the other sources to meet user requirements (e.g. global service providers via internet or mobile applications) ▪Unavailability of adequate staff and funds for the implementation of the proposal may jeopardize the job done by the experts	of participants in twinning activities
		Proposal for determining costs and prices for such products *(baseline – 0; target – 1)*	▪Project technical and progress reports		
		Operational know-how in marketing and sales techniques transferred to the NHMS staff *(baseline – 0; target – 10)*	▪Project technical and progress reports ▪Report on the hands-on trainings		
Component 3: Human resource development					
	Result 8: Hydrometeorological and climate services delivery capacity of NHMS staff strengthened	Report on analysis of training needs, including but not necessarily limited to the following: weather, climate and hydrological forecasters (at least 35), data management staff (at least 10) and data analysists (at least 10), maintenance (at least 25), marketing (at least 5) and communication staff (at least 5), legal, strategy and organisation development staff (at least 10) *(baseline – 0; target – 1)*	▪Project technical and progress reports ▪TNA report	▪Difficulties in implementing capacity building activities due to unpredictable conditions (e.g. pandemic) ▪Unsuitable environment for the fully adaptation of the best practices	▪Willingness, commitment and determination of the beneficiary institutions to strengthen hydrometeorological and climate services provision

	Description	Indicators (with relevant baseline and target data)	Sources of verification	Risks	Assumptions (external to project)
		Training Programme to be implemented as training of trainers with detailed curricula for the above group of NHMS staff involved in hydrometeorological and climate services endorsed by the NHMS *(baseline – 0; target – 1)*	▪ Project technical and progress reports ▪ Copy of the training programme	▪ Unsustainability of the staff to be trained ▪ Language problem of the staff for training given by the foreign experts	▪ Access is ensured to the required information of the staff for the staff capacity assessment and preparation of the training programs
		Training packages, approved by the head of the NHMS *(baseline – 0; target – 7)*	▪ Project technical and progress reports ▪ Copies of the training packages		
		% of employees gained knowledge and new skills with regard to forecasting / multi-hazard early warnings / hydrological warnings / climate predictions / database management / operation and maintenance / communication / commercialization *(baseline – 0; target – %)*	▪ Project technical and progress reports ▪ Training report		

Annex 2: International Conventions and Treaties in environment and climate sector ratified in Azerbaijan

Year	Convention/Agreement	Year of ratification in Az	Ratified
1948	International Union for Conservation of Nature (IUCN)	2015	Yes
1951	International Plant Convention	2000	Yes
1957	(GENEVA) European Agreement – International Carriage of Dangerous Goods by Road (ADR)	2000	Yes
1971	(RAMSAR) Convention on Wetlands of International Importance Especially as Waterfowl Habitat	2001	Yes
	1982 (PARIS) Amendment		
	1987 (REGINA) Amendments		
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	1997	Yes
	1978 Amendments (incineration)		
	1980 Amendments (list of substances)		
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and Flora	1998	Yes
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL)	2004	Yes
	1978 (LONDON) Protocol (segregated ballast)		
	1978 (LONDON) Annex I on Prevention of pollution by oil	2004	Yes
	1978 (LONDON) Annex II on Control of pollution by noxious liquid substances	2004	Yes
	1978 (LONDON) Annex III on Hazardous Substances carried in packaged form	2004	Yes
	1978 (LONDON) Annex IV on Sewage	2004	Yes
	1978 (LONDON) Annex V on Garbage	2004	Yes
	1978 (LONDON) Annex VI on Prevention of Air Pollution from Ships	2004	Yes
1979	European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) Annex A Provisions Concerning Dangerous Substances and Articles Annex B Provisions Concerning Transport Equipment and Transport Operations	1999	Yes
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats	1999	Yes
1985	(VIENNA) Convention for the Protection of the Ozone Layer	1996	Yes
	1987 (MONTREAL) Protocol on Substances that Deplete the Ozone Layer	1996	Yes
	1990 (LONDON) Amendment to Protocol	1996	Yes
	1992 (COPENHAGEN) Amendment to Protocol	1996	Yes
	1997 (MONTREAL) Amendment to Protocol	2000	Yes
	1999 (BEIJING) Amendment to Protocol	2012	Yes
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	2001	Yes
	1995 Ban Amendment		
	1999 (BASEL) Protocol on Liability and Compensation		
1992	(RIO) Convention on Biological Diversity	2000	Yes
	2000 (CARTAGENA) Protocol on Biosafety	2005	Yes
1992	(NEW YORK) Framework Convention on Climate Change	1995	Yes
	1997 (KYOTO) Protocol	2000	Yes
1994	(PARIS) Convention to Combat Desertification	1998	Yes
1979	(GENEVA) Convention on Long-range Trans-boundary Air Pollution (LRTAP)	2002	Yes

Year	Convention/Agreement	Year of ratification in Az	Ratified
	1984 (GENEVA) Protocol - Financing of Co-operative Programme (EMEP)		
	1985 (HELSINKI) Protocol - Reduction of Sulphur Emissions by 30%		
	1988 (SOFIA) Protocol - Control of Emissions of Nitrogen Oxides		
	1991 (GENEVA) Protocol - Volatile Organic Compounds		
	1994 (OSLO) Protocol - Further Reduction of Sulphur Emissions		
	1998 (AARHUS) Protocol on Heavy Metals		
	1998 (AARHUS) Protocol on Persistent Organic Pollutants	2003	Yes
	1999 (GOTHENBURG) Protocol to Abate Acidification, Eutrophication and Ground-level Ozone		
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context	1999	Yes
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Watercourses and International Lakes	2000	Yes
	1999 (LONDON) Protocol on Water and Health	2002	Yes
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents	2004	Yes
1994	(LISBON) Energy Charter Treaty	1997	Yes
	1994 (LISBON) Protocol on Energy Efficiency and Related Aspects	1997	Yes
1995	(ROME) The Rome Consensus on World Fisheries. Adopted by the FAO Ministerial Conference on Fisheries.	2013	Yes
1998	(AARHUS) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	1999	Yes
	2003 (KIEV) Protocol on Pollutant Release and Transfer Register		
2000	(FLORENCE) The European Landscape Convention	2011	Yes
2001	(STOCKHOLM) Convention on Persistent Organic Pollutants	2004	Yes
2003	(TEHERAN) Framework Convention for the Protection of the Marine Environment of the Caspian Sea	2006	Yes
2011	(AKTAU) Protocol Concerning Regional Preparedness, Response and Co-operation in Combating Oil Pollution Incidents	2012	Yes
2012	(MOSCOW) Protocol for the Protection of the Caspian Sea against Pollution from Land-based Sources and Activities	2014	Yes
2014	(ASHGABAT) Protocol for the Conservation of Biological Diversity		
2015	Paris agreement on climate change		

Annex 3: Current status and services of the NHMS

a) Mandates and Tasks of the NHMS

Current NHMS was established on the basis of the National Environmental Monitoring Department, the National Hydrometeorology Department, the Hydrometeorological Research Institute, the Metrology and Standardization Centre and the Laboratory Centre for the Environment under the presidential decree on 16 January 2019[1]. The activities of the NHMS are regulated by its Statute approved by the presidential decree on 27 March 2020[2] and the Law on the Hydrometeorological Activities, approved by the presidential decree on 17 April 1998.

As stipulated in the Statute, main mandates and responsibilities of the of the NHMS are:

- to ensure the organization and conduct of hydrometeorological observations, preparation and dissemination of forecasts and warnings;
- to study the hydrometeorological regime and climatic features of the territory of the Republic of Azerbaijan, including the section of the Caspian Sea (lake) belonging to Azerbaijan;
- to study, analyse and forecast hydrometeorological events and processes in the territory of the Republic of Azerbaijan, including the upper layers of the atmosphere;
- to carry out active influence on hydrometeorological and other geophysical processes in order to reduce and prevent the possible damage to the population and economy;
- to perform other duties assigned to NHMS by the Ministry in accordance with the legislation.

Based on the main mandates and responsibilities defined in the existing legislation, the main tasks performed by the National Hydrometeorological Service are listed below:

- to make the meteorological, hydrological and climate observations,
- to provide observational data and information on the daily meteorological events to the public,
- to prepare short, medium and long range forecasts,
- to prepare early warnings against hazardous events,
- to disseminate forecasts and warning products to the public and relevant management authorities,
- to prepare climate scenarios of several periods from months to hundred years,
- to prepare tailored products and services depending on the sectoral based requirements and user demands (e.g. short-range forecasts of rainfall for hydrological models for flood forecasting and water management, seasonal forecasts for drought and agricultural applications, frost warnings for agricultural sector),

b) Hydrometeorological and Climate Observations

The existing hydrometeorological observing network was established based on manual observing systems of human observers and conventional observing instruments.

The types of the observations made by the NHMS are meteorological, climatological, aeronautical, hydrometeorological, aerological, agrometeorological, hydrological and marine hydrometeorological.

Specific observations such as radio-meteorological ozonometric, actinometric and heat balance are available in the observing network.

The main weather parameters (air temperature, precipitation, visibility, relative humidity, atmospheric pressure, cloudiness, atmospheric phenomena, wind, etc.) are observed at manual stations and reported every 3 hours on a daily basis.

There is a process under execution for expansion of the observing network and establishment of Automatic Weather Stations (AWSs). The main structure of observing network is as follows:

- 84 operational meteorological stations (with 3 hours observations); (67 with AWS)
- 75 operational meteorological posts (with limited observations of temperature once a day, precipitation twice a day)
- 101 hydrological stations (observations maximum of twice a day)
- 4 weather radar stations in operation as legacy from the Soviet Union with old technology

[1] Decree of the President of the Republic of Azerbaijan on measures to improve the structure and management of the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, dated 16 January 2019 (https://president.az/articles/31541/print)

[2] https://president.az/articles/36259/print

c) Forecasts and Warning Services

The Hydrometeorological Forecasts Office (Bureau) of the NHMS prepares and issues the following meteorological and hydrological forecasts and warnings:

- Short range forecasts (including daily forecasts, 48 and 72 hours forecasts) for seven regions of the Republic of Azerbaijan and Baku city;
- Monthly weather forecasts for 7 regions of the Republic of Azerbaijan;
- Short range forecasts-term (half-day, daily, 48 and 72 hours forecasts) marine hydrometeorological forecasts compiled for 6 rivers of the Caspian Sea;
- Warning of expected natural hazards having potential of disasters;
- Medical-meteorological forecasts;
- Daily flow forecast to large reservoirs (Mingachevir, Shamkir);
- 2-3 day level forecasts for Kur-Surra, Shirvan and Salyan settlements downstream of Kura river
- Medium range (Ten-days) hydrological forecasts for rivers;
- Extended-range (monthly) hydrological forecasts for rivers;
- Long range (Seasonal) water flow forecasts for large reservoirs;
- Seasonal (Spring-Summer; April-June) flood forecasts.

Information on daily observations and weather forecasts, as well as warnings for floods, mudflows, and actual water content observed in rivers are continuously posted on the website of the Ministry (www.eco.gov.az).

Short-term weather forecasts for the regions of the country, as well as Baku and Absheron Peninsula, warnings of hazardous hydrometeorological conditions and flash flood forecasts are sent to government agencies, relevant organizations and especially the Ministry of Emergency Situations by fax and e-mail. At the same time, the specialists of the Bureau regularly give interviews to the media on the actual and expected situation of the weather.

d) Information and Communication Technologies (ICT)

TURKMETCAP is a data collection, analysis and visualization software used for getting data from several platforms such as Automatic Weather Stations (AWSs), weather radars, satellites, lightning detection systems, Global Telecommunication System (GTS) of the WMO, making data analysis, and generating products and visualisation them particularly for forecasting purposes. In order to improve the foresting capability for high quality forecasts and warnings in Azerbaijan, the TURKMETCAP software was established in 2004 by Turkish State Meteorological Service, and the it was updated with latest version in 2010. In addition to the necessary real time and near real time information used in the preparation of forecasts, numerous prognostic maps, the outputs of Numerical Weather Prediction (NWP) models are obtained through this system.

Very Small Aperture Terminal (VSAT) system for satellite based data exchange: It is possible to connect to the computer network of the Turkish State Meteorological Service through this satellite system.

Roshidromet exchanges information through the UniMASS-Data Switching Center, through which European Centre For Medium-Range Weather Forecasts (ECMWF) forecast maps are obtained. The results of ECMWF Ensemble Prediction System (EPS) are also used in the preparation of forecasts.

The satellite data receiving system gets the data from European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) satellites to use for several applications particularly for forecasting and warnings.

e) Recent developments

Starting from 2003, after Azerbaijan became a member of the World Meteorological Organization (WMO), the State has spent a number of efforts to improve safety of the population and their property in the country, as well as various sectors of the economy, against weather, water and climate related hazards.

Recently, a modernization programme of technical infrastructure including existing observing network and Information and Communication Technology (ICT) systems is under execution in Azerbaijan. Application of new technologies, modernization of working processes was carried out in the direction of hydrometeorological observation and environmental monitoring, modern telecommunication system and climate database were installed for the purpose of data collection, processing, visualisation, dissemination and archiving.

Existing hydrometeorological stations and posts were equipped with new devices and equipment that meeting modern requirements and the number of AWSs was increased up to 67. 34 automatic meteorological stations, 4 automatic naval stations, 25 hydrological stations and six stations for

monitoring of air quality were installed to modernize the hydrometeorological observation network. Two sets of C-Band Doppler Weather Radars with dual polarization capability to meet observational data requirements particularly for nowcasting and early warnings against hazards were installed in Goygol and Shamakhi. Considering that one of the main sectors most vulnerable to climate change is the agricultural sector, 10 agrometeorological stations and seven agrometeorological posts were established.

Currently, a total number of observation stations for collection of climate data at the national level is 89. Azerbaijan coastal meteorological monitoring network includes 79 stations, which belong to the State Hydrometeorological Committee. One station belongs to the national railway administration.

Surface and space-based remote sensing observations are obtained from two doppler radars and the EUMETSAT satellites via EUMETCast respectively, which are providing data and products for several applications particularly for nowcasting and very short range weather forecasting .

Satellites can provide data of cloudiness, precipitation rate, land & sea surface temperature, snow cover, vegetation, forest fire and dust storm. Satellite data is also used in NWP models and climate studies.

Weather radars, as active remote sensing systems providing high resolution real time data from large scale areas, are the backbone of the early warning systems with their capacity for detection and tracking of severe weather phenomena particularly heavy precipitation and strong winds, and providing vital information for nowcasting and early warnings.

Weather radars have the capabilities of determination of time, quantity and location of the precipitation occurred; estimation of time, quantity and location of expected precipitation (Quantitative Precipitation Estimation, QPE), identification of precipitation type (hydrometeor classification).

In September 2016, Climate database (MESSIR-CLIM)and communication system as Message Switching System (MESSIR-COMM) were installed. Since July 2018, Azerbaijan has joined to Regional Meteorological Data Communication Network (RMDCN) to transmit hydrometeorological data to the WMO and GTS. AWSs were installed and made operational in Jojuq Marjanli settlement. Later, in March 2018 in Nakhchivan and Julfa Hydrometeorological Stations (HMSs) of Nakhchivan hydrometeorological department of Nakhchivan AR, and in May 2021 Sadarak HMS were established.

Annex 4: List of relevant Azerbaijani Laws and Regulations

During past years, a number of normative legal acts in the field of hydrometeorology have been adopted, concrete measures have been taken to strengthen hydrometeorological activities.

Main codes and other legal acts that regulate the sector are:

- Water Code (1997);
- Land Code (1999);
- Law on Melioration and Irrigation (1996);
- Law on Water Supply and Waste Water(1999);
- Law on Safety of Hydrotechnical Plants (2002);
- Law on State land cadastre, monitoring of lands and structure of earth (1998);
- Law on specially protected nature areas and objects (2000).

In addition, a large number (more than 75) of Decisions of the Cabinet of Ministers have been issued to support implementation of environmental legislation and related Presidential Degrees and Orders. The following resolutions are among them:

- RESOLUTION No 206 on approval of some rules regarding water legislation of Azerbaijan Republic (Cabinet of Ministers, October 15, 1998);
- RESOLUTION No 195 on approval of Rules on implementation of state control over consumption and preservation of water objects (Cabinet of Ministers, September 25, 1998);
- Resolution No 7 on approval of state water registration rules, (Cabinet of Ministers, January 17, 2000);
- Resolution No 65 (Cabinet of Ministers, of April 12, 1999) About approval of the Instruction about rules of carrying out observations, preparation and use of the data on hydrometeorology and monitoring of the environment belonging to the category of limited and open information (as amended on 08-04-2006)

Annex 5: List of applicable Union acquis/standards/norms and other international regulations

The main related EU directives and regulations are:

1) EU Directive 2007/60/EC on the Assessment and Management of Flood Risks
2) EU Directive 2000/60/EC Water Framework Directive
3) EU Directive 2001/42/EC125 on The Strategic Environmental Assessment (SEA)
4) EU Regulation 2017/373 on Implementing Air Traffic Management (ATM) / Air Navigation Services (ANS) Implementing
5) EU Regulation 2021/1338 amending Implementing Regulation (EU) 2017/373
6) EU Communication COM/2021/82 on Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change
7) EU Regulation 2021/1119: European Climate Law
8) EU Regulation 2021/1119 on Establishing The Framework for Achieving Climate Neutrality in the European Union (amending EU Regulation 2021/1119)
9) EU Regulation 2021/523 on Requirements on Climate Change Mitigation and Adaptation
10) EU Decision 1313/2013/EU on a Union Civil Protection Mechanism
11) EU Regulation 2021/836 amending Decision No 1313/2013/EU on a Union Civil Protection Mechanism
12) EU Directive 2019/1024 on Open Data and the Re-use of Public Sector Information
13) EU Agreement For The Establishment of the Economic Interest Grouping Eumetnet
14) EU Eumetnet- Meteoalarm color coded alert system against meteorological hazards
15) EU Copernicus, Earth Observation Programme

The main related WMO technical regulations, manuals and guidelines are:

16) WMO-Technical Regulations, Volume I- General Meteorological Standards and Recommended Practices (WMO-No.49)
17) WMO-Technical Regulations, Volume II-Meteorological Service for International Air Navigation (WMO-No.49)
18) WMO-Manual on the Global Observing System (WMO-No.544)
19) WMO- Manual on the WMO Integrated Global Observing System (WIGOS) (WMO-No.1160)
20) WMO-Manual on Codes, International Codes, Volume I.1 (WMO-No.306)
21) WMO-Manual on Codes, Regional Codes and National Coding Practices, Volume II (WMO-No.306)
22) WMO-Manual on the WMO Information System (WMO-No.1060)
23) WMO-Manual on the Global Telecommunication System (WMO-No.386)
24) WMO- Manual on Stream Gauging (WMO-No. 1044)
25) WMO-WIGOS Metadata Standard (WMO-No.1192)
26) WMO- Manual on the Global Data-processing and Forecasting System (WMO-No. 485)
27) WMO-Manual on the High-quality Global Data Management Framework for Climate (WMO-No. 1238)
28) WMO- Guide to the Implementation of Quality Management Systems for National Meteorological and Hydrological Services and Other Relevant Service Providers (WMO-No.1100)
29) WMO- Guide to Instruments and Methods of Observation (WMO-No.8)
30) WMO- Guide to Hydrological Practices (WMO-No. 168)
31) WMO- Guide to Agricultural Meteorological Practices (GAMP) (WMO-No-134)
32) WMO- Guide to the WMO Integrated Global Observing System (WMO-No.1165)
33) WMO- Guide to the Global Observing System (WMO-No.488)
34) WMO- Guide to Climatological Practices (WMO-No.100)
35) WMO-Guide to Information Technology Security (WMO-No.1115)
36) WMO-Guide to Virtual Private Networks via the Internet between WMO Information System Centres (WMO-No.1116)

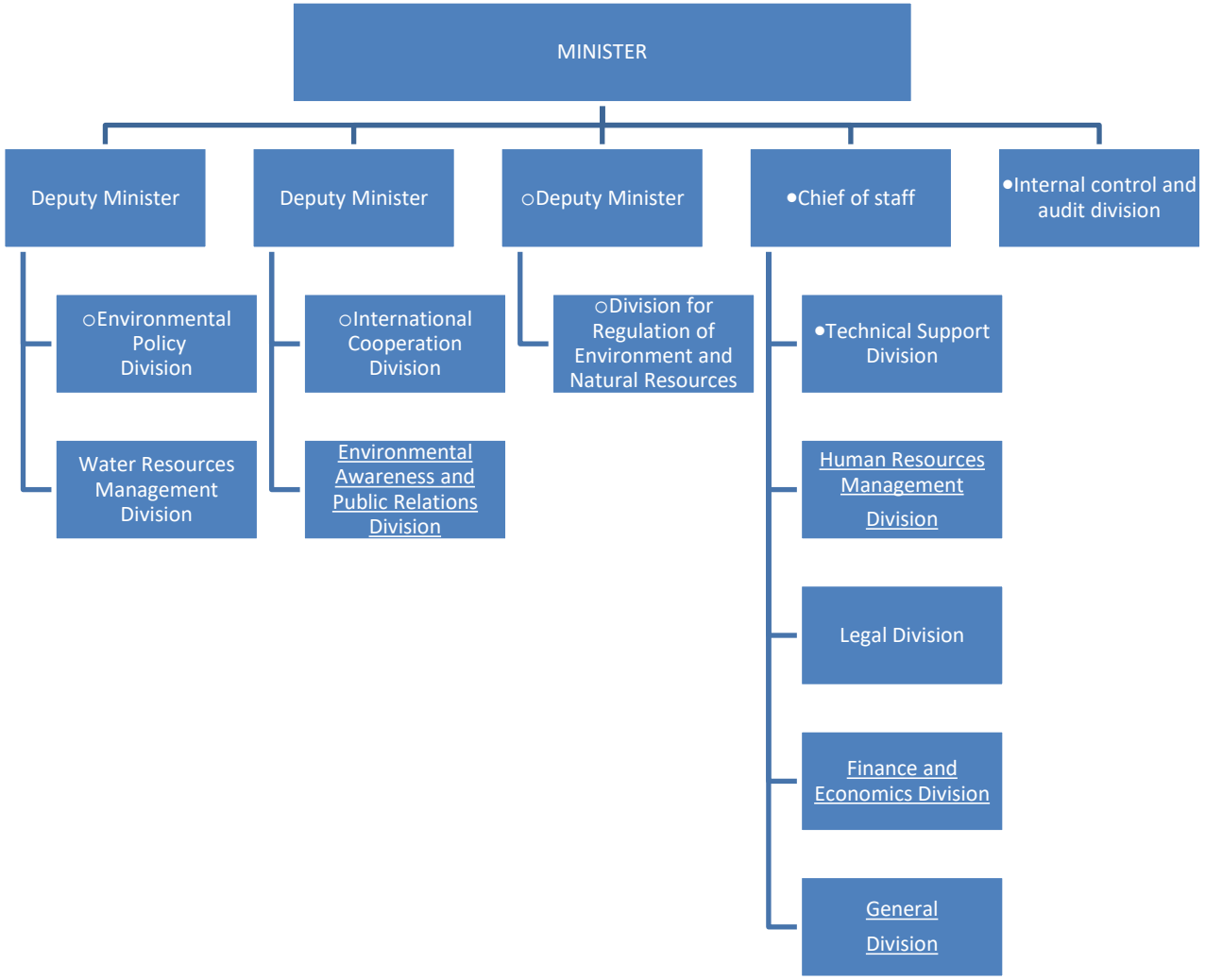
37) WMO-Guide to the Implementation of Education and Training Standards in Meteorology and Hydrology (WMO-No.1083)
38) WMO-Guide to Competency (WMO-No. 1205)
39) WMO-Guidelines on the Role, Operation and Management of National Meteorological and Hydrological Services (WMO-No.1195)
40) WMO- Guidelines on Multi-hazard Impact-based Forecast and Warning Services (WMO-No. 1150)
41) WMO- Guidelines on Ensemble Prediction Systems and Forecasting (WMO-No. 1091)
42) WMO- Guidelines for Implementation of Common Alerting Protocol (CAP)-Enabled Emergency Alerting (WMO-No.1109) WMO- Use of Climate Predictions to Manage Risks(WMO-No. 1174)
43) WMO- Guidelines for Nowcasting Techniques (WMO-No. 1198)
44) WMO- Guidance on Good Practices for Climate Services User Engagement : Expert Team on User Interface for Climate Services (WMO-No. 1214)
45) WMO-The WMO Strategy for Service Delivery and Its Implementation Plan (WMO-No. 1129)
46) WMO-Compendium of WMO Competency Frameworks (WMO-No.1209)
47) WMO-A Disaster Risk Reduction Roadmap for the World Meteorological Organization (WMO,2017)
48) WMO- Multi-hazard Early Warning Systems: A Checklist : Outcome of the first Multi-hazard Early Warning Conference (WMO, 2018)
49) WMO- Capacity Development for Climate Services: Guidelines for National Meteorological and Hydrological Services (WMO-No. 1247)

The main related ICAO documents are:

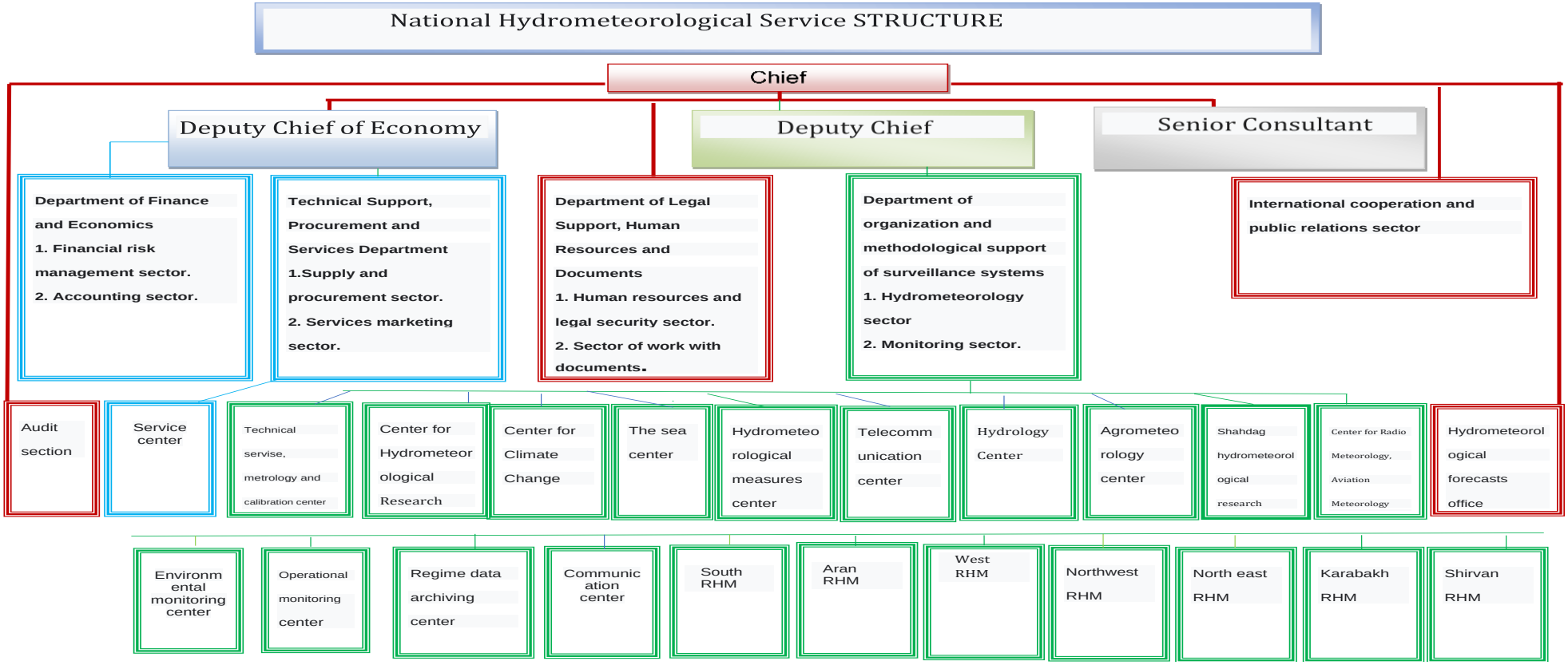
50) ICAO-Annex 3 to the Convention on International Civil Aviation, Meteorological Service for International Air Navigation
51) ICAO-Manual of Aeronautical Meteorological Practice (ICAO-Doc 8896)
52) ICAO-Manual of Runway Visual Range Observing and Reporting Practices (ICAO-Doc 9328)
53) ICAO-Manual on Automatic Meteorological Observing Systems at Aerodromes (ICAO-Doc 9837)

Annex 6: Structure of the Ministry of Ecology and Natural Resources and its subordinated body National Hydrometeorological Service

6.1 Structure of the Ministry of Ecology and Natural Resources



6.2 Structure of the National Hydrometeorological Service



Total number of NHMS staff is 1,052 (455 of them are men and 597 women). 533 staff have high education degree, while 519 of them have high school or technical school degree. 199 staff are under the age of 29, 515 staff are between the ages of 30 and 49, and 338 staff are over the age of 50.

The figures above show that gender balance is relatively achieved and age level of the staff is quite young enough for improvement of their skills and sustainability of the staff for the services.

Annex 7: Indicative list of capacity building needs

1) Utilization and processing of data coming from observing network the NHMS and GTS of the WMO

2) Utilization of remote sensing systems (radars, satellites and lightning detection systems) for nowcasting, very short range forecasting and early warnings

3) Conducting monitoring and assess status of water recourses according to international standards (ISO, EU WFD and others)

4) Sustainable and efficient operation and maintenance of observing network and ICT systems

5) Adaption and utilization of the NWP models, hydrological and agrometeorological forecast models

6) Regional and international cooperation, and exchanging knowledge and experiences

7) Assessment and use of snow information (snow cover, water equivalent and depth) in hydrometeorological forecast;

8) Development and implementation of a verification system for weather forecasts

9) Using new technologies and methods for data processing, forecasting and product dissemination

10) Development of an integrated system to provide sustainable and effective climate services

11) Development of the precise climate change scenarios to predict change of air temperature, precipitation and other climatic elements according to these scenarios

12) Providing sustainable and effective climate services

13) Development of a single comprehensive hydrometeorological and environmental database;

14) Development of mechanisms for user engagement including public and private sectors, academia, NGOs, and individuals in service delivery mechanisms

15) Development methods and tools for assessment of the feedback from the users

16) Development of partnerships with private sectors on service delivery

17) Development of mobile application as an efficient tool to reach the users

18) Development of operation and maintenance strategy for observing network and ICT systems

19) Commercialisation of the hydrometeorological and climate services, including marketing services in field of hydrometeorology and climate

Annex 8: Linked donor activities

EU support

On-going regional EU4Climate project (2019-2022) aims to contribute to climate change mitigation and adaptation and to the development towards a low-emissions and climate-resilient economy in line with the Paris Agreement in Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine. It will assist the EaP countries to integrate the low-emissions and climate resilience objectives into development policies and plans, to improve and consolidate climate policies and legislative alignment.

Actions are clustered around seven priority results: (1) Implementation and update of Nationally Determined Contributions (NDCs) to the Paris Agreement; (2) Development of mid-century Low-Emission Development Strategies (LEDS); (3) Introduction of robust domestic emissions monitoring, reporting and verification (MRV) frameworks; (4) Alignment with EU acquis included in bilateral agreements and Energy Community Treaty on Climate Action; (5) Mainstreaming climate in sectors and sectoral guidelines for the implementation of Paris Agreement; (6) Climate Investment; (7) Adaptation planning.

The Action is implemented by the United Nations Development Programme. The European Commission provides the overall direction.

Completed Twinning project "Upgrading the National Environmental Monitoring System (NEMS) of Azerbaijan on the base of EU best practices" (2016-2019) aims to strengthen environmental monitoring system ensuring provision of the high quality information that does support strategic environmental policy planning and compliance control. The project mainly focused on improvement of the institutional and human capacity of MENR in air quality monitoring and management.

Completed technical assistance project "Implementation of the principles and practices of the shared environmental information system (SEIS) in the eastern partnership countries" (ENI SEIS II East) was implemented by the European Environment Agency (EEA) (2016-2020). The main objective of the project is to continue to implement the principles and practices of the Shared Environmental Information System. The project built on previous cooperative activities in the six Eastern Partnership countries. Within the project, Azerbaijan's water quality data have been harmonised in line with the Water Information System for Europe (WISE) water quality data dictionary. It is now compatible with the European dataset. Similarly, the indicators based on water quality data and published on the EcoPortal follow the EEA's indicator template. This will enable comparison of the state of water resources in Azerbaijan with that of any neighbouring country as well as with that of any EU Member State. Having regionally comparable indicators will support knowledge-based policy dialogue on water resources at the national and regional level.

Aiming to improve the management of water resources, in particular trans-boundary rivers, developing tools to improve the quality of water in the long term, and its availability for all, o*n-going project "European Union Water Initiative Plus for Eastern Partnership Countries (EUWI+East)"* addresses existing challenges in both development and implementation of efficient management of water resources management (Implementation period 2016-2021). It specifically assists the EaP countries (Armenia, Azerbaijan, Republic of Belarus, Georgia, Republic of Moldova, and Ukraine) to approximate their legislation to the EU Water Framework Directive, as well as other thematic and sectoral water directives and UN Multilateral Environmental Agreements (MEAs). More specifically, the project aims to support partner countries in bringing their national policies and strategies into line with the EU Water Framework Directive and other multilateral environmental agreements.

Air quality governance in the European Neighbourhood and Partnership Instrument (ENPI) East countries (2011-2014) project objective was to support the participating countries (Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russia, Ukraine) in improving their convergence with European legislation and regulations that contribute to improved air quality and strengthen implementation and compliance, as well as to improve the implementation of multilateral environmental agreements. It also raised environmental awareness through cooperation at national and regional levels among decision makers, industry and civil society. It also included pilot projects which were implemented at local level, such as Action plan for Baku Air Quality.

EaP Green "Greening Economies in the European Union's Eastern Neighborhood" Programme (2013-2016) responded to commitments made by countries, the European Union and other partners in major international forums including the Rio+20 Earth Summit. This four-year programme (2013-2016) was funded by the European Union and other donors including the governments of Austria, Norway,

Slovenia, Switzerland, and the Netherlands. The programme was jointly implemented by a consortium comprising OECD, United Nations Economic Commission for Europe (UNECE), UN Environment and United Nations Industrial Development Organization (UNIDO)..

Other donor activities

United Nations Development Programme (UNDP) - Global Environment Facility (GEF) Kura II Project "Advancing Integrated Water Resource Management (IWRM) across the Kura river basin through implementation of the transboundary agreed actions and national plans" (2017-2021) was designed to implement the Strategic Action Program (SAP) for the Kura River Basin in partnership with the Governments of Georgia and Azerbaijan. The SAP is framed around four agreed Ecosystem Quality Objectives (EQO) which are:

- To achieve sustainable utilization of water resources to ensure access to water and preserve ecosystem services;
- To achieve water quality such that it would ensure access to clean water for present and future generations and sustain ecosystem functions in the Kura river basin;
- To achieve and maintain ecosystem status whereby they provide essential environmental and socio-economic services in a sustainable manner in the Kura River Basin; and,
- To achieve mitigation of adverse impacts of flooding and climate change on infrastructures, riparian ecosystems and communities.

The Project aims to integrate water resources management in the Kura river basin to address water-energy-food-ecosystem security nexus through the implementation of agreed actions in the SAP. The following five components were designed to achieve this objective:

- Establishment of effective cross sectoral IWRM governance protocols at the local, national and transboundary levels in the Kura Basin;
- Strengthening national capacities to implement multi-sectoral IWRM in the Kura basin;
- Stress reduction in critical areas and pre-feasibility studies to identify investment opportunities for improving river system health;
- Targeted education and involvement projects to empower stakeholders in implementing local / national / regional actions in support of SAP implementation;
- Enhancing science for governance by strengthening monitoring, information management and data analysis systems for IWRM.

Ongoing Green Climate Fund (GCF) readiness adaptation planning project *"National Adaptation Plan (NAP) Support Project for adaptation planning and implementation in Azerbaijan"*, was launched in December 2019. As a Delivery Partner, the UNDP supports the Government of Azerbaijan in facilitating the development of the NAP and the improved climate change adaptation actions in Azerbaijan in three priority sectors identified by the Ministry of Ecology and Natural Resources (MENR) through stakeholder consultations: water, agriculture and coastal areas. Main focus areas for improving the Climate Change Adaptation (CCA) planning process in Azerbaijan are: (i) Improved data availability, access and sharing for decision making; (ii) Enhanced institutional and technical capacity for CCA in water, agriculture, and coastal areas; and (iii) Increased mainstreaming of CCA considerations into planning at national, regional, local levels in the priority sectors.