Water Resources and Irrigation Project

Preparation of River Basin Management Plans for Drini-Buna and Semani AOBWs

Contract Number MEFWA/CS/001

Drini-Buna Final River Basin Management Plan – June 2019

Final Revision
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Ministry of Agriculture and Rural Development

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Drini-Buna Final River Basin Management Plan

June 2019

MARD

Preparation of River Basin Management Plans for Drini-Buna and Semani AOBWs

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Contents

Acronyms and Units

AGS	Albanian Geological Services
AOBW	Administration Office of Basin Water
BOD	Biochemical oxygen demand
°C	Degrees Celsius
c	Capita
Ca	Calcium
Cd	Cadmium
CEMSA	Consolidation of Environmental Monitoring Systems in Albania
CHIRPS	The Climate Hazards Group InfraRed Precipitation with Station data
Cl	Chloride
Co	Cobalt
CO_3	Carbonate
COM	Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions
Cr	Chromium
CRU	Climatic Research Unit
Cu	Copper
DB	Drainage Board
DCM	Decision of the Council of Ministers
DHI	Danish Hydraulic Institute.
DO	Dissolved Oxygen
e.g.	Exempli gratia (for example)
€	Euro
EC	European Commission
EEC	European Economic Community
ELV	Emission Limit Values
EO	Environmental Objective
EQO	Environmental Quality Objective
EQS	Environmental Quality Standard
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FD	Floods Directive
Fe	Iron
FWUA	Federation of Water Users Associations
GoA	Government of Albania
GIS	Geographical Information System
GWD	Ground Water Directive
GWh	Gigawatt Hour
ha	Hectare
HCO_3	Bicarbonate
HH	Household
HPP	Hydropower Plant
i.e.	Id est (that is)
IE	Industrial Emission
IFC	International Finance Corporation
INSTAT	Albanian Institute of Statistics
IPCC	Inter-governmental Panel of Change
IPPC	Integrated Pollution Prevention and Control
IWRM	Integrated Water Resources Management
K	Potassium
KfW	Kreditanstalt für Wiederaufbau
km	Kilometer
kW	Kilowatt
kWh	Kilowatt Hour
l	Liter
ICI	Industrial, Commercial and Institutional
Incl.	Including
LGU	Local Government Unit
m	Meter
mg	Milligram
mm	Millimeter

MARD	Ministry of Agriculture and Rural Development
Mn	Manganese
Mg	Magnesium
MIKE HYDRO	River modelling package
MoIE	Ministry of Infrastructure and Energy
MoFE	Ministry of Finance and Economy
MoHSC	Ministry of Health and Social Care
MoI	Ministry of Interior
MoD	Ministry of Defence
MoTE	Ministry of Tourism and Environment
MW	Megawatt
MWh	Megawatt hour
N/A	Not Applicable
NAM	A lumped and conceptual catchment runoff model with continuous accounting of moisture content in sub-surface zones
NEA	National Environmental Agency
NEMP	National Environment Monitoring Programme
NPEI	National Protected Environmental Instruments
NGO	Non-Governmental Organization
Ni	Nickel
NO_2	Nitrite
NO_3	Nitrate
NH_4	Ammonium
NRW	Non Revenue Water
No.	Number
NWC	National Water Council
NWS	National Water Strategies
NPWS	National Plan for the Water Sector
NWSSA	National Water Supply and Sewerage Agency
O_2	Oxygen
P	Phosphate
PA	Protected Area
PAMP	Protected Areas Management Plan
Pb	Lead
PET	Potential Evapotranspiration
PO_4	Orthophosphate
PPP	Public-Private Partnership
PS	Pumping Station
R	Rural
RB	River Basin
RBD	River Basin District
RBioA	Rapid Biological Assessment
RBC	River Basin Council
RBM	River Basin Management
RBMP	River Basin Management Plan
s	Second
SEC	Section
SHPP	Small Hydropower Plant
Sida	Swedish International Development Cooperation Agency
SO_4	Sulphate
TAR	Territorial Administrative Reforms
ToR	Terms of Reference
TS	Time Series
U	Urban
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WATECO	Water and Economics (WFD Working Group)
WBMP	Water Basin Management Plan
WE	Water Enterprises
WFD	Water Framework Directive
WRMA	Water Resource Management Agency
WMO	World Meteorological Organisation
WRA	Water Regulatory Authority
WRIP	Water Resources and Irrigation Project
WSS	Water Supply and Sanitation

WTP	Water Treatment Plant
WUC	Water Utility Company
WUA	Water Users Association
WUO	Water User Organization
WWTP	Wastewater Treatment Plant
Zn	Zinc

Executive Summary

The following information has been detailed in the Drini-Buna RBMP, arranged according to the general requirements Annex VII of the EU Water Framework Directive (2000/60/EC). This includes:

- A description of the legal acts governing the water management in the Drini-Buna River Basin.
- A description of the general characterization of the River Basin, which includes a description of the surface waters and delineation of the catchments using the DHI MIKE HYDRO Basin model, the corine landcover, and the impact of climate effects on the current and future water balance of the basin.
- A summary of the significant pressures on the River Basin, which includes impacts of pollution to surface waters and groundwaters from agriculture, erosion, hydropower plants and solid waste. This section also includes the model results, which provide estimates of the present and future consumptive water demands by the main water using sectors, including irrigation, and estimates of river flow requirements for the non-consumptive use as hydropower.
- The identification of the Protected Areas in the River Basin detailing areas for the abstraction of water intended for human consumption, the protection of economically significant aquatic species, recreational and bathing Waters, and the protection of habitats or species.
- A plan of action for monitoring of surface and groundwaters according to the requirements of the WFD.
- A summary of the status of surface waters and groundwaters in the river basin based on available data.
- The current status of the water infrastructure in the River Basin in terms of water and wastewater treatment, irrigation and hydropower.
- The historical and current situation with regards to floods in the Basin, which provides an analysis of the gaps required to bring about effective flood management together with recommendations to meet the requirements of the EU Floods Directive.
- The designation of Environmental Objectives (EOs), together with a list of actions and measurable indicators, that are required to be carried out in order to achieve the EOs.
- An economic analysis of water use, trend projections, water and wastewater service costs and the current cost recovery of water services in the basin.
- A proposal for the Programme of Measures (PoMs) required in the River Basin to meet the EOs. The PoMs are divided into of ‘basic’ and ‘supplementary’ measures, which are, in the absence of determination of ecological status, based on components of the National Sectoral Water Plan relevant to the River Basin.
- A summary of the trainings held for the Administration Office of Basin Water (former River Basin Agency) and Ministry staff involved in the management of waters and also identifies the key issues via consultations with a wide range of Stakeholder groups in the River Basin.

The Programme of Measures has been developed directly in line with the Environmental Objectives reflecting the seven distinct categories of the EOs, each of which is inclusive of ‘basic’ and ‘supplementary’ measures:

- To promote the sustainable use of water resources, their fair distribution among users, maximizing economic benefits in respect of environmental conditions and sustainable management principles
- Preservation and achievement of minimal "good" ecological and chemical status for surface water bodies that have "less than good", "poor" or "very poor" status. (rivers, lakes, transitional / transitional waters, coastal, artificial and highly modified water bodies)
- Prevention of pollution in order to avoid a deterioration of groundwater quality and to attain a good chemical status in GWBs
- Preservation and achievement of minimal "good" quality for bathing water (internal, coastal and transitional)
- Reduction of flood risk and losses for life, livelihoods, health, economy, cultural and environmental assets of persons, businesses and communities
- Improvement of the safety irrigation dams
- Preservation and/or reduction of the rate of erosion in rivers

To mitigate current and future problems in the River Basin, an action plan is proposed for the implementation of the Programme of Measures in the Drini-Buna River Basin from2020-2032. The action plan is required in order for the main and supporting institutions to cooperate and coordinate resources in order to achieve effective water management in the Drini-Buna River Basin in the future.

The Programme of Measures has also been developed with an orientation for gender mainstreaming line with the requirement of Law No. 9970/2007 on gender equality in society. In order to ensure a gender sensitive approach for water management in the Drini-Buna River Basin, key indicators and targets are included for all measures to evaluate the degree to which females and males participate in the economy and in decision-making in the public sector and civil society in relation to water management.

The action plan includes a description of the specific priority activities to be undertaken, the timeframe, the costs and national and regional or local obligations and/or responsibilities. The indication of the source of the funding is required although the exact names of the donors and the IFIs cannot be known at this stage.

The preliminary estimation of the costs for each planned infrastructure measure are based on cost estimation for the investment used on Water Supply and Sewerage Master Plan for Albania, on the Government Plan of Measures (draft document) and on local and international experience. The targets based on the Environmental Objectives, which are line with the National Plan of the Water Sector (NPWS), are provided for each of the activities at three timeframes (2020, 2022 and 2029).

The total cost for the implementation of the proposed measures for the Drini-Buna River Basin is €512,700,000 with approximately 11% of the costs attributed to ‘supplementary’ measures.

The document concludes with recommendations to be undertaken water in the Drini-Buna River Basin by the Competent Authority during the next 6 years, which are aligned to both the national water strategy and the requirements of the EU WFD.

1 Introduction

The Preparation of a River Basin Management Plan (RBMP) for the Drini-Buna River Basin is part of the institutional support for Integrated Water Resources Management (IWRM) component of the Albania Water Resources and Irrigation Project (WRIP). The WRIP is financed by the World Bank, the Swedish International Development Cooperation Agency (Sida) and the Government of Albania, and is designed to lay the foundations for more rational and accountable water resources management.

In developing a River Basin Management Plan, it is necessary to recognize that Albania is a candidate for membership of the European Union and that the EU has specific requirements for such a plan. However, the project Terms of Reference does not actually detail the specific requirements of the EU's Water Framework Directive. It is clear that effective implementation of the WFD, as required under European law, would not currently be fully possible in any of the 6 River Basins in Albania.

Effective implementation of the WFD requires further development of the central and regional capacities to carry out the specific WFD requirements, and, although detailed in the national laws and reflected in the institutional structure, which equates to a serious intent to implement the WFD in the future, Albania does not currently have the technical capacity to carry out the specific requirements of the WFD.

The River Basin planning also involved the development of an appropriate river basin model as a tool for assessing different water resources development scenarios. Water quality aspects have received close attention in the plans, as water quality deterioration is a growing concern.

The River Basin planning proposes clarification on the effectiveness of the current water management structure and outlines the future mandate of management institutions as required by the basin-wide management needs.

It is key to take into account that rural women in Albania are often excluded from decision-making processes related to land management in general, although they work and manage the resources alongside men. Also, young people tend to be excluded from decisions, especially young women. This culture is upheld by both women and men, but leads to a high risk of less informed decisions that do not take women's priorities, needs or e.g. business ideas into account. Involving women and different age groups is key to ensure a broad buy-in and efficient implementation of the plans to be developed under this project. It was a requirement, that the consultant seek, wherever feasible, a broad inclusion.

As part of the preparation of the RBMP, the project supported training activities to strengthen the capacity of water management staff in river basin management, with a focus on the latest concepts, international trends and practices of IWRM and operational management of river basins. Training of women was also prioritized as a means to bring them into the process.

The following sections below have been detailed in this draft final report, which are arranged according to the general requirements Annex VII of the EU Water Framework Directive (2000/60/EC).

- **Section 2** of this report provides a description of the legal acts governing the water management in the Drini-Buna River Basin
- **Section 3:** General Characterization of the River Basin
- **Section 4**: Significant Pressures on the River Basin, which includes surface waters, groundwaters and other pressures and impacts
- **Section 5**: Protected Areas
- **Section 6**: Monitoring Networks for surface waters, groundwaters and coastal waters
- **Section 7**: Water Status in relation to chemical and ecological for rivers, lakes and coastal waters
- **Section 8**: Water Infrastructure, which includes water abstraction and treatment, wastewater treatment, hydropower and irrigation

- **Section 9**: Flood Management
- **Section 10**: Environmental Objectives
- **Section 11**: Economic Analysis of Water Use
- **Section 12**: Programme of Measures
- **Section 13**: Stakeholder Consultation
- **Section 14**: Objectives and Recommendations
- **Annexes**

2 Legal and Institutional Framework for Water Management

As Albania moves towards EU membership, the legal and institutional framework and the knowledge base for addressing policy preparation, planning, implementation and evaluation are under constant review, aimed at clear and transparent responsibilities and implementation of the EU Acquis. Legislation and regulations on water management are divided into four major sections: primary legislation, secondary legislation, inter-sector legislation, and EU Directives.

2.1 Primary legislation

The water resources have been regulated since 15.11.2012 by Law No. 111 "on Integrated Management of Water Resources" amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management" enabling:

- Protection and improvement of the aquatic environment, surface waters, either temporary or permanent, sea water, territorial waters, exclusive economic zones, continental shelf, transboundary waters, groundwater, and their status;
- Security, protection, development and sustainable use of water resources, necessary for life and for the social and economic development of the country;
- Equitable distribution of water resources, as intended by their effective management;
- Protection of water resources from pollution, overuse and promotion of consumption contingent on actual needs;
- Establishment of the institutional framework, at national and local level, required for the implementation of a national policy for the administration and management of water resources to the benefit of communities and according to the country's social and economic interests.

Law No. 111/2012 amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management" integrates various laws into a single package aimed at improving the status of surface waters, ground waters, protected areas and in particular of curative waters, mineral and geothermal. In addition, the spirit of the law is based on the precautionary principle; preventive actions should be taken, environmental damage should be addressed with priority at its source and the polluter must pay.

Chapter 1 provides definitions within the context given by this Law. As such the law defines the concept of River Basin Districts and other basic principles of integrated management of water resources:

- Respecting the integrity of the watershed based on social and economic demands for water resources, protecting and maintaining the quality of these resources and environmental quality for future generations;
- Coordination of public control over water resources through territory planning and projects for socio-economic development, at national and local level;
- Rational use of water resources and emissions control;
- Respect the cost recovery principle of water services, including environmental costs, in accordance with the "user pays" principle;
- The environmental protection principles;

- Ensuring a sufficient supply of surface and groundwater of good quality for sustainable, balanced and equitable water use;
- Undertaking preventive actions to avoid damaging the water resources, as a priority.

In Chapter 2 of Law No. 111/2012 the national administration and management bodies of water resources have been defined, along with their relevant mandates and responsibilities. Chapter 1.4.5 below presents the institutional aspects related to the management of water resources.

All other Chapters of Law No. 111/2012, amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management" provide the necessary clarifications with regard to water resources management, division of territory to this end, the planning documents and specifications for the IWRM Strategy. Specific provisions on pollution control, protected areas, protection of areas prone to pollution as well as measures for protection of water resources correlates the law with the EU Water Framework Directive and other national legislation that regulate the above.

Subsequent chapters of Law No. 111/2012, amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management", detail the following aspects on IWRM:

- Chapter 5 addresses the use of water resources by authorizations, permits and concession contracts. It also sets the priorities, purpose and circumstances for use of water resources. The protection of natural resources, curative waters, mineral and geothermal waters are now addressed and regulated by defining the rules and principles for the right of ownership and economic use in accordance with sustainable environmental development of these limited resources;
- Chapter 7 details the authorization, permitting and concession process for using water resources in compliance with Law No. 10081, dated 23.02.2009 "on licenses, authorizations and permits in the Republic of Albania" and by-laws, as amended. Subject of the aforementioned law are protected areas. The law defines areas of sanitary protection, their importance and the method for determining their boundaries, which shall be approved by the Council of Ministers upon the proposal of the Prime Minister, the Minister responsible for tourism, the Minister responsible for health issues and the Minister responsible for water supply and sewerage infrastructure issues);
- Chapter 8 addresses the protected areas and surfaces, detailing on the types of protected areas and surfaces and on responsibilities of the various central authorities (Council of Ministers, line ministries, National Water Council etc.) in the designation, regulation, and management of these areas.
- Chapter 10 envisages the administration and management bodies for water resources, aiming to ensure people, livestock and property safety by taking appropriate measures in flood affected areas.
- Chapter 11 stipulates that construction activities for use of water resources or for prevention of adverse effects of water, carried out as public services, are subject to authorization, permitting or concession contracts;
- Chapter 12 provides the conditions for discharges into water bodies, soil, underground and wastewater systems, which shall be carried out after obtaining a permit or authorisation issued by the respective water resources management and/or administration institutions;
- Chapter 15 provides details on maintaining the status of marine waters, surface waters, underground waters and protected areas.

Law No. 111/2012, amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management", also stipulates and defines the content of water policy documents, including: the objective of planning and development of water management actions according to economic, demographic, social, environmental, cultural and historic development; implementation measures, operational plans and the establishment of necessary budget for implementation.

2.2 Secondary legislation (by-laws)

Law No. 6/2018 on some amendments and additions to Law No. 111/2012 “on the Integrated Water Resources Management” needs to be completed with several remaining secondary acts. Current secondary legislation on water management (by-laws) includes:

- DCM No. 416, dated 13.05.2015 “on the approval of general and special conditions, accompanying documentation, period of validity, application forms for authorizations and permitting, procedures for decision making and types of authorization and permits for use of water resources”;
- DCM No. 797 dated 29.09.2010 “on the approval of hygiene and sanitary regulation “for water quality management”;
- DCM No. 63 dated 27.01.2016 “on the reorganization of operators that provide drinking water, collection, removal and treatment of wastewater services”;
- DCM No. 504 dated 6.07.2016 “on the establishment of the National Water Supply and Sewerage Agency”;
- DCM No. 643, dated 14.9.2011 “on the approval of the National Sectorial Strategy of Water Supply and Wastewater Services”;
- DCM No. 590, dated 18.10.2017 “on establishment and functioning of the National Water Council”;
- DCM No.177, dated 26.03.2014 “on creation and composition, functions, responsibilities and duties of the Special Commission on Transboundary Water Management”;
- DCM No.177, dated 31.03.2005 “on Permitted norms for liquid discharges and criteria for environmental zoning of rivers or sea waters”;
- DCM No. 268, dated 06.04.2016 “On the approval of the regulation on functioning of the National Water Council”, following the previous DCM No. 125, dated 02.03.206 “On establishment of the National Water Council”, and DCM No. 1080, dated 18.12.2013, “On establishment and composition of the National Water Council”.
- DCM No. 342 dated 4.05.2016 “on the approval of the territorial and hydrographic river basin borders in the Republic of Albania, the head office location and composition of the council for each of them”;
- Parliamentary Decision No. 34/2016 “on the approval of the structure, organisation and classification of job positions within the Water Regulatory Authority”;
- Decision No. 40 dated 9.12.2015 “on the approval of supporting documentation for the approval of tariffs related to water supply, sewerage and sewage treatment”;
- Decision No. 28 dated 28.09.2011 “on the approval of the methodology for tariff establishment”;
- DCM No. 230, dated 23.4.2014 “for the composition, organization and functioning of the Technical Secretariat of the National Council Water”;
- DCM No. 379, dated 25.05.2016 for approval of regulation “Quality of Drinkable Water”, repealing the DCM no. 145, dated 26.02.1998 for approval of Hygienic – health regulation on control of drinking water quality, design, construction and supervision of supply drinking water system”;
- Draft Decision “on the content, development and implementation of National Water Strategies, of River Basin District Management Plans and of Flood Risk Management Plans”, currently approved by the National Water Council on 17.02.2015 but still to be approved by the Council of Ministers. This DCM is the most important by-law act of Law No.111/2012. It sets out the contents and the procedures for the development and implementation of the National Water Strategies, River Basin Management Plans and Flood Risk Management Plans. These strategies and plans are subject to the strategic environmental assessment procedures. The DCM annexes contain detailed descriptions on EU WFD and EU FD issues.
- DCM No. 881, dated 14.12.2016 “On approval of the General National Territorial Planning” and connected Law No. 107/2014 “On the Territorial Planning and Development” amended, and the by – laws under its execution. DCM No. 881 takes into consideration the proposals of the National Territorial Planning of Albania, respectively in chapter 3, “Territorial Systems”, in wich it is explain the organization of the territory in Albania and the proposals for the 5 territorial systems (urban, natural, agricultural, water, infrastructurare).

2.3 Regulatory compliance

The provisions of Law No. 6/2018 and Law No. 111/2012 are in compliance with the Law No. 9115, dated 24.07.2003 "On the environmental treatment of wastewater", as amended, Law No. 8743, dated 22.02.2001 "On state immovable properties" in conjunction with the Maritime Code, Article 5, Law No. 10081, dated 23.02.2009 "On licenses, authorizations and permits in the Republic of Albania" and other by-laws, as amended, as well as Decision No. 643, dated 14.09.2011 of the Council of Ministers "On the approval of the National Service Sector for Water Supply and Sanitation".

Law No. 111/2012 and Law No. 6/2018 are in compliance with:

- SEC (2009) 386 - White Paper - Accompanying Document on Water;
- COM (2009) 147 final - White Paper on European Framework of Action;
- WFD Guidance Document no. 24 - Basin Watershed Management in a Changing Climate;
- Directive 2000/118/EC - on groundwater;
- SEC (2010) 166 final - Staff Working Document as enclosed document of the Directive on Groundwater;
- SEC (2010) 1096 final - Report on Groundwater Directive;
- Directive 91/271/EEC - on urban wastewater;
- Directive 2008/105/EC - on environmental quality standards in the field of water policy;
- COM (2004) 472 - Communication on Flood Risk Management, Prevention, Protection and Mitigation;
- COM (2007) 414 final - Communication on lack of water scarcity and droughts. Plan Report on Droughts;
- COM (2007) 354 final - Green Paper on adapting to climate change.

The Law is partly in compliance with:

- Directive 2006/118/EC of the European Parliament and Council, dated on 12 December 2006 “On the protection of groundwater against pollution and deterioration”, regarding definition of "baseline levels". The rest of this Directive is fully transposed;
- Directive 2007/60/EC “On flood risk management”, the outstanding issues being the legal definition of the terms "flood" and "flood risk".

2.4 International agreements

An early attempt to codify international water law was the ‘**Helsinki Rules on the Uses of the Waters of International Rivers**’ adopted by the International Law Association in 1966, which was non-binding. The document was superseded by the Berlin Rules of 2004.

The Republic of Albania ratified the UNECE Convention on the **‘Protection and use of transboundary watercourses and international lakes**’ on 5 January 1994, this being the primary document on transboundary rivers and, with the exception of Kosovo, was also ratified by all neighbouring countries.

The preamble states that the protection and use of transboundary watercourses and international lakes are important and urgent tasks which can only be settled by international cooperation. It also stresses the importance of combating the existence and threats of adverse effects on the environment, economies, and well-being of the member countries. It also emphasises the need for strengthened national and international measures to prevent, control and reduce the release of hazardous substances into the aquatic environment and to abate eutrophication and acidification.

Part I of the convention applies to all parties. The first Article is a set of definitions such as “Transboundary Waters".

The first of the General Provisions, Article 2, states that “*The Parties shall take all appropriate measures to prevent, control and reduce any transboundary impact.*” It also emphasizes the need for strengthened national and international measures to prevent, control and reduce the release of hazardous substances into the aquatic environment and to abate eutrophication and acidification. The article also refers to the

Precautionary Principle (avoidance of potential hazards without waiting for definite proof of the danger) and the Polluter Pays Principle (the costs of pollution prevention, control and reduction measures shall be borne by the polluter).

Part I also contains a series of articles related to ‘Prevention, Control and Reduction’, ‘Monitoring’, ‘Research and Development’, ‘Exchange of Information’, ‘Responsibility and Liability’ and ‘Protection of Information’.

Part II is on ‘Provisions Relating to Riparian Parties’. In this section, Article 9 covers ‘Bilateral and Multilateral Cooperation’ including the establishment of joint bodies. It also covers areas of cooperation such as joint research, exchange of information and warning and alarm systems.

The third, and final part, relates to institutional issues.

The Republic of Albania ratified the UNECE ‘**Protocol on water and health**’ on 8 March 2002. The main aim of the Protocol is to protect human health and well-being by better water management, including the protection of water ecosystems, and by preventing, controlling, and reducing water-related diseases.

The Protocol is the first international agreement of its kind adopted specifically to attain an adequate supply and safe drinking water and adequate sanitation for everyone, and effectively protect water used as a source of drinking water. Clear developments to this end can be seen by analysing the last summary report submitted by the country in April 2016:

- the percentage of samples that failed to meet the national standard for E. coli dropped from 1.9% in 2013 to 0.67% in 2015;
- population access to water and sanitation services increased from baseline values;
- bathing water quality increased from 45% in 2011 to 68% in 2015.

The above UNECE Conventions relate to ‘water quantity’ rather than ‘water quantity’. By contrast the UN **‘Convention on the Law of the Non-Navigational Uses of International Watercourses’** adopted in 1997 expands the area of interest, by stating in its preamble that “a framework convention will ensure the utilization, development, conservation, management and protection of international watercourses and the promotion of the optimal and sustainable utilization thereof for present and future generations.” One of the key concepts in this Convention is that Watercourse States shall in their respective territories utilize an international watercourse in an “equitable and reasonable manner”. The Convention sets out criteria to judge whether use is ‘equitable and reasonable.” Of countries neighbouring Albania, only Greece and Montenegro have ratified this convention.

The transboundary lakes are: Shkodra shared with Montenegro, Ohrid shared with FYROM and Prespa shared with FYROM and Greece. The Drini-Buna river basin is shared with four neighbour countries: Montenegro, FYROM, Greece and Kosovo. In 2003 an agreement was signed with Montenegro, which lays out bilateral cooperation regarding shared water resources. From 2008 until 2012 the project “Shkodra Lake: Integrated Ecosystem Management” financed by GEF and the Albanian Government, was implemented. In addition, in April 2003 a cooperation agreement with Greece was ratified.

In 2010 a **Memorandum of Understanding** was signed on “taking measures to regulate the water regime in Shkodra Lake, Buna River and Drini River basin” with Montenegro. An agreement between with FYROM is under negotiation, however not yet producing the desired outcome although both countries have expressed their will to conclude it. An agreement with FYROM was signed for Ohrid Lake on the “Protection and sustainable development of Ohrid Lake and its watershed”.

To improve flood preparedness and response in the Drin basin, Albania signed the Joint **“Conclusions for the Development and Deepening Regional Cooperation in the Field of Crisis Management”** between the republics of Albania, Kosovo and Macedonia, which was signed in Skopje in May 2011.

In November 2011 a **Memorandum of Understanding** was signed in Tirana for “Drini River: A strategic shared vision” with FYROM, Greece, Kosovo and Montenegro. This agreement aims at improving water resources management at a transboundary level.

2.5 Institutional aspects

Administration and management structures for water management are provided at national and local level. Figure 2.1 depicts the current relationship between government ministries and local agencies.[1] At the national level, the National Water Council (NWC) is the central executive body. Albania being a candidate country for EU Accession, it needs to approach compliance with a significant number of EU directives related to water management. The country is divided into six river basins, each one having a River Basin Council (RBC) and a Administration Office of Basin Water. This structure is favourable, in principle, to counteract the current fragmentation of water resources management and promote an effective administration at local level.

2.5.1 Central level institutions

The ministry responsible for irrigation and drainage is responsible for managing irrigation and drainage activities, and carries out the following tasks:

- sets the national policy on irrigation and drainage systems;
- supervises the operation and activities of organizations, federations and drainage boards from legal and financial perspective;
- supervises the technical aspects of irrigation and drainage infrastructure;
- proposes the establishment of Drainage Boards;
- authorizes the transfer of irrigation systems and main irrigation channels to federations;
- undertakes necessary actions to ensure the operation of flood protection facilities and dams as part of the irrigation systems;
- maintains the database of drainage organizations, federations and Drainage Boards;
- advises and guides organizations, federations and drainage boards, always acting on the latter's request for legal, technical and financial issues;
- supervises the selection of administration boards for organizations and federations;
- conducts financial auditing of organizations, federations and DBs;
- performs technical and physical status inspections of irrigation systems, main channels, main drainage systems and flood protection works;
- monitors the quality of irrigation, drainage waters and soils.

The NWC was established in 1996. This is the central executive body for water resources management, providing a high-level forum for water resources planning and management in an integrated manner. The NWC now provides the majority membership of the Integrated Policy Management Group for water, established by PM Order no. 129 dated 21.09.2015. National Water Council Decision No. 4 of 2nd December 2015 established the four sub-thematic groups (Water for People, Food, Environment, and Industry, respectively). Their responsibilities are well defined, besides providing the flexibility needed to respond to ad hoc situations in time for action to be effective. In principle, they would meet indicatively twice in every month or otherwise as necessary.

Law 111/2012 “on the Integrated Water Resources Management” and Law No. 6/2018 “on some amendments and additions to Law No. 111/2012 on the Integrated Water Resources Management”, established the NWC as the top-level body responsible for determining the main policy lines and decision-making. The Prime Minister chairs the NWC and, in accordance to Article 5(2) of the LWR, its composition shall be determined by the Council of Ministers. Members of the NWC are as follows:

- Prime Minister (Chairman), or in his absence the Deputy Prime Minster;

[1] Recent position changes in both Drainage Boards and the River Basins Authorities have been included.

- The minister responsible for water resources policy;
- The minister responsible for irrigation and drainage;
- The minister responsible for the environment;
- The minister responsible for civil emergency;
- The minister responsible for finance;
- The minister responsible for energy issues;
- The minister responsible for water supply and sewerage infrastructure issues;
- The minister responsible for tourism;
- The minister responsible for urban development issues;
- The minister responsible for health issues.

The functions of the NWC include, but are not limited to:

- Making proposals for draft laws and regulations for any kind of activity related to water resources;
- Approving the legal, technical and regulatory framework to implement the LWR, and in addition, draft instructions and undertake other necessary actions for implementing the national plan on water resources;
- Approving and managing River Basin Management Plans;
- Issuing water use and wastewater discharge permits and authorizations when the concerned activities take place beyond the boundaries of a single river basin;
- Adopting the functioning rules for the Water Resource Management Agency, River Basin Councils and Administration Office of Basin Water;
- Approving interregional, national plans and projects in the fields of agriculture, urban planning, industrial and territorial development with effects on water conservation and management;
- Defining river basin boundaries and establishing the headquarters for each, where the Register of Water Resources will be kept;
- Establishing agencies or other organisational units, under the Council's control, to facilitate water resources management and law enforcement;
- Proposing and adjusting appropriate measures for implementing any international agreement or convention on water resources to which the Republic of Albania is a signatory party; and
- Approving concessions for water resources according to the Council of Ministers' provisions. In cases where water resources are of national importance, the concession will come into force only upon approval by the Parliament.

The NWC is supported by the Water Resource Management Agency, established by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management". Although initially under the ministry responsible for environmental issues, the Water Resource Management Agency currently functions as the executive body of the National Water Council under the Prime Minister Office. In addition, the Deputy Prime Minister is a member of the NWC and leads the meeting in case of Prime Minister's absence.

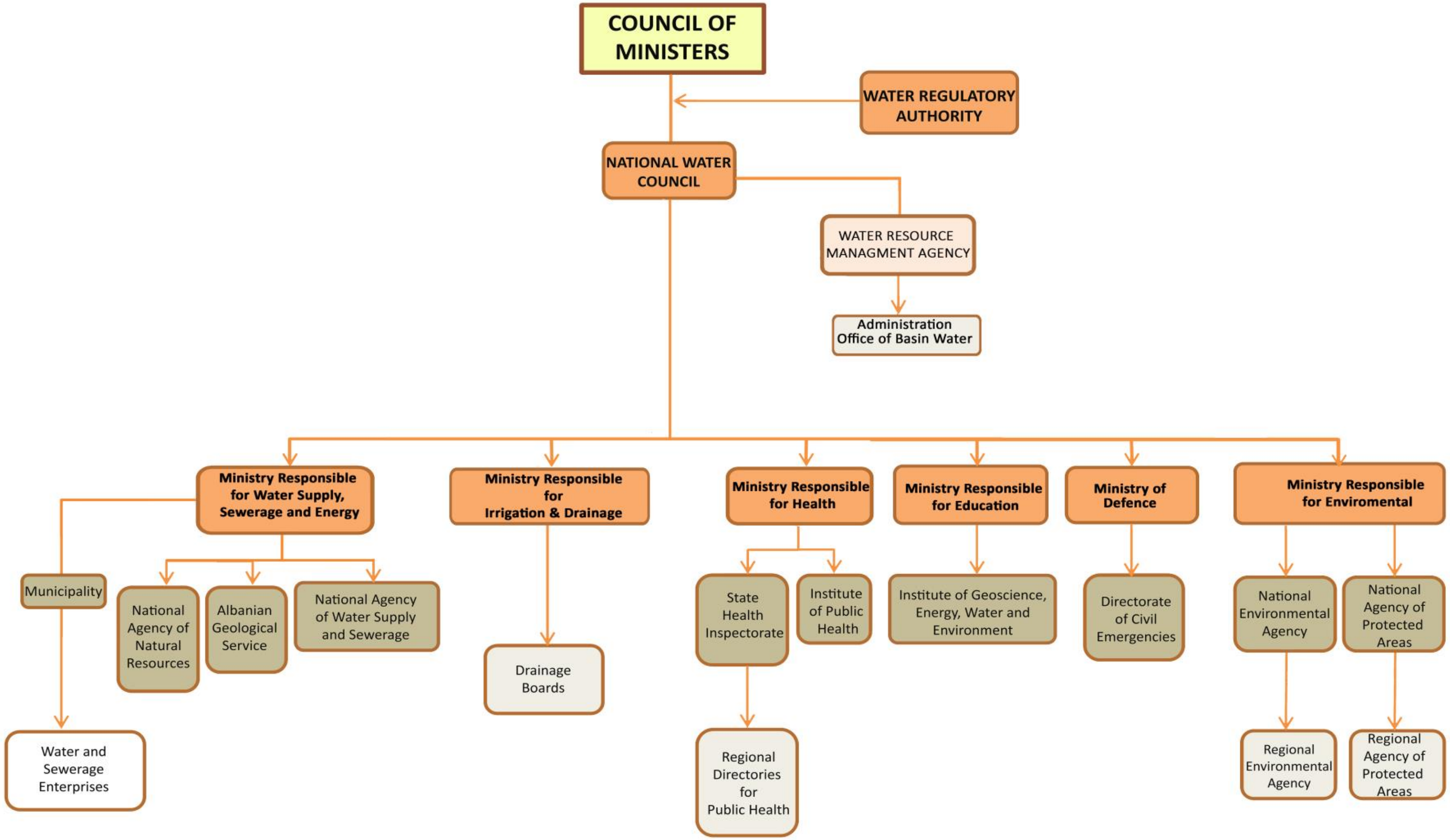
The functions of the Water Resource Management Agency include, but are not limited to:

- implementing the water resources policies approved by the NWC;
- implementing the provisions of international agreements on transboundary water resources to which the Republic of Albania is a signatory party;
- developing a national inventory of water resources, including quantity and quality information;
- screening applications for water use and wastewater discharge permits and authorizations to be issued by the NWC;
- promoting water users' participation in water resources management;

- promoting studies and research;
- identifying research areas and the relevant funding sources, in coordination with research institutions;
- coordinating and supervising the work of River Basin Councils and Administration Office of Basin Water;
- monitoring River Basin Management Plans' implementation.

Following DCM no. 91 and 92 dated 4.02.2015, the responsibility of the "Water Policy Directorate" was transferred from the ministry responsible for environment, responsible for irrigation and drainage, managing irrigation, drainage and flood protection.

Figure 2.1: Organizational chart for institutional framework on water resources management



The ministry responsible for water supply and sewerage infrastructure issues prepares the policies and strategies for the water supply, wastewater collection and treatment sector. These are based on governmental programmes and sector strategies, plans and investments for the construction and rehabilitation of the water supply and wastewater systems, wastewater treatment plants and solid waste facilities. The ministry responsible for water supply and sewerage infrastructure issues also assesses the needs for subsidies and implements their distribution through its subordinate institutions.

The National Water Supply and Sewerage Agency (NWSSA) is an institution reporting to the ministry responsible for water supply and sewerage infrastructure issues, being specialized in drinking water supply, wastewater collection and treatment. NWSSA technically assists the ministry responsible for water supply and sewerage infrastructure issues according to legislation in force and policies set out in relevant sectoral strategies including water management and water quality protection policies, in cooperation with other national authorities at central and local level. Within its organisational structure, NWSSA includes a Technical Directorate, an Economic Directorate, a Directorate for Foreign Projects, a Monitoring Directorate, and three regional directorates.

The ministry responsible for energy issues plays an important role in the water sector; being responsible for hydropower generation, which represents about 97% of total electricity production. The ministry is responsible for approving new hydropower plants. The ministry may intervene in the distribution network to improve service security and increase potential exports (World Bank, 2009a).

The ministry responsible for health issues has the mission to prepare (or draft/develop) and implement policies and development strategies in the healthcare sector2. Among others, the ministry responsible for health issues prepares, proposes for approval and implements legal and sublegal acts for the provision of quality drinking water. Pursuant to the legal acts in force, the ministry responsible for health issues performs monitoring, inspection and expertise of drinking water quality through its subordinate institutions, namely the Regional Public Health Structures (RPHP), the State Health Inspectorate (SHI) and the Institute of Public Health (IPH).

The ministry responsible for civil emergency carries out its activities according to the legislation on prevention, reduction and mitigation of any adverse civil emergency effects to population, livestock, property, cultural heritage and environment. The ministry has within its structure the General Directorate of Civil Emergencies, which implements the National Plan of Civil Emergencies, prepared considering the exposure to natural disasters including floods and human activity related disasters. The ministry responsible for Civil emergency, through the District Prefect institution, coordinates the activity of central institutions and of delegated functions with the Local Government Units (LGUs) at Municipality and Region level (GoA, 2015b).

The ministry responsible for finance allocates, based on Government priorities, financial resources for the water sector, thus giving priority to appropriate water resources management for meeting the society's needs. The Minister responsible for finance is a member of the NWC. 3

2.5.2 National Institutes involved in water monitoring and assessment

The organization of water (resources) monitoring is complex, with over 20 different government institutions currently involved in data collection for a limited number of parameters with a partial geographical coverage.

Overall, the National Environmental Agency (NEA), under the ministry responsible for environmental issues, is responsible for quality and quantity monitoring of water resources. It supervises the work of relevant institutes on monitoring activities and is the main beneficiary of data provided by the following institutions:

- The Institute of GeoScience, Energy, Water and Environment, (formerly the Hydro-meteorological Institute) under the ministry responsible for education, monitors hydro-meteorological parameters and is responsible

[2] DCM No. 940 dated 09.10.2013 On defining the scope of state responsibility of the ministry responsible for health

[3] According to Article 5(2) of the LWR.

for carrying out surface water quantity monitoring for rivers and lakes. The meteorological network of IGEWE consists now of automatic stations. Hydrological data and alerts (flood and forest fire risk indexes) are disseminated to stakeholders and published on-line;

- The Albanian Geological Survey (AGS), under the ministry responsible for energy issues is responsible for quality monitoring of underground and marine waters, risk assessment and soil pollution monitoring;
- The National Agency of Natural Resources (NANR), which is under the ministry responsible for energy issues, has a focus on monitoring of hydropower plants;
- The Institute of Public Health (IPH), a reference research centre for public health services, a university and information centre under the administrative authority of the Minister responsible for health issues, is responsible, inter alia, for providing expertise and participation in training of human resources with regard to public health[4]. It supports Regional Public Health Structures with expertise in external monitoring of drinking water quality, epidemiological surveillance, and ongoing training as well as the State Health Inspectorate with expertise and laboratory examinations. The IPH, in contract with the NEA, carries out the microbiological assessment of bathing waters quality. This assessment is based on their bacterial load (*Escherichia Coli, Enteroccocus Intestinalis*) as well as environmental inspection for assessing their contamination risk factors;
- The Water Regulatory Authority is an independent institution established by the Parliament. Its main duties include issuing of licenses for drinking water supply and wastewater and approving drinking water tariffs.

In 2009, the rules and procedures for National Environmental Monitoring have been approved through Decision of the Council of Ministers No. 1189, setting the ground for quality monitoring of surface water (rivers, lakes, and bathing (sea) waters), groundwater and wastewater discharges; DCM 267 from 7 May 2014 approves the list of priority substances to be monitored as part of these efforts, thus transposing Directive 2008/105/EC on environmental quality standards.

The State Authority for Geospatial Information was established in 2013, according to law 72/2012 "on the organization and functioning of the national infrastructure of geospatial information in the Republic of Albania", its main responsibilities being:

- Implementation of the national policy for geospatial information infrastructure;
- Responsible for the design, construction, maintenance and updating of the Geodetic Framework;
- Decisions on collection, processing and updating geospatial information from public authorities, including the water sector;
- Sets uniform standards and rules for creating GIS for various fields, including the water sector, and for the creation of the National GIS in accordance with the relevant European standards;
- Prepares rules associated with creating, updating, sharing, access and use of geospatial information and related services;
- Administers geospatial information collected, processed and updated by public authorities in various fields;
- Ensures work coordination, supports initiatives and activities related to geospatial information in the public and private sectors;
- Develops and administers the National Geoportal and guarantees public access according to Law 72/2012 provisions.

2.5.3 Local Government Units, River Basin Councils, Administration Offices of Basin Water

Since the local elections in 2015, the organisation of local governance has changed. Prior to entry into effect of the Law on the new administrative-territorial division (Law No. 115/2014), the country was divided into 308 villages, 65 municipalities and 12 regions (quarks). There were no changes to the 12 regions following the administrative-territorial reform, but the municipalities and villagesunderwent radical changes. Under the new

[4] Law No. 10 138, dated 11.05.2009 “On the public health”, amended

administrative-territorial division, 61 municipalities have been created. Municipalities are the basic units of local government, representing the first tier of government. Local Government Units (LGUs) are organized into constituent administrative units (former villages) as their administrative subdivisions. From the urban planning viewpoint, municipalities will continue to be organized into towns and villages.

The impact of socio-economic development at regional level and the role of regional institutions have been weak in the past due to the lack of a clear model for regional operation, lack of financial resources, assets and low institutional capacity. Decentralised bodies at local level are represented by two institutions, namely, (i) the Prefect's Office and (ii) the regional/local directorates/offices of sector ministries. Water management is organised at the River Basins level through six River Basin Councils (RBC), each of which having a Administration Office of Basin Water.

Each of the River Basin Councils (RBC) is chaired by one of the responsible Prefects and is comprised by 29 members representing diffrent local institutions, LGUs, businesses and consumers in the basin (DCM no. 342 dated 4 May 2016 on the approval of the territorial and hydrographic boundaries of river basins in the Republic of Albania and composition of the council of each of them).

Article 12 of Law No. 111/2012 and also Law No. 6/2018 "on some amendments and additions of Law No. 111/2012 on the Integrated Water Resource Management" emphasizes that each RBC should ensure:

- A rational protection, development, and operation of water resources within its own basin boundaries;
- Fair distribution within its own basin boundaries, according to the purpose of use and effective water administration;
- Protection of water resources against pollution, misuse, and overuse.

The River Basin Councils are assisted by Administration Offices of Basin Water, which function as a technical secretariat for the RBC. They are responsible for implementing the LWR. They perform the technical evaluation of applications for water abstraction (surface and groundwater), make recommendations for approval by the RBC, support municipalities in solving problems related to water resources and are responsible for on-site inspection of all activities related to water resources use. However, the AOBWs have little authority to enforce legal and regulatory procedures.

The participation and involvement of end-users in water resources management is regulated by NWC Decision No. 2 (21.6.2006), which states that water users' representatives are to account for 30% of NWC's members. In addition, the RBCs' meetings are open to public attendance. In practice, the general public or end-user groups only participate to a very limited extent in the formal water resources management processes. Drinking water supply is the responsibility of 57 water utility companies under LGUs (DCM no. 342 dated 4 May 2016 on the approval of the territorial and hydrographic boundaries of river basins in the Republic of Albania and composition of the council of each of them).

In 2010, a Decision[5] of the Council of Ministers transferred the ownership of 305 smaller agricultural reservoirs to the LGUs, responsible now for their operation and maintenance. Permitting and enforcement of environmental legislation is the responsibility of twelve Regional Environmental Agencies (REAs).

In 2015, DCM No. 1108 was issued on 30.12.2015 "for transferring irrigation and drainage infrastructure, personnel and assets from the Regional Drainage Boards" because irrigation and drainage services were still in need for improvement. By transferring small irrigation infrastructure towards municipalities and villages, user decision-making regarding the irrigation and drainage systems will be improved.

As only the main irrigation and drainage infrastructure and dams are now administered by the ministry responsible for Irrigation and Drainage, municipalities will cooperate and coordinate, together with regional structures of the ministry responsible for irrigation and drainage and DBs, planning activities for annual irrigation water demand, utilisation, maintenance and rehabilitation of irrigation and drainage systems.[6] The current institutional set-up for irrigation and drainage management includes the villages/municipalities as an important link, resulting in three levels of management:

[5] No. 567, dated 14.7.2010, the Ministry of Agriculture, Food and Consumer Protection.

[6] National Crosscutting Strategy for Decentralization and Local Governance 2015-2020.

- Central government, where the ministry responsible for irrigation and drainage and the Drainage Boards have the highest level of administration power over primary assets and dams;
- Villages/municipalities as intermediate level of administration for secondary and tertiary assets; and
- Water users' organizations and their unions as the lowest level of administration.

The intermediate link between the central government and its local structures on one hand, and the WUAs/WUOs on the other, has thus been better established, which was missing from previous agricultural reforms. The Drainage Boards and the new Local Government Units and municipalities will work in partnership with the WUOs to improve local capacity.

3 General Characteristics of the Drini-Buna River Basin

3.1 Description of Surface Waters

The Drini-Buna river basin is one of the most complex in Europe; in places one of its main tributaries is bi-directional and the surface water catchment and the groundwater catchment are not contiguous. The Drini-Buna extends outside the boundary of the country. Parts of the basin lie within the areas of Macedonia, Montenegro, Kosovo and Greece. In terms of area, approximately 40% of the total basin lies within Albania and the rest outside.

Within the basin there are three major lakes: Lake Shkoder, Lake Ohrid and Lake Prespa. In terms of area Lake Shkoder is the largest, varying from 370 km^2 to 530 km^2. The lake is shallow with an average depth is 5 metres and its elevation varies from 4.7 to 9.8 metres above sea level. Its volume is 1.93×10^9 m^3. The lake is fed partly by the inflow of the surrounding rivers and partly by karstic springs, which rise within the lake itself.

Lake Ohrid is one of Europe's deepest and oldest lakes, preserving a unique aquatic ecosystem that is of worldwide importance, with more than 200 endemic species. It has a surface area of 388 km^2 and an average depth of 155m and a maximum depth of around 300 metres. Its surface is at an elevation of 693 metres. Its volume is $55.49\text{x}10^9$ m^3.

Lake Prespa lies within an endorheic basin, i.e. with no river flowing out of it. It actually consists of two lakes: The Great Prespa Lake and the Small Prespa Lake. Its total surface area is 274 km^2 and its volume is $4.8\text{x}10^9$ m^3. With a surface elevation of 854 m it is the highest lake in the Balkans. The average inflow to Lake Prespa has been estimate as 2.55 m^3/s. It is likely that all of this is transferred underground to Lake Ohrid. Given the large difference in surface elevation between Lake Prespa and Lake Ohrid, the variation is relation lake level is relatively small and the flow rate will not vary much throughout the year.

The Drini River is largest River of Albania, as well as the largest on the Adriatic coast of the Balkan Peninsula, both in terms of catchment area as well as ran-off catchment flow. The Drini River Basin is transboundary in nature, located in the northern and eastern of Albania territory with a total area is 14,173 km^2, of which 5,973 km^2 resides within the territory of Albanian, with the remainder in Greece, Kosovo, Macedonia and Montenegro.

The Drini River in the Albanian territory is characterized by a mountainous relief, with average altitude of 971 metres above sea level, with approximately 50% of the catchment area of the river in the territory of Albania situated at an altitude 850m. The Drini River, which starts from Ohrid Lake in Struga and ultimately discharges into the River Buna, has a length of 285 km and a drop of 685 metres, corresponding to an average gradient of 2.3%. The Drini River is formed from two main branches: The Black and White Drini. The length of the Black Drin River, from Lake Ohrid to Kukes, is 149km and the surface of the basin is 5,885 km^2, while the White Drini from the source (Kosovo) to the confluence with the Black Drin River has length of 136 km and basin surface of 4,964 km^2. Until 1956 (when the implementation of Vau Dejes Hydropower started), the Drini River after Vau Deja was divided into two branches, i.e. Bahçallëk, which discharged in Boone and the branch of Lezha, which after receiving the Gjadrit waters discharged to the sea close to Lezha City. With the construction of the Gjadri and Mjed embankment, the waters of the Drini River go mainly towards Bahçallëk, joining the river flow of Buna.

The Buna River originates from Lake Shkoder. The surface of the Buna River watershed is 5,179km^2, of which 1,025 km^2 is contained within national territory of Albania, while the rest is located in Montenegro. The Buna River, from starting point in Samerisht village until his discharge in the Adriatic Sea has a length of 24 km, separating the state border between Albania and Montenegro. The average altitude of the Buna River is

909 m above sea level. The Buna River collects the waters of Drini River and water from Shkoder Lake. The Buna River features a classic delta, consisting of several alluvial islands, located in the estuary of the river.

The major tributaries and their respective areas in the Drini-Buna River basin are shown in Table 3.1.

Table 3.1: The characteristics of the major tributaries in the Drini River[7]

River	Main tributaries	Length (km)	Drainage Basin Area (km^2)	Mean Altitude Above Sea Level (m)	Average flow (m^3 s-1)
Drini	White Drin	134	4,964	862	68.2
Drini	Black Drin	149	3,504	1,132	118
Drini	Drin main branch	285	11,756	971	352
Buna	Buna main branch	1.5	5,187		320
Drini + Buna	Confluence	32.5	19,582	770	680

On Drini River there are three big operational hydropower plants with a total installed capacity of 1350 MW, “Vau i Dejës” Hydropower Plant (HPP), “Fierza” HPP and “Koman” HPP. Furthermore, a concessionary contract has been concluded for “Ashta” hydropower plant on Drin river with an installed capacity of 48.2 MW. According to information provided by NANR, in the 1st trimester of 2018, there were 29 SHPPs in operation. The Drini-Buna River Basin is characterised by three main types of aquifers: i) Quaternary (Shkoder, Zadrimë-Nënshkodër and Peshkopia aquifers), with ‘good’ water quality; ii) carbonate, at the northwest side and in the southern part of the central basin, and iii) magmatic, exploited in the massif Krrabi. Both the carbonatic and magmatic aquifers are classed as ‘very good’ water quality.

There is a total of 110 irrigation reservoirs in Drini-Buna River Basin. However, due to erosion in the basin and the resultant sedimentation, the actual volume of water available for irrigation is only approximately 50% of design capacity of reservoirs with an average total of approximately 0.03 km^3 of water used for irrigation.

A Hydrographic Map of the Drini-Buna River Basin is provided in Figure 3.1. An overview of water resources and the water use in the Drini-Buna River Basin is shown in Table 3.2.

[7] *Source: Consolidation Environmental Monitoring System in Albania “CEMSA”*

Figure 3.1: Hydrographic map of the Drini-Buna River Basin

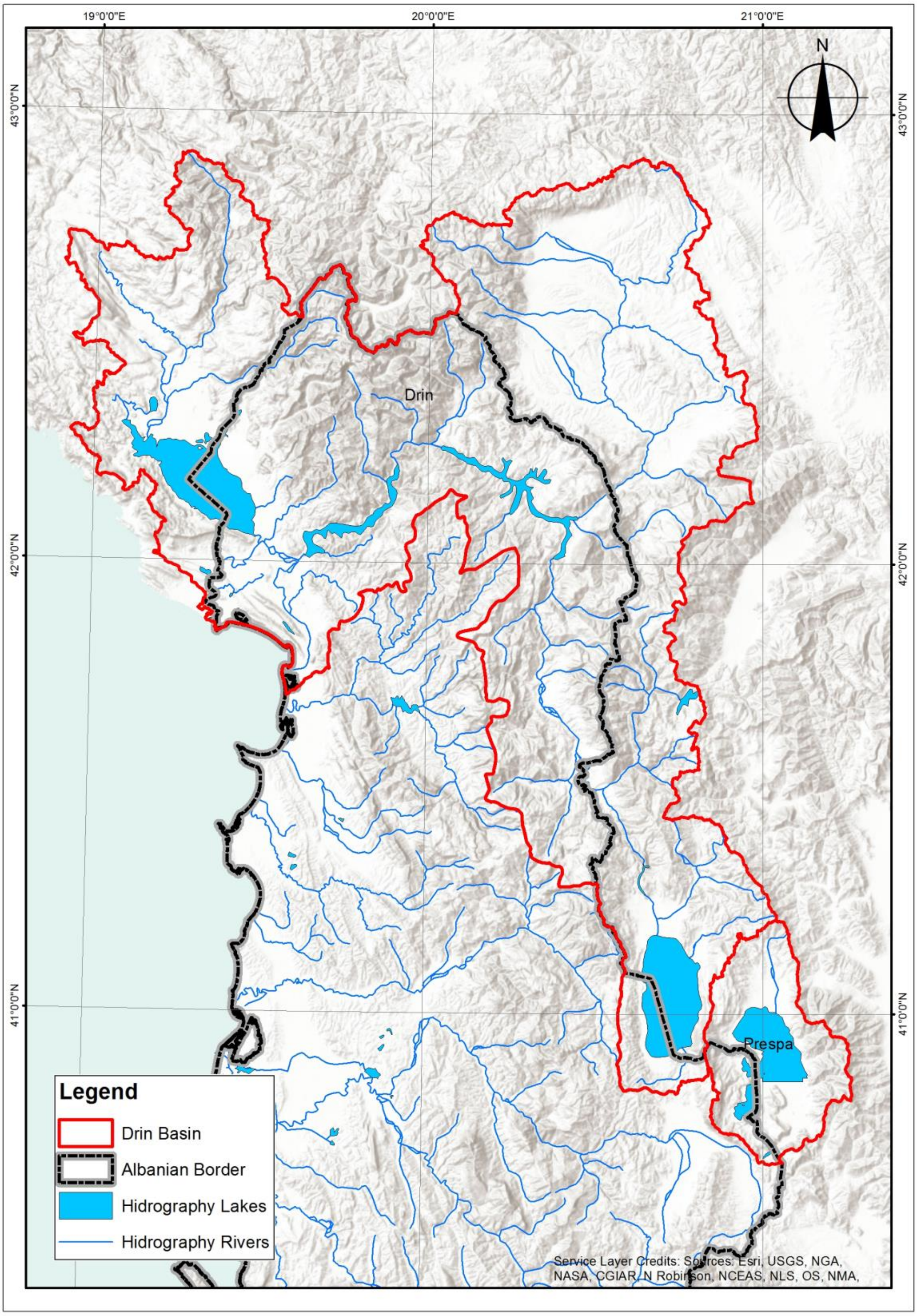


Table 3.2: Overview of water resources and water use in the Drini-Buna River Basin[8]

Surface Area	
Total surface area of Drini Sub Basin in Albania	5,973 km^2
Total surface area of Buna Sub Basin in Albania	1,025 km^2
Total surface area of Drini-Buna River Basin in Albania	6,998 km^2
Total surface area of transboundary Drini-Buna River Basin	19,582 km^2
Water Resources	
Number of main rivers	2
Number of tributaries	5
Length of main river (km)	285
Average annual flow (m^3/s)	680
Surface water quality	Good-Very Good
Number of large lakes	3
Number of main aquifers used (World Bank, 2012)[9]	3
Water Use	
Agricultural reservoirs	High Use (110 Dams)
Number of Major Hydropower Plants (48-500MW)	4
HPP Concessions	47 for a total of 121 HPPs10
Potable (Drinking) Water	High
Use by industry	High Use
Potential for pollution hotspots	High
Number of Protected Areas	10
Importance of forest coverage	Very Important
Other uses	Shipping/Fishery
Risk of droughts	Low
Risk of flooding	High
Demographics	
Number of inhabitants (2011 census)	461,721

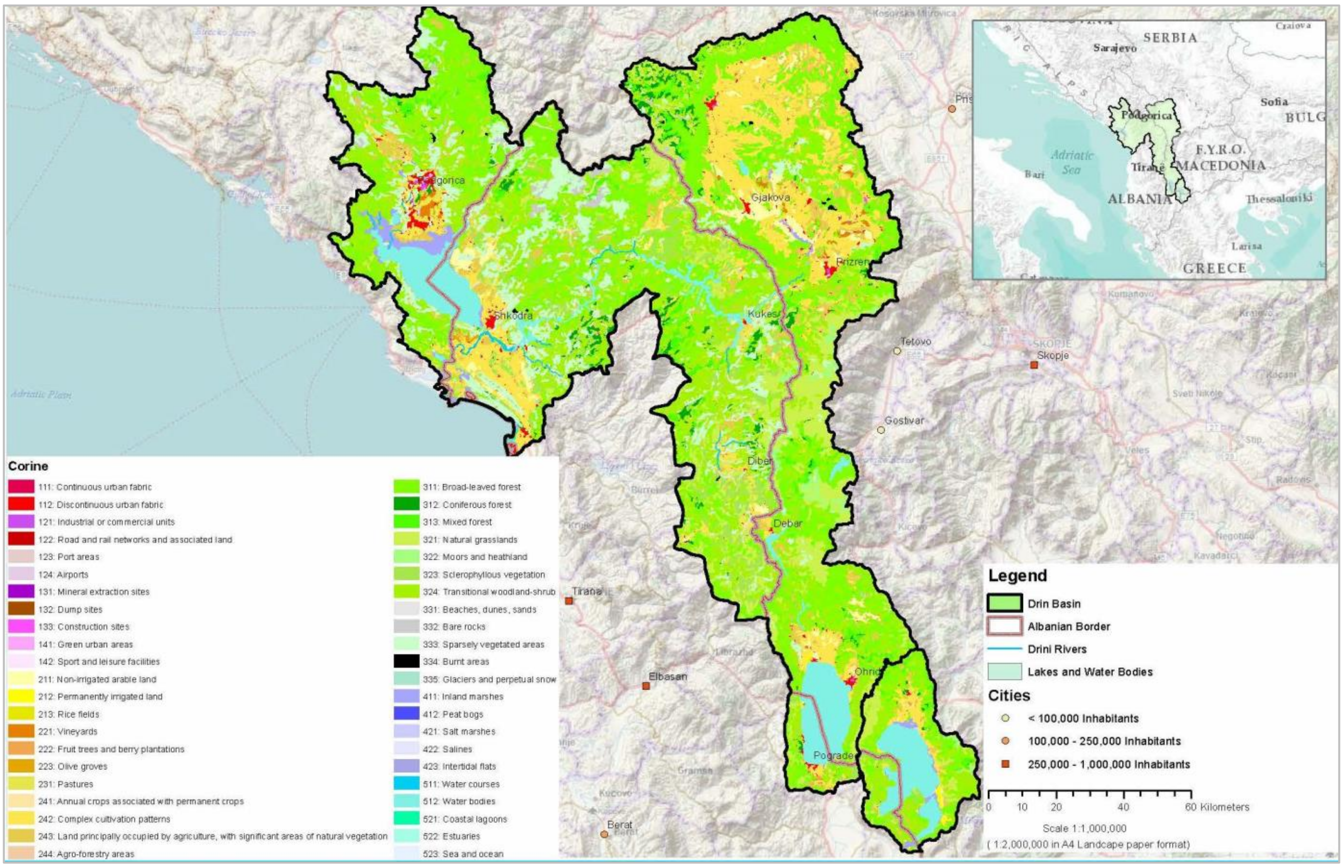
[8] IWRM (draft) strategy for Albania. November 2016
[9] World Bank, 2012. Inventory of Groundwater Resources
[10] 1st trimester 2018, information provided by NANR

3.2 Corine Land Cover

This Corine meaning 'coordination of information on the environment' is an inventory of land cover in 44 classes, and presented as a cartographic product, at a scale of 1:100 000. This database is operationally available for most areas of Europe and is operated by the European Environment Agency.

Corine land cover information is used to set the baseline of land cover classes, which aids to minimise impacts to economic activity due to plan implementation without conflicting with the objectives of the WFD. This information also provides a baseline for assessing potential damage to designated landscapes as a result of Plan implementation, i.e. important for Strategic Environmental Assessment of the RBMP Programme of Measures. The Corine land cover for the Drini-Buna River Basin is represented in Figure 3.2.

Figure 3.2: Corine land cover in the Drini-Buna River Basin[11]



3.3 Climate Effects

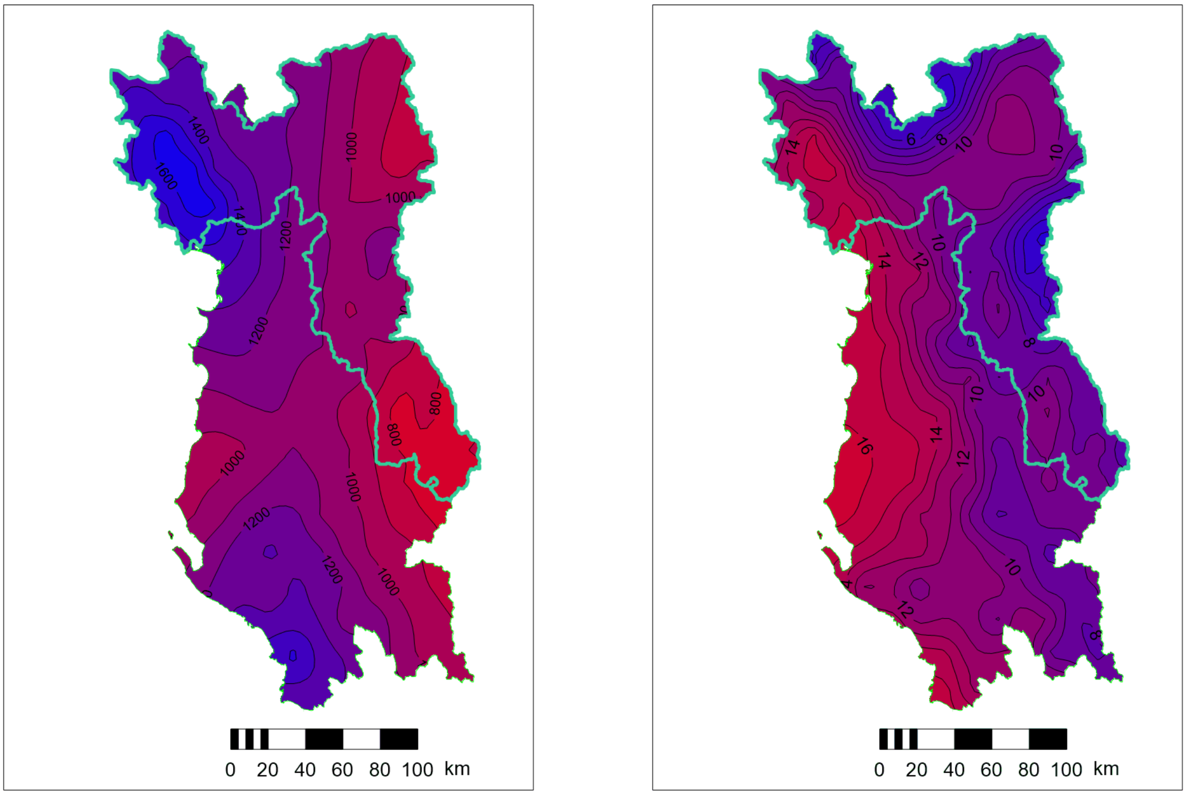
With its coastline facing the Adriatic and Ionian seas, its highlands backed upon the elevated Balkan landmass and the entire country lying at latitude subject to a variety of weather patterns during the winter and summer seasons, Albania has a high number of climatic regions for so small an area. The coastal lowlands have typically Mediterranean weather; the highlands have a Mediterranean Continental climate. In both the lowlands and the interior, the weather varies markedly from north to south. There are two main factors that create the variability in the climate: altitude over sea level and distance from the sea.

[11] http://land.copernicus.eu/

Generally, the precipitation decreases from west to east. The highest values are found near the Mediterranean in west, the lowest in the mountains. Snowfall is normal in the mountains, less normal in the lower parts of the country. The maps in Figure 3.2 show the annual average precipitation. The wettest area is over Lake Shkoder in the Drini-Buna catchment with annual rainfall of over 1600 mm a year. The driest parts of the basin are to the northeast and to the east.

The adjoining map in Figure 3.3 shows the average annual temperature. In this case the hottest areas are around Lake Shkoder and the coastal areas to the south.

Figure 3.3: Precipitation and temperature profiles in the Drini-Buna River Basin[12]



Average Annual Precipitation (mm/year) **Average annual temperature (°C)**

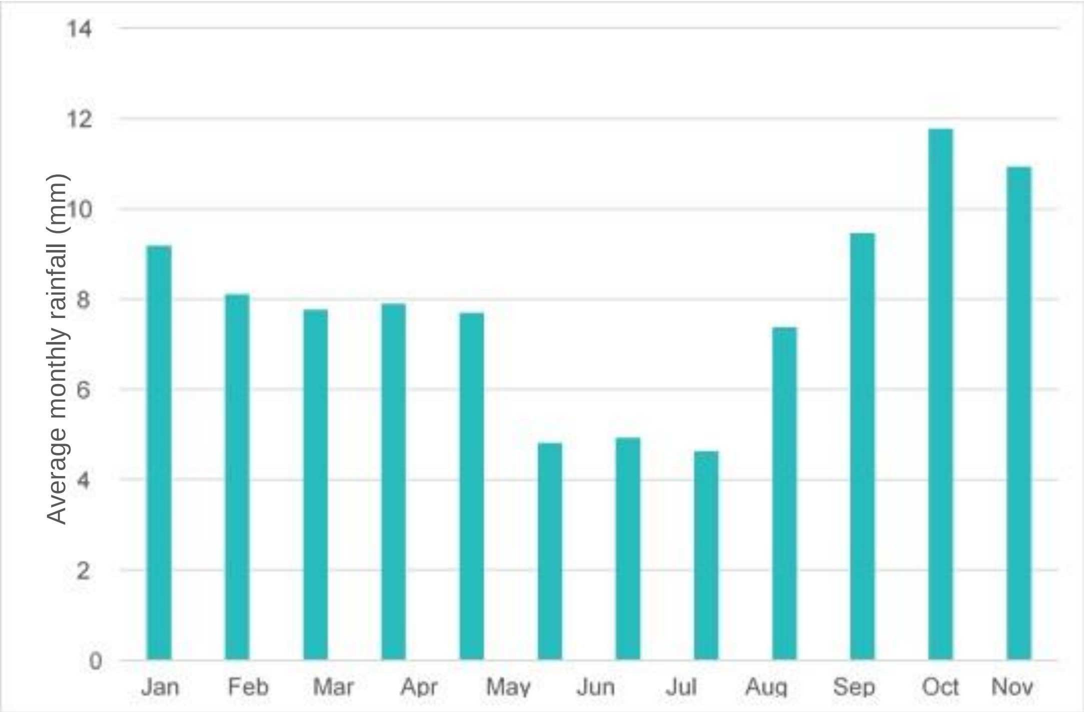
Figure 3.4 shows the average monthly precipitation at Kukes in the Drini basin. This figure demonstrates the seasonal nature of the rainfall with June, July and August being the driest months; the period most important for crop growing. It also shows that four wettest months are October to January. At higher elevations, most of the precipitation in winter months is in the form of snow which only runs off when the temperature increases in the spring.

The potential evapotranspiration (PET) in the Drini-Buna River Basin is shown in Figure 3.5. The potential rate of evaporation represents the amount of evaporation, which could occur if the soils were moist all the year round. In reality, the low rainfall in the summer means the soils become too dry for evaporation and the actual rates of evaporation would be less. In this case the highest rates of evapotranspiration are on the coast and the lowest rates are to the northeast. The adjoining map in Figure 3.5 shows the irrigation demand expressed

[12] Prepared by Mott MacDonald

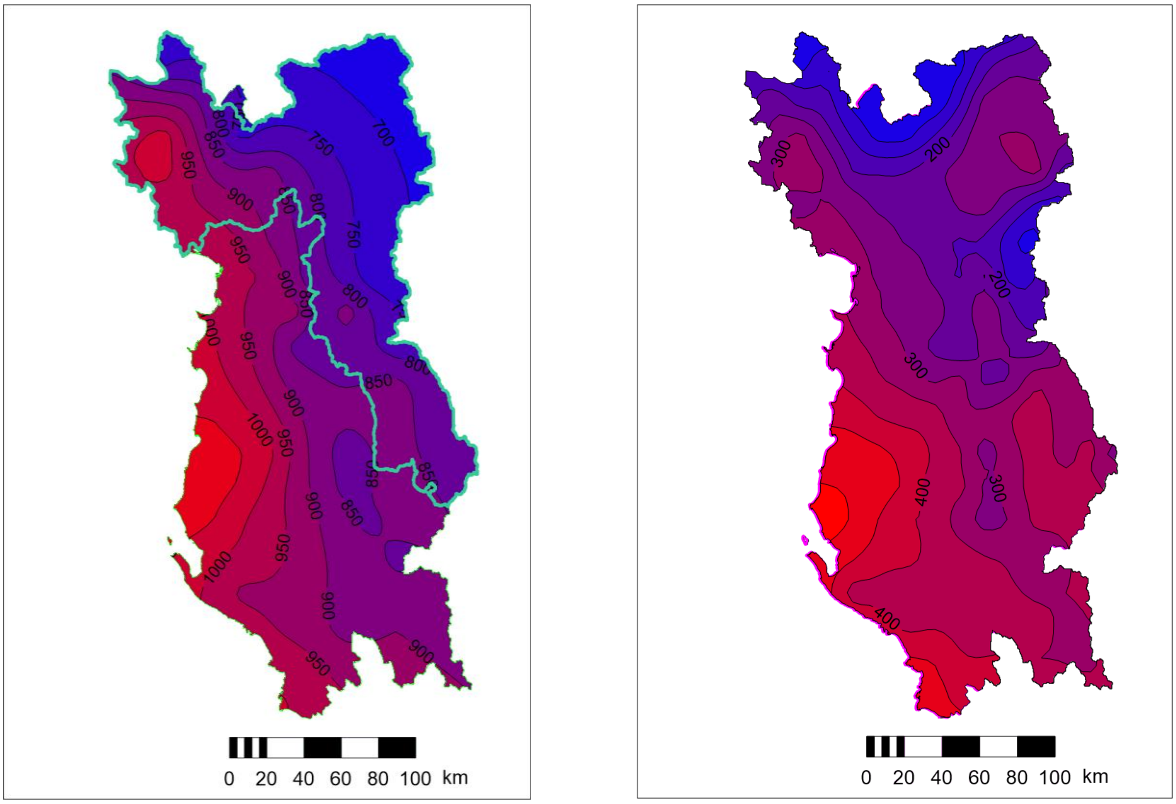
in mm year. This is the sum of the Potential evapotranspiration (PET) minus rainfall for months when PET is higher than rainfall. This shows that in coastal areas, where rainfall and PET are of similar magnitude, the irrigation demand is a high as 600 mm year. This is due to the fact that most rainfall is in winter when PET is low.

Figure 3.4: The average monthly precipitation in Kukes in the Drini-Buna Basin[13]



[13] Prepared by Mott MacDonald

Figure 3.5: Average annual potential evapotranspiration and average annual irrigation demand in the Drini-Buna River Basin[14]



Average Annual Potential Evapotranspiration (mm/year)

Average annual irrigation demand (mm/year)

3.4 River Flow

The hydrographic catchment of the Drini has a total area of 19,582 km² from which 14,173 km² belong to the Drini itself and 5,187 km² to the Buna River. The Drini is formed by two main tributaries: the Drini i Zi, with a catchment area of 5,885 km², flowing from Macedonia, and the Drini i Bardhe, Kosovo. They are sometimes referred to as the White and the Black Drini.

The Buna River, drains Lake of Shkoder, which is fed by rivers originating from Montenegro and Albania; its larger tributary is the Moraça River. At times of low levels in Lake Shkoder the flows on the Buna River can be reversed.

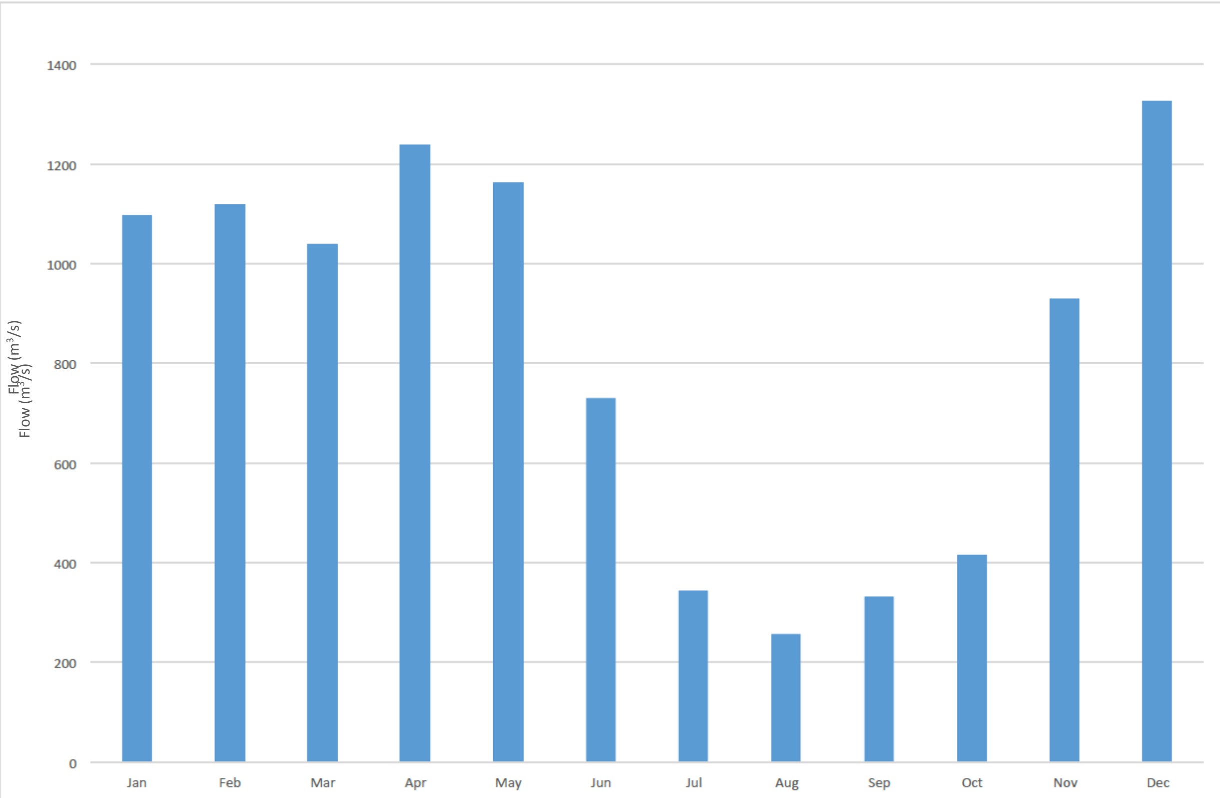
In the past, the exits of Buna and Drini rivers have been separated. At present the old bed of the Drini, leading south to the city of Lezha, carries only a minor part of the discharge; the rest meets the Buna near Shkoder and follows its riverbed along the border with Montenegro.

The Drini River for the period 1951-1985 has a mean annual discharge of 680 m³/s, of which 360 m³/s come from Drini itself and 320 m³/s from Buna. The resulting specific discharge is about 35 l/s.km² and the runoff coefficient 0.74. These high values are mainly due to the very high yield of the Buna, which cannot be much exploited except for navigation. Keeping in mind the water use in Albania, the most important river is the Drini.

[14] Prepared by Mott MacDonald

Figure 3.6 shows the monthly flow of the Drini River upstream of its confluence of the Buna. One interesting feature of the flow pattern is that flows in April and May are higher than those of January and February, whereas with precipitation it is the other way around. The reason for this is that much of the precipitation in winter in the mountains falls as snow and only becomes runoff in late spring. The mountain snow is, in effect, a reservoir, which releases water at the start of the irrigation. It is likely that with climate change and higher temperatures there will be less snow in the winter and the seasonal pattern of river flow will more closely the pattern of precipitation.

Figure 3.6: The monthly average flow in the Drini River Upstream of the confluence with the Buna River[15]



3.5 Water Resources of the Drini-Buna River Basin

This section summarises the results of a calibrated model of the water resources of the Drini-Buna River basin.

The model is developed in the MIKE HYDRO Basin river basin modelling software, which simulates a basin water balance using a node-link network. Runoff inputs to the basin (including snowmelt) are estimated as a function of rainfall, evaporation, and temperature using the rainfall-runoff model NAM. Node elements in the MIKE HYDRO Basin include reservoirs and lakes where water is stored, hydropower facilities, and water use elements, which represent locations where water is abstracted for irrigation, domestic, or industrial uses. Feedbacks between surface water and groundwater are simulated using simplified two-layer linear groundwater model. Based on the node elements, the basin has been delineated into discrete catchments, which are the organizing units for simulating rainfall-runoff processes and groundwater flows.

[15] Prepared by Mott MacDonald

Model data includes meteorological input data as well as calibration data. All meteorological input data have been obtained from global data sets. Calibration data, which were obtained from a mix of local and global data sets, included river discharge time series, reservoir levels, and information about hydropower generation.

Anthropogenic activities affecting the basin water balance include irrigation, hydropower production, and domestic/industrial uses. Irrigation activities include the storage of seasonal flows in small irrigation reservoirs, as well as the diversion of river flows for irrigation. Irrigation reservoirs and irrigated water use are aggregated at the catchment level to reduce model complexity. Hydropower production occurs at the three main reservoirs of the Drini cascade. Domestic and industrial uses are assumed to be equal to reported water production by municipal water supply companies.

The model has been calibrated by adjusting rainfall-runoff model parameters, reservoir operating rules, and groundwater parameters. The calibration of inflows to the Drini cascade, as measured at Fierze Reservoir, is reasonable. However, the calibration of simulated local inflows to Komani and Vau i Dejes reservoirs should be revisited if more data become available, either for input or for calibration.

3.5.1 Modelling system and its basic elements

The MIKE HYDRO Basin model of the Drini-Buna basin has been prepared to estimate the balance between water supply and demand under both present and future conditions. Because future conditions may include climate change impacts, a rainfall-runoff model has also been developed using the simulation software NAM. The NAM rainfall-runoff model is used to estimate how changes to precipitation and evapotranspiration may affect water supply and demand.

The MIKE HYDRO Basin model consists of elements used to represent catchments, rivers, water use locations, conveyance channels, reservoirs, and hydropower facilities. In catchments where human impacts on alluvial groundwater flows may be significant, the model also includes a simplified groundwater model that estimates the impact of water use activities on groundwater base flows to the river system.

3.5.1.1 Catchments

Catchments are represented in MIKE HYDRO Basin as spatial polygon elements. Catchments are the units that produce runoff and also represent the areal extent of groundwater bodies in catchments where the MIKE HYDRO Basin groundwater model is active.

Runoff generated in each catchment is simulated using the NAM rainfall-runoff model. The model simulates inflow to the river system in the form of surface runoff from rain and snowmelt, as well as base flow contributions from groundwater discharge. The model is parameterized on a lumped catchment basis, with the exception of the snowmelt module.

If the MIKE HYDRO Basin groundwater model is used in a catchment, the groundwater system is represented using a two-layer linear reservoir model. The two-layer model consists of a shallow layer and a deep layer. Time constants are used to control the baseflow discharges from both layers to the river system, as well as from the shallow layer to the deep layer. Recharge to groundwater is estimated from the NAM model. Irrigation system and water distribution losses are also routed to the groundwater model.

3.5.1.2 Rivers and conveyance channels

The river system is represented as a network of channels that receive runoff from catchments as well as return flows from water use locations. Flows are routed through the river network using delay parameters that approximate travel times in the basin. In catchment areas where alluvial groundwater systems are important, groundwater baseflow discharges also make an important contribution to river flows.

The river network is linked to water use locations using conveyance channels, which convey surface water to water use locations, and also convey return flows from water use locations back to the river system.

Reservoirs and lakes are represented as storage nodes where river flows can be stored or diverted. Operating rules are used to determine reservoir releases as a function of storage.

Minimum flow requirements are also represented as nodes in the river network where minimum flows must be maintained. These requirements have priority over storage and water use.

3.5.1.3 Flow regulation and water use

Water user locations are represented in the model as nodes where water is abstracted from river channels or groundwater. A fraction of water abstracted is returned to the river system as return flow.

Water use nodes are used to represent uses in the following sectors: domestic supply (including industry), irrigation, and hydropower. Water use within each sector is represented as follows:

- Domestic/industrial water uses are represented using monthly demand time series. We assume one water location for each municipal water supply company. Domestic/industrial water users abstract water from groundwater, the river system, or a combination of the two. We assume that a constant fraction of water delivered to domestic/industrial locations returns to the river system as return flows. We also assume that a fraction of water abstracted is lost because of distribution system losses.
- Irrigation water use is also represented using monthly demand time series. We assume one irrigation water user in each catchment, each representing the aggregated irrigation demand within that catchment. Irrigation water users abstract water from the river system only. We assume that a constant fraction of water delivered to irrigation locations returns to the river system as return flow. We also assume that a fraction of water abstracted from the river system is lost because of conveyance and field losses.
- The three large hydropower plants in the Drini Cascade are represented in the model. Other small-scale hydropower plants are not represented.

Because no information on water use is available for the parts of the basin outside of Albania, modelling of these parts of the basin is limited to rainfall-runoff modelling.

3.5.2 Model extent

Catchments and rivers in the Drini-Buna basin have been delineated using a Digital Elevation Model (DEM) with a spatial resolution of 90m by 90m. The DEM was obtained from the NASA Shuttle Radar Topography Mission (SRTM).

The coastal area close to the river mouth is artificially drained and supplied with water diverted from the Drini, and here the resolution of the applied SRTM model does not suffice for delineation. To include these areas in the model, the model boundary has been extended southwards and included the coastal plains until the outlet of the southernmost diversion canal from the Drin, which discharges into the sea close to Lezhë.

The Drini-Buna basin receives inflows from two neighbouring basins. Along the northern boundary a hydropower plant near Niksic in Montenegro diverts water to the Buna basin. In the southernmost catchment Lake Ohrid is reported to receive subterranean discharge from Lake Prespa. The diversion in Montenegro is not included in the model due to lack of quantitative information on these flows. Although quantitative information is not available about the discharge from Lake Prespa, an assumption has been made about this flow because its importance to the basin water balance.

3.5.3 Catchment delineation

Based on the Mike Hydro model, the Drini-Buna basin has been delineated into 13 catchments. Ten are located in mountainous areas that drain into the reservoirs of the Drini reservoir cascade, two catchments are located in the Buna basin upstream of Lake Shkoder, and the remaining catchment covers the lowest part of the basin in Albania downstream of Vau i Dejes Reservoir and Lake Shkoder.

Catchment outlet locations used for delineation have been selected based on the following criteria:

- Estimating water supply at particular locations.
- Availability of streamflow data for model calibration.
- Splitting larger catchments into smaller ones to improve the representation of spatial variations – particularly in rainfall.

The catchment delineation balances the availability of hydrological data for calibration with an appropriate discretization of water balances of various parts of the basin. A catchment map is shown in Figure 3.7. Clear reasoning for the delineation of each of the catchment is provided in Table 3.3.

Figure 3.7: Drini-Buna River Basin catchments

Table 3.3: Delineation of catchments in the Drini-Buna Rover Basin

Catchment No.[16]	Reason for Delineation
1	Representation of Ohrid lake with the limitations dictated by the DEM
2	Dam Site, intake for power plant
3	Sub delineation of larger catchment
4	Sub delineation of larger catchment and flow information Station Drinit Te Zi at Ura Dodes
5	Sub delineation at Kosova flow station Kline
6	Sub delineation of larger catchment
7	Inflow from Kosova, Flow station Vermice
8	Outlet of Fierza Reservoir
9	Outlet of Komani Reservoir
10	Catchment downstream of Shkoder Lake and Vau i Dejes reservoir, receiving water from Drini, Buna and smaller tributaries.
12	Outlet of Vau i Dejes Reservoir
17	Sub delineation of larger catchment. Main inflow channel to Shkoder Lake (Moraca River)
20	Outlet of Shkoder Lake

The 13 catchments strike a reasonable balance between data availability, project resource constraints, and the level of detail need to estimate reasonable water balances in various parts of the basin.

3.5.4 Water balance

Establishing a water balance is an important first step toward the development of an integrated water resources management strategy. Basically, the water balance quantifies available water resources, water use and what remains available for alternative uses. The water balance calculation is based on the document[17] “Guidance document on the application of water balances for supporting the implementation of the WFD” (Technical Report: 2015-090). This is the official guidance on Water Balance set out by the European Commission.

The water resources available are those from surface water (rivers) and aquifers (groundwater). In the case of the Drini-Buna River Basin surface water resources from runoff within the country are augmented by inflow from neighbouring countries.

The three main uses of water are classed as agriculture, industry and drinking water. In the case of agriculture, the principal use is for irrigation. There are of course other agriculture related uses, such as drinking water for animals and aquaculture, but these are very small compared to irrigation. A similar situation exists in relation to industry. Industrial water use is very low in the Drini-Buna River Basin and is classed as ‘bottling’ and ‘other’[18]. There is also some use for industry from groundwater. The abstraction classed as

[16] Catchment numbers are given according to the DHI Mike Hydro model, used in stakeholder training exercises.

[17] “Guidance document on the application of water balances for supporting the implementation of the WFD” (Technical Report - 2015 – 090)

[18] National Register for Permission of use of Water Resources, Ministry of Environment, 2014

'drinking water' includes all municipal abstractions. The fourth water use, environmental flows, has not been fully quantified and is not included in Table 3.4. It is established under Albania Law as representing the flow that would naturally occur 355 days in a year. Its importance, particularly as demands increase and resources are reduced by climate change, is recognised.

Whilst ostensibly straightforward it is important that the water balance recognises the specific characteristics of different types of water use. A very clear example of this is to compare irrigation and hydropower. When water is used for irrigation most of it evaporates and very little, if any, returns to rivers or groundwater for further use. Though of course it is recognised that not all water that is diverted for irrigation reaches the fields. When water is used for hydropower virtually all the water that enters a reservoir passes through the turbines to generate electricity. It is for this reason the EU guidance document of water balance states clearly that hydropower is not included in the water balance calculation, i.e. "water abstracted for hydropower generation (in-situ use) should be excluded from the formulation of the water balance equation". For hydropower, the gross use is high but the net use is small; for irrigation, the opposite applies. Similar considerations apply to public drinking water where some of the water abstracted return as a potential water resource either through leakage to groundwater or after treatment at a sewage treatment plant to a river. At present, there is a large loss in distribution system either from leakage or unmetered connections; in the future, these losses will be controlled and the abstraction for drinking will reduce even though the amount supplied will increase.

Aside from the above there is also a difference in the importance of different types of water resource. For example, a large proportion of drinking water comes from groundwater sources.

Table 3.4: Water balance for the Drini-Buna River Basin

Precipitation (mm/year)	1,205[19]			
Hydrograph basin within Albania (km^2)	6,887			
Total hydrographic basin (km^2)	19,582[20]			
Water Resources (10^9 m^3/year)	**Current**		**2027**[21]	
Runoff within Albania	7.12		6.72	
Runoff from outside of Albania	7.92		7.17	
Total Surface Water	**15.04**		**13.89**	
Of which groundwater	6.11		5.70	
Total Renewable Water Resources	**15.04**		**13.89**	
Water Demand (10^9 m^3/year)	**Current**		**2027**	
	Gross	%[22]	Gross	%
Water used for	0.07	0.46	0.34	2.44

[19] http://www.cru.uea.ac.uk/data

[20] http://www.cru.uea.ac.uk/data

[21] Resources reduced by 4.5%. 'Third National Communication of Albania to UNFCCC (third draft)'.

[22] Calculated as a percentage of the total renewable water resources.

Precipitation (mm/year)	1,205[19]			
agriculture (including irrigation)				
Water used for industry	0.00	0.0	0.00	0.0
Water used for drinking water	0.02	0.14	0.06	0.43
Total Demand	**0.09**	**0.60**	**0.40**	**2.87**
Water Balance	**14.95**		**13.49**	

Table 3.4 above summarises the water balance for two periods; the first is the current estimate and the second is for the year 2027. The 2027 data include an allowance for the impact of climate change, which is projected to reduce water resource availability, and for the future water demand, which is expected to increase.

The main sources of information used to prepare the table, which were used as input data to the MIKE HYDRO model, were:

- Water Supply and Sewerage Master Plan for Albania - January 2013. This is latest summary of water demands within Albania;
- Third National Communication of Albania to UNFCCC (third draft)'. The United Nations Framework Convention on Climate Change is one the main intergovernmental bodies related to climate change. Reports to that committee can be consider as representative of the government's opinion of climate change;
- Eftimi "Hydrogeological characteristics of Albania" AQUAmundi (2010). This paper, whilst dealing mainly with groundwater also gives general information on the hydrology and water resources of Albania. The paper in turn draws on other documents produced by the government of Albania in particular "Climate of Albania" produced by the Institute of Hydrometeorology in 1975 and the "Hydrology of Albania" from the same source and published 1984.
- The industrial use is based on two sources. The 'National Register for Licenses of Use of Water Resources', Ministry responsible for Environment, and Groundwater Production and Use by Households and Industry, National Agency for Water Supply and Sewerage, 2011.

The recent EU Guidance Document on 'The Application of Water Balances' discusses the question of scale. This relates both to 'time scale' and 'spatial scale'. Among the alternative time scale, they suggest is 'wet/dry season'. The above analysis of the Drini-Buna at an annual scale suggests the water balance is strongly positive. A separate analysis in line with section EU guidance document was carried or for the dry season, which based on meteorological data, was taken as running from June to September inclusive. This showed that for the Drini-Buna the average water demand for that 4-month period was calculated as 2.2 times higher than the annual mean. Even though the water demands are highest during the summer months, they are still a small percentage of the available water resources and the overall water balance is still positive. However, it is important to note that further research is required in order to determine the water demand in each sub catchment in relation to the specific availability of surface and groundwater resources.

3.6 Characterisation of Groundwaters

The Drini-Buna River Basin is characterised by three main types of aquifers: Quaternary, Carbonate and Magmatic. Figure 3.8 shows a map of the main aquifers in the Drini-Buna River Basin.

3.6.1 Shkoder quaternary aquifer

Deposits of the Shkoder aquifer are observed in the rivers and valleys in the area of Shkoder, Nen Shkoder and Lezha town. Proluvions are encountered in the dry riverbed, where the maximum thickness reaches 6 metres. These are also encountered in the other streams, but in small quantities. Alluvial deposits are encountered in the following valleys: Drini-Buna, Gjadri, Kiri, Vermoshi, Valbona, Drini i Zi (Bllata, Muhurr).

From the Drishti village to Kiri River, three terraces built by the alluvial deposits can be observed with two of the three depositions cemented by carbonate materials. In the Vermoshi River there is an alluvial area on which is located the Vermoshi village. This alluvial terrace has a height of 0.5-1 metre and a maximum thickness of 3-4 metres. The granular composition is mostly coarse, medium grain, gravel, and pebbles.

Porous rocks are located in Nen Shkoder-Zadrime and Shkoder areas. The groundwater is associated with sandy-gravely (alluvial) depositions constituting the richest water-bearing layer or horizon of underground basin of Shkoder, Zadrime and Nenshkoder.

3.6.1.1 Shkoder aquifer

This porous aquifer has a high permeability and includes deposits of coarse gravel and sand, which make up water bearing horizons, present throughout the whole area of Shkoder.

In the eastern part of the aquifer, the gravels are replaced limestone rocks with numerous caverns, whereas in the north, a few km to the south of Koplik, the gravels are in contact with the clay-sandy formations of Piacensiani. The gravels mostly appear on the surface in eastern and northern parts of the Shtoi field, while moving toward the south and west, under deposits of the sub clay coverage, they form sub-artesian water horizons, and sometimes in the winter season the wells provide water (with pressure).

In some areas near Shkoder Lake the wells provide water, but only in winter. This is as a consequence not only of the lowest field quota, but also because of the lithological composition, where the gravel and grits near the Lake of Shkoder are substituted partly with clay and sub clays, which serve to limit the groundwater discharge into the lake, i.e. causing an increasing groundwater level.

From the foothills of Dobrac up to Grizhe field is a sector rich in groundwater reserves, which constitutes the main facility for the drinking water supply of Shkoder population. The porous aquifer with the highest permeability is found in almost the entire area of Mbishkodres.

To the east, the gravels contact with base formations such as karstified limestone of Triassic, Jurassic and Cretaceous ages. Groundwaters feeding this horizon emerge from the base formations of Rrjolli, Vrakë streams and Kiri River.

Atmospheric precipitation falling directly on the surface plays a role in feeding the groundwater where the water-bearing horizon lies. Groundwater flow moves according to the inclination of terrain, i.e. north-eastern and eastern to the southwestern and western areas.

3.6.1.2 Zadrimë - Nënshkodër aquifer

According to hydrogeological conditions, this aquifer can be divided into two separate sectors: NënShkoder and the Zadrima Field.

The section of NënShkoder it is large spread in valleys of Buna and Drin River and their fields. In south, this sector is bordered by Zadrima field, and in the north by MbiShkoder basin. It occupies all the lower field area and has the cumulative activity for porous material. Quaternary alluvial deposits of the Buna and Drin Rivers constitute a strong layer of coarse gravels and sand with high filtration feature, which accumulate substantial amounts of fresh underground water reserves. Coarse gravel and sand dominate with layer thickness averaging from 5-10 metres to 60 metres in some areas. Sub-sand coverage ranges from 2-3 metres to 25-30 metres. Gravels form outcrops in the areas of Mjedes, Kac-Naraçit, and Stajkes. Sub-clays and sub-sandy coverage increases from north to south and right to east-west flows toward the Buna and Drini Rivers.

In the north-eastern part of this basin, groundwater is evident without pressure, while in the southern and western sectors, as a result of sub-gravelly and sub-sandy coverage increasing as result of higher hypsometric position of the area, they gain pressure and drillings in some areas the waters have artesian character, e.g. Trush, Pistull, Paçram and Gocaj villages. Groundwater levels, however, in most of the territory, are close to the surface, as in area of MbiShkoder.

Filtration coefficients vary from 30-50 m/day and specific flows from 5-10 l/sec/m, in areas of south-western and western extremes and southern of basin, up to 400-700 m/day and 100-150 l/sec/m, respectively in most of its sectors, especially near Buna and Drini Rivers.

The direction of groundwater flow is mainly toward south and southwest. Groundwater in this basin is generally fresh with good physical and chemical properties and a temperature range of 12-16oC.

The sector of Zadrima field, which is associated with cumulative activity of alluvial loamy material of Gjader cascade, is not extensively rich in groundwater. Alluvial depositions of rivers are limited in the Zadrima field. Quaternary thickness does not exceed 25-30 metres in certain areas and up to 50 metres in areas near the Rivers. The gravel layers have small thickness up to 2-3 metres.

Specific sectors of the Zadrima field in the vicinity of the rivers (Mabe, Dajç, Gramsh and Gjader. Ne Zoje and Mabe) have water-bearing gravels up to 20 metres thick and with a high yield and high permeability. In these sectors the filtration coefficient ranges from 35 to 60 m/day, while the specific flow rate has a range of 5-14 l/sec/m. In the Gramshi, Zoje and Gjadri sector the filtration coefficient ranges from 5 to 30 m/day, while the specific flow rate to 2 l/sec/m.

3.6.1.3 Peshkopia region in the Municipality of Diber

This includes gravels and grits, clay-sandy sandstones that are found at the bed of the Drini I Zi River. They are extended from the Doda Bridge to the vicinity of Maqellara in the south and consist of rounded rocks having a thickness ranging from several meters to 10-15 metres in the area of the Muhuri and Fushe-Aliaj zone. These gravels have good hydraulic connection with the River.

3.6.1.4 Quantitative assessment

The quaternary aquifer reserves are exploited for drinking water, supplying Lezha, Shkoder, Malsi Madhe, Tropoja, Puka, Kukes, Pogradeci and surrounding villages.

Exploitation of reserves from the SubShkoder field up to 1000 l/sec are evidenced from springs that flows from limestone, which are in dependent of atmospheric precipitation.

The city of Shkoder is supplied with water from the Dobrac water bearing areas from wells, exploited a total flow of 900 l/sec at Dobrac pumping station. Other wells used that supply villages with water near Shkoder provide the following:

- Berdica: 100 l/sec from 2 wells
- Bushat: 2 l/sec
- Bacallek: 100 l/sec
- Dajç: 11 l/sec
- Oblike: 2 l/sec
- Other-Drillings: 80-100 l/sec

The total amount of water used by the Shkoder region is about 1200-1300 l/sec.

The Zadrima zone provides nearly 300 l/sec of water although this area has limit exploitation of underground water due to poor water quality. However, during the recent years, wells drilled in the Kakariqi carbonate formations showed good water quality. Today in this area waters are exploited as follows:

- 50 l/ sec from pumping stations, 20 l / sec of those in limestone formations
- 200 l/sec obtained from the village wells used for irrigation
- 200 l/s obtained from natural springs in the area surround

For Peshkopia town flows ranging from 60 - 100 l/sec are obtained from 3 wells located in the gravel bed of the Black Drin River near Muhurri Field.

3.6.2 Carbonatic aquifer

This aquifer comprises of limestone and dolomites deposits, which lie almost in all of the northwest side and in the southern part of the central basin, forming the large mass of carbonate in the so-called Albanian Alps. In these deposits, there are highly productive springs, such as in Tushemishti, Lin (Pogradec), Kalimash, Skavica (Kukes), Valbona, Dunishe (Tropoje), Petroshan and Syri Sheganit. Underground waters belonging carbonate depositions have a large groundwater debit varying from 100-3000 l/s. Water regime in this basin aquifer is very changeable in the winter season where they are called springs but in fact are almost rivers.

Water reserves of Tropoja, Kukesi and Pogradeci regions are the most productive springs, which are currently not fully exploited for the needs of these districts. For the Peshkopia region, groundwater is provided from the Radomira Spring. The following assessment is outlined:

- In the Tropoja Region, the natural spring in Shoshani Vrella has a discharge of 1000 l/sec, supplying the town of Bajram Curri and for the villages around the town. Currently, only 100 l/sec is exploited.
- For the Kukesi region, the town of Kukesi is supplied by the Kolosiani natural spring with discharge of 300 l/sec. The town of Kruma is supplied by the Kruma natural spring with discharge of 100 l/sec.
- In the Pogradeci Region, the natural spring at Tushemishti provides approximately 200 l/sec. The Lin natural spring provides up to 20 l/sec for the Customhouse, 20 l/sec for Lin village and 80 l/sec for fish farming.
- For the Peshkopia region, the town of Peshkopia town it supplied with 100 l/sec from the Radomira natural spring. For the Maqellara zone, the Blata natural spring provides 20 l/sec.

The main monitoring stations in the aquifer are shown in Figure 3.7. Water quality of the water extracted from the carbonatic aquifer can be summarized as follows:

- Total mineralization in aquifer varies from 142-280 mg/l. The waters of this aquifer are fresh waters.
- Total hardness varies from 4.42-10.01 Fp.° gj in Gurra e Kolesjanit, Kukës, Tushemit, Lin Pogradec, Syri i Sheganit, Shkoder springs. The hardness is within the Albanian standard.
- The pH of groundwater is weakly alkaline with a range from 7.4-7.69.
- The content of Ca, Na, K, Mg, Cl, SO_4 and total dissolved solids are all within the Albanian and EU standards.
- Levels of NH_4, NO_3 and NO_2 are within the standards required for drinking water.
- The water quality of the carbonatic aquifer is classed as 'very good'.

3.6.3 Magmatic aquifer

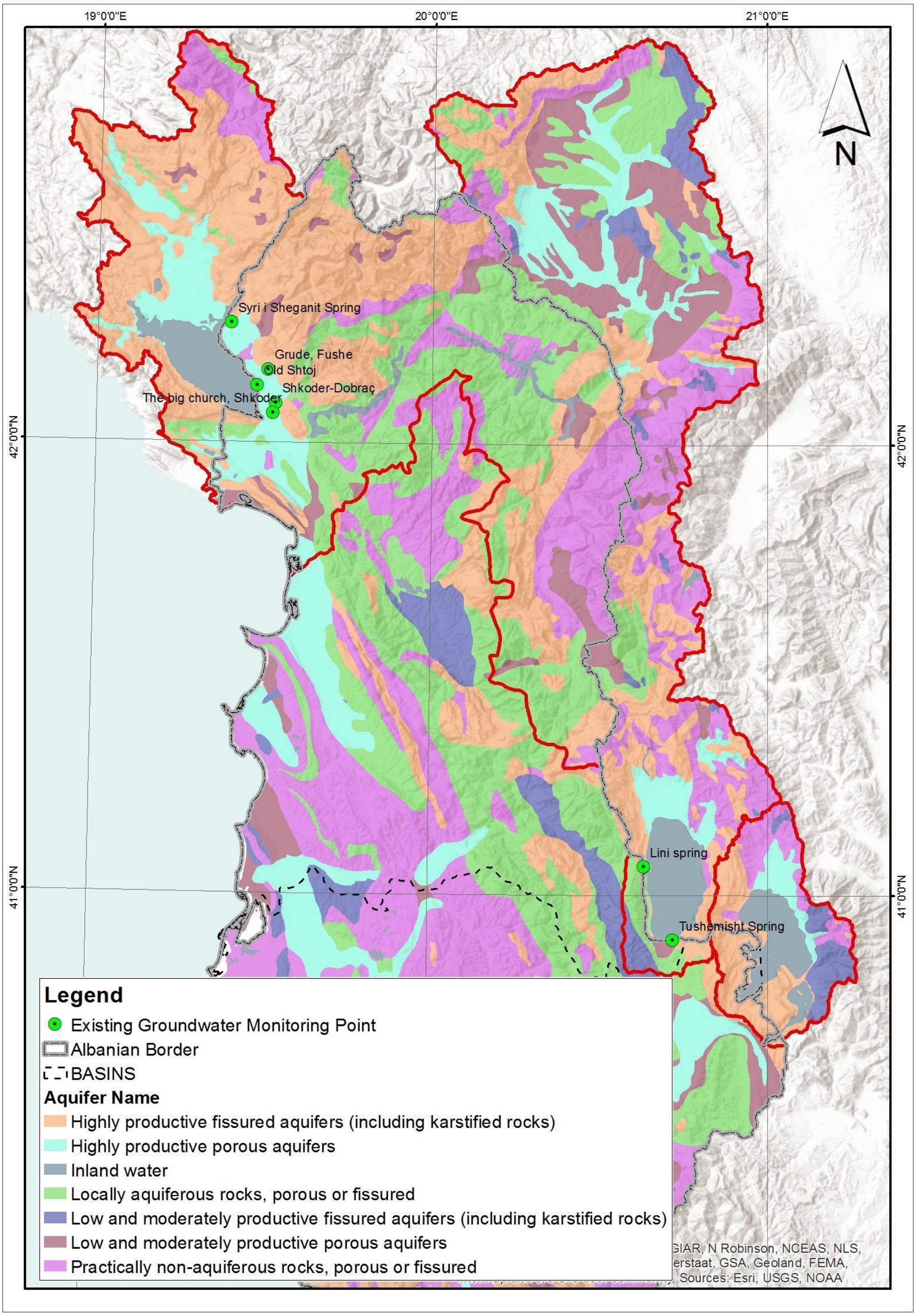
The magmatic aquifer is composed of three types of rocks:

- Aquifer ultrabasic rocks: These are widespread in the Drini-Buna River Basin. These rocks consist predominantly of harzburgites, lercolites of dunite, and serpentines, less pyroxene. Distribution of springs that are encountered in this complex is not has similar for every ultra basic massifs as result of a number of factors that influence in the water bearing massifs (elevation of massif, the density of breaks, snow cover, etc.). For this complex with interest is only Krrabi massif where the springs produces 5-25 l/s.
- Aquifer of high - acid rock: These rocks have limited spread and consist of quartz diorite, plaggios granite, micro diorites and granites. These rocks lie in the form of small massifs. Hydrogeological properties of rocks of this complex are not good with a flow that may vary from 0.05-0.3 l/s.

- Aquifer of Permian and Lower - Medium Triassic depositions: These water-bearing deposits spread throughout the Drini-Buna River Basin, as in the Alps and tectonic zones as Gashi and Korabi massifs. These are deposits with an older age with a typical flow of 0.1-5.0 l/s.

For this aquifer, the only area of interest for groundwater exploitation lies in the massif Krrabi where there are sources with a discharge of 5-25 l/s. The waters classified as fresh waters with a mineralisation of 250-350 mg/l.

Figure 3.8: Main aquifers in the Drini-Buna River Basin



4 Pressures and Impacts

4.1 Sources of Water Pollution in Drini-Buna River Basin

Urbanisation, industrial development, agriculture, energy production, the presence of hot spots, urban and rural wastewater discharge on both sides of the Drini-Buna River Basin in Shkoder, Kukes, and Diber regions are the main sources of pollution. The water of the river basin is used mainly for industrial activities, irrigation, and energy without considering the cumulative impact this might have in water quality. In addition, the catchment area of the river has been partially deforested and the buffer area is often cultivated with crops. Furthermore, the Drini-Buna River Basin and its tributaries are used as a channel for the municipalities and industry to discharge the wastewater without treatment. Consequently, without controlling actions, the Drini-Buna River Basin faces an increase in water pollution together with the potential loss of flora and fauna.

Several sources of water pollution and pressures on the river remain constant from region to region. This is the case of the municipal solid waste disposal, wastewater discharge, and industrial waste disposal. The main difference between the 3 regions is related to the type of industry and extent of agriculture development.

4.1.1 Waste management

Solid waste management in the three regions is characterized by lack of solid waste collection in rural areas, inadequate transport, and lack of suitable treatment and disposal facilities. Lack of adequate wastewater treatment and disposal areas (landfills) constitutes the main challenge and potential source of water pollution in Shkoder and Kukes region. The three regions deposit their solid waste in improvised landfills (more precisely dumpsites) next to the riverbed thus polluting the Drini-Buna River Basin and its tributary waters with their leachate. Shkoder is one of the few regions that have a sanitary landfill. However, the Shkoder Region also has 4 unsuitable solid waste disposal areas (dumpsites), while Kukes has 5[23] and Diber has 4[24]. The Velipoje dumpsite in Shkoder is located about 670 metres from Drini River, while Kukes has two dumpsites that distance about 500m and 70m from Black Drini and Fierza Lake respectively. Peshkopi also has one dumpsite close to the river at a distance not more than 220m from Perroi i Llixhave, the Black Drini's tributary. Similarly, although there are tentative plans to build wastewater treatment plants in the three regions, the municipality wastewater is still discharged directly into the Drini-Buna River Basin tributaries without treatment.

Concerns about river pollution from solid waste will only increase in the future since solid waste production increases from year to year, although there has been a tendency to reverse this trend in the last two years with an increase in recycling. In Shkoder, the rate of solid waste production per person has increased by 70% from 2005 to 2014 (0.167 to 0.237 kg/person/day, respectively), and in by Kukes in the same time period by 62% (0.133 to 0.214 kg/person/day, respectively)[25]. The increased amount of generated solid waste increases pressure on rivers as long as the regions lack wastewater treatment plants and sanitary landfills to deposit municipal and industrial wastes. The MoUD in cooperation with ASIG, has recently included information about landfills of solid urban waste in the Geoportal of the State Authority for Geospatial Information, which can be viewed at: http://geoportal.asig.gov.al

[23] http://geoportal.asig.gov.al

[24] http://geoportal.asig.gov.al

[25] Source: Ministry responsible for Infrastructure

4.1.2 Industrial activity

Industry places also a constant pressure the resources of Drini-Buna River Basin. The three regions inherit industrial pollution from the past and face serious concerns related to industrial pollution of the present although the type of industry changes from region to region.

In the past, the industry developed in Shkoder region varied from building industry to chemical and mechanical one. In Kukes and Diber, mining has been the main sector of economy in the area over the last 50 years. The Kukes and Diber region are rich in chromium, copper, Iron, nickel, silicate, aluminium ore (bauxite), lignite, platinum, uranium, asbestos, quartz, coal and clays that have been exploited continuously[26].

In the past, the Kukes Region economy was built primarily on mining of ferro-nickel, chromium and copper. In addition to the economic benefits of this sector for the population, mining has also impacted water quality of Drini-Buna River Basin mostly through acid water drainage and waste[27]. The main plants that have caused environmental issues are the chromium mines and quarries (in Çabrat, Rrogam 1, 2, 3, Çorraj, Lajthizë, Kam, Kepenek, Zogaj 1, 2, 3, Skatinë, Shpati i Vishisë; Vlahën, Përollaj, Qafë Prushi, - Prroi i Batrës, Kalimash 1, 2, 3) and the copper mines and quarries (in Gjegjan, Gdheshtë, Shëmri/Leproi, Golaj, Nikoliq, Krumë/Kullaj, Goskolli)[28]. Studies have shown that the copper mines continuously discharge acidic wastewater in springs or rivers, which end up in Fierza Lake. Due to the past mining activity, Kukes region has inherited two former mining related hotspots, i.e. the mine in Gjegjan and the copper-melting plant in Rexhepaj. The hotspots have dumpsites that still store large amounts of mining waste. The former Copper Mine in Gjegjan and the former Copper-Smelting Plant in Rexhepaj still pose serious threats to environment, although the activities are not active today. The Copper-Smelting Plant in Rexhepaj is located only 300m from Luma River. Often, the waste ends up in Luma River, which transports them directly to Fierza Lake, only 1km distance from the former pant. In addition to the hot spot areas, the region has also a dump in the former Chromium Enrichment Plant in Kalimash that has not been classified as a hotspot. In Dibber, most of the mining activity was focused on chromium extraction in Bulqizë, Bater, Theknë, Ternovë, and Cërujë, and Shkallë and on marmer in Muhurr village.

Mining is still the main economic sector in the Kukes and Diber regions, focused on anhydride (anhydrous calcium sulfate, $CaSO_4$) mining on the right side of Black Drini in Diber Region and on ferro-nickel, chromium, and copper mining around Fierza Lake in Kukes Region. By 2014, in the Kukes Region there were approximately 80 operators that had obtained a mining permit (35 in Tropoje, 30 in Kukes and 15 in Hasii)[29].

A selection of maps is provided in Figures 4.1 to 4.4 to show the current mining activities and dumpsites in the Drini-Buna River Basin[30].

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[26] Albanian Geological Services

[27] Albanian Geological Services

[28] Albanian Geological Services, “Gjeoresurset dhe Gjeorreziqet në Qarqet e Shqipërisë” Qarku i Kukesit, 2014

[29] Albanian Geological Services, “Gjeoresurset dhe Gjeorreziqet në Qarqet e Shqipërisë” Qarku i Dibres and Kukesit

[30] geoportal.asig.gov.al

Figure 4.1: The location of current mining activities in Shkoder and Kukes regions

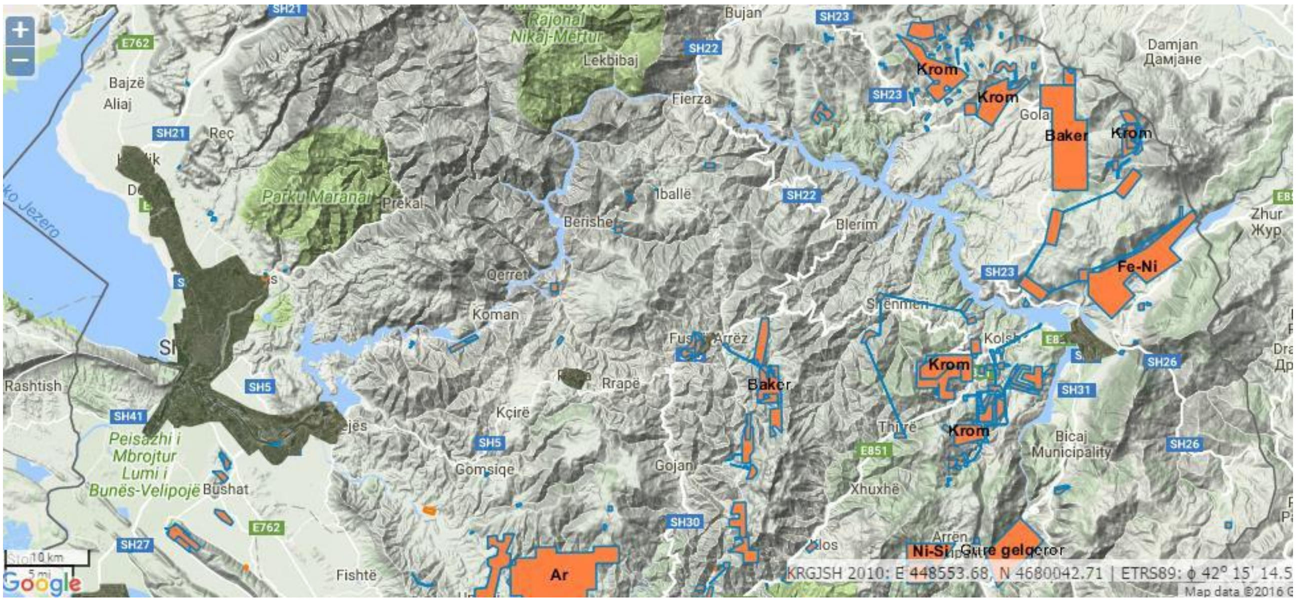


Figure 4.2: The location of current mining activities in the Diber region

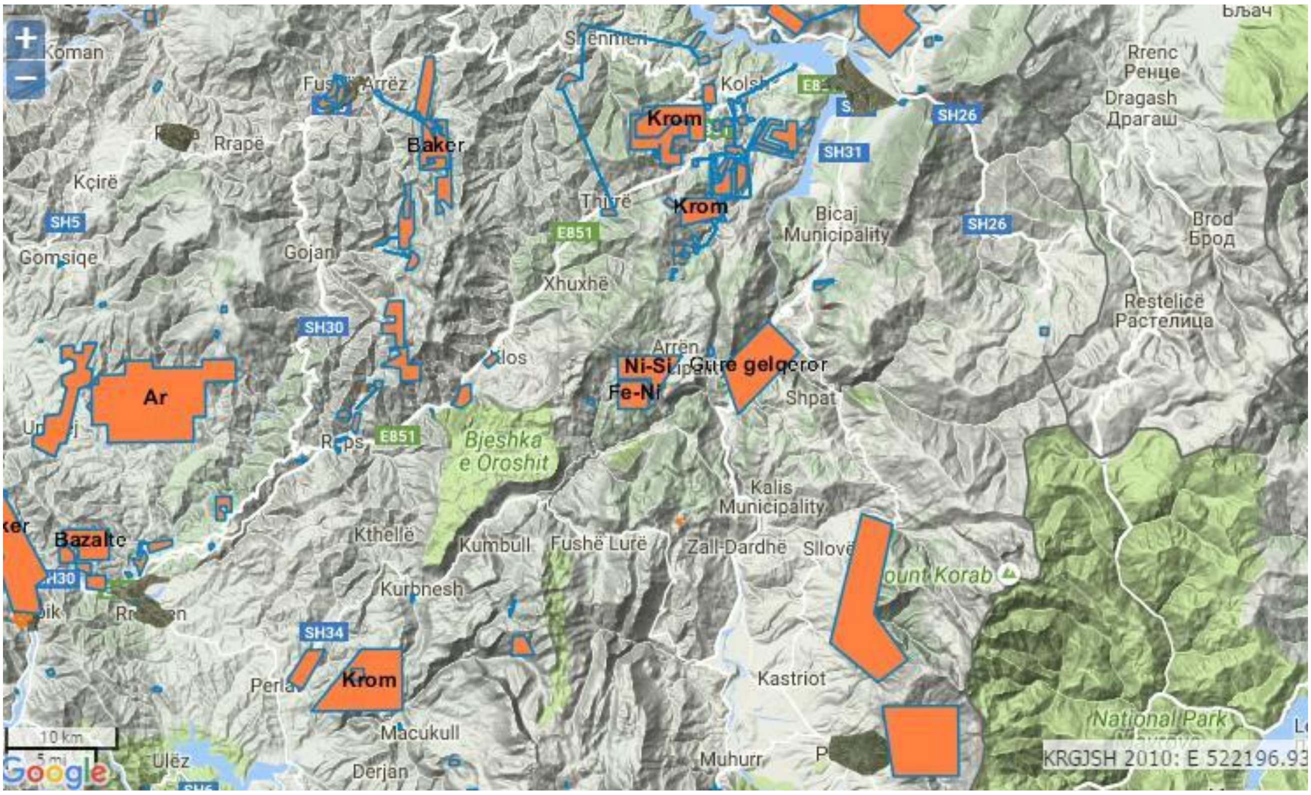
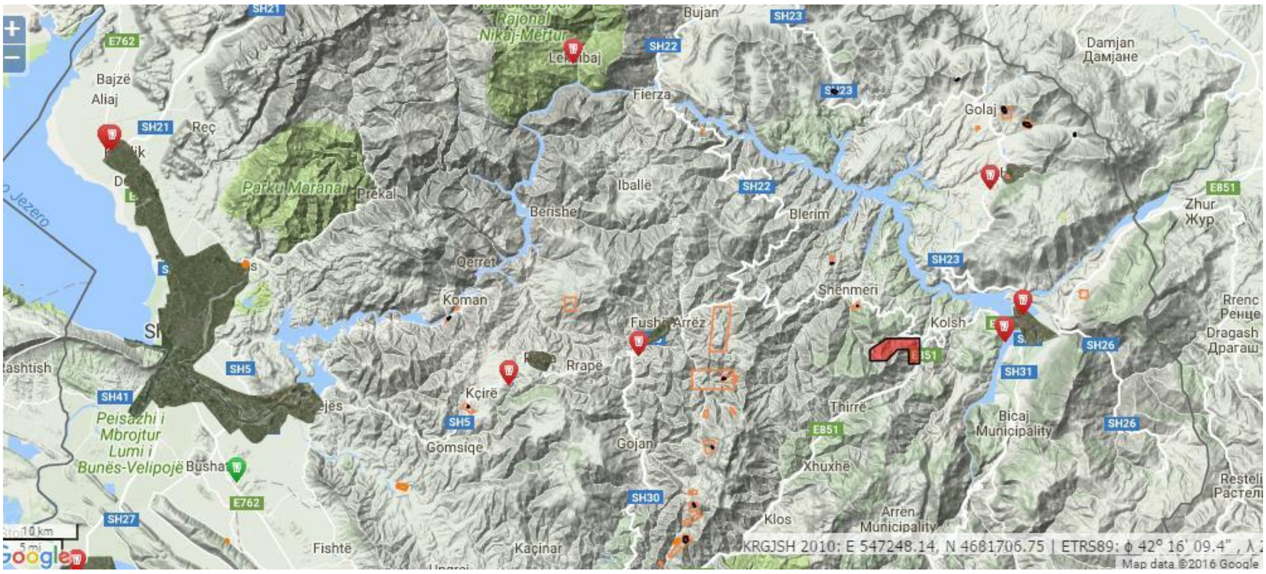
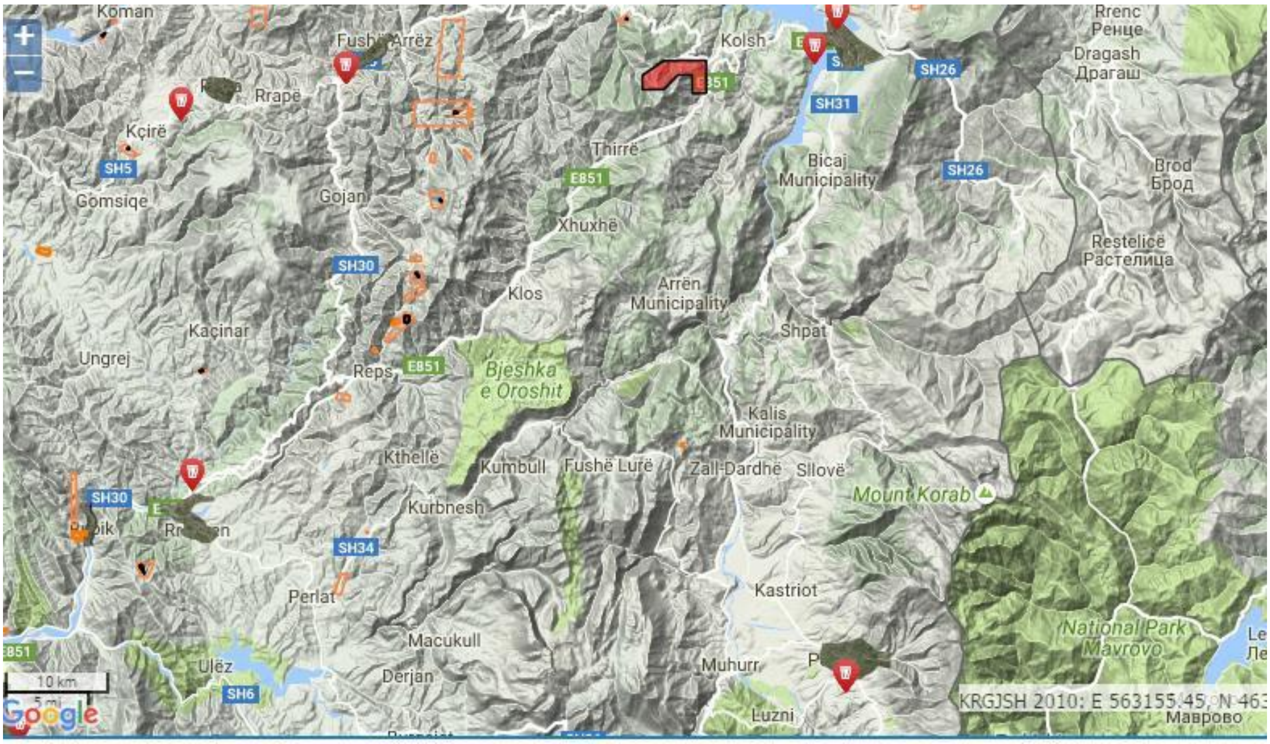


Figure 4.3: Dumpsites and mining hazardous areas in the Drini-Buna River Basin*



***Map marker show dumpsites; Red and orange areas refer to mining hazardous areas**

Figure 4.4: Dumpsites and mining **hazardous areas close to the Black Drini**



4.1.4 Erosion

Sediment (inert) exploitation of the Drini-Buna River Basin is also an activity that has seriously damaged the river tributaries over the last 25 years. Consequently, the Drini-Buna tributaries suffer severe vertical channel erosion in Drin-Gjader-Kir channel in Mali i Rrezuem (>50cm deepening), Beltoje (>50cm), and Zalli i Kirit (>15cm). In Black Drini River erosion has impacted mainly the Ura e Muhurit section (>50cm)[31].

4.1.5 Hydropower plants

Serious concern about water quality of Drini-Buna River Basin is also related to hydropower plants although most of the Drini River has been used for energy production for over 40 years. However, there has been a significant increase in the number of the smaller concessional hydropower plants (SHPPs) that have been built or that are planned in Drini-Buna River Basin. At national level, since 2008 in Albania there are 197 concession contracts concluded for building 555 small hydropower plants, out of which, 180 concession contracts are active as 17 contracts were terminated by the ministry. For the 180 active concession contracts, it is foreseen the construction of 486 SHPPs. Also, pursuant the implementation of the DCM 822, there are another 119 HPPs that are not subject to concession32. With respect to the Drini-Buna River Basin, according to NANR, at the end of 1st trimester 2018 there were 47 concession contracts in place for the construction of 121 Small Hydropower Plants (SHPP) with an estimated installed capacity of approximately 650 MW, and also 26 SHPPs that are not subject to concession. 29 SHPPs were currently in operation.

Studies on the impact SHPPs are having on the Drini-Buna River Basin water quality and aquatic life have undertaken when legally required. However, there remain many open questions in relation to the location of SHPPs and their effect on the River Basin in terms of environmental and social issues, which include:

- The designated locations, i.e. in or on the border of Protected Areas or construction with a respect of architectural and environmental features;
- Insufficient residual flow into the river bed, i.e. the potential to breach ecological flow standards;
- The quality of the environmental impact reports, which includes the lack of independent review and availability of reports;
- The need for environmental and social impact assessment under specific loan agreements;
- Compensation to land owners and local communities affected by lack of water or increased flooding.

Furthermore, the potential impacts the SHPPs are having on sea erosion[33] has not been studied, i.e. by serving as a barrier, the dams do not allow the flow of the river to transport sediment (pebbles, large particles, etc.) to the sea that helps sustain the beaches[34].

With regards to the effects of hydropower in relation to EU Nature legislation, European Commission had issued in 2018 a guidance document[35]. The document outlines the range of effects that hydropower can have on habitats and species under the EU WFD and Nature Directives in particular, such as:

- Changes in river morphology and riverine habitats;
- Barriers to migration and dispersal of protected species;
- Disruption of sediment dynamics;
- Changes of the ecological flow regime;
- Changes of the flow regime by peaking hydropower plants;
- Changes in seasonal flood cycles;
- Water chemical and temperature changes;

[31] Albanian Geological Service
[32] NANR.gov.al, information provided for 1st trimester 2018
[33] NEA, State of the Environment Report, 2014
[34] NEA (Agjencia Kombëtare e Mjedisit), Raporti i Gjendjes në Mjedis, 2014
[35] Guidance document on the requirements for hydropower in relation to EU Nature legislation, European Commission, 2018

- Injuries and killing of individual animals;
- Displacement and disturbance;
- Effects on terrestrial species and habitats.

Drawing in the same time the attention to the fact that the above also might have cumulative effects, which will often only occur over time, and the cumulative effects of even small hydropower installations can be many times, unacceptably high.

The EU water directors' statement on hydropower development under the WFD from 2010[36], is still valid:

- "Pre-planning mechanisms allocating 'no-go' areas for new hydropower projects should be developed. This designation should be based on a dialogue between the different competent authorities, stakeholders and NGOs.
- In order to minimise the need for new sites, the development of hydropower capacities could be supported by modernising and upgrading existing infrastructures.
- The development of hydropower should be accompanied by improved water ecology, clear ecological standards for new facilities or modernised existing facilities, and improved operating conditions. New hydropower plants should, for example, all have fish passages and should respect a minimum ecological flow.
- An analysis of costs and benefits of the project is necessary to enable a judgment on whether the benefits to the environment and to society preventing deterioration of status or restoring a water body to good status are outweighed by the benefits of the new modifications. This does not mean that it will be necessary to monetise or even quantify all costs and benefits to make such judgment.

  The size of the project is not the relevant criteria to trigger Article 4(7). The relevant approach is to assess whether a given project will result in deterioration of the status of a water body. Thus, projects of any size may fall under Article 4(7)"

A valuable conclusion of the Guidance document relevant for Albania's particular situation where the construction of SHPPs has rapidly developed in the latest years, is that:

"The traditional approach to developing a plan or project, be it for hydropower or for any other interests, is to first design the plan or project for its purpose and then later to consider wider environmental and other use issues. However, this often results in potential conflicts being taken into consideration at a relatively late stage in the planning process, at a time when there is less room for manoeuvre…When the design concept is already so far advanced, the environmental impact assessment often becomes an exercise in damage limitation… Recognising these difficulties, more and more infrastructure planners are now adopting an integrated approach to project planning and design. The integrated approach considers both the infrastructure and the ecological needs of the site at the outset and factors these into the initial project design, together with other land uses of the river. This also promotes a more interactive and transparent planning process and encourages the active assistance and input from ecologists and other stakeholders from the beginning."[37]

The focus on building small HPPs to mitigate the need for electricity in the country has created considerable pressure on watercourses in general, and ecosystems in particular. In these conditions, it is of utmost importance to observe the procedures and in particular the laws and regulations related to the use and management of water in a river basin.

An important element of this process is the ecological flow (see also chapter 4.2.3), the observance of which is provided in Law 111/2012 "On Integrated Management of Water Resources", which defines it as the daily averages of hydrological study, which is not exceeded more than 355 days a year. This means that on average the natural flow is lower than the Q355 value for only 10 days of the year. This is an important indicator in determining the conditions of water aquatic ecosystems. Institutions that confirm and monitor it are: i) Administration Offices of Basin Water, at the time of approval of the Water Use Application and ii)

[36] Informal meeting of water and marine directors of the European Union, candidate and EFTA countries, Segovia, 27-28 May 2010

[37] Guidance document on the requirements for hydropower in relation to EU Nature legislation, European Commission, 2018

Regional Environmental Agency, which must monitor and respect the ecological flow conditions. In many cases permission of water use for energy production is not based on sustainable daily discharge curve, as is required by the Law 111/2012 mention above, but only in some estimation done from designer.

From the data received is understandable that majority of SHPPs are with derivation outlet which means that a certain amount of water is taken from normal flow for a certain distance and is bringing back again in the stream. There are only a few cases that the SHPP is with dam. In this case the regime of flow downstream is strongly depended from the regime of dam itself. In both cases ecological flow is obligatory. This value should be added to the amount of water necessary for the other users downstream the SHPP, which can be water for irrigation, water for drinking purposes or other water use industries.

It is understood that during the permit procedures not in all cases the right evaluation of ecological flow, taking in consideration also other users downstream respective SHPP, is done. Sometimes other users have been neglected, especially those related to the irrigation, since part of agriculture land have not been irrigated regularly during the last time. Besides that, as shown above, ensuring an ecological flow, does not guarantee that the ecology of the river basin is not significantly impacted.

Experience shows that it is necessary to increase the professional skills of AOBW in evaluating the ecological flow and their awareness of its respect by every user. This is because, as stated above, they are responsible for interpreting the hydrological studies prepared and submitted by the water users, whilst giving consideration to the ecological flow that should be allowed in the watercourse bed.

Capacity building at AOBW and above is a necessity, not only to understand and interpret hydrological elements of the flow, but also to connect them with the opportunities for water use and the need for ecological flow, which is indispensable for a sustainable ecological environment in time and space.

These offices should be able to make an overall assessment of the water balance in the water course section in different time season in order to properly assess the water demand and water supply, keeping permanently ecological flow which is necessary for environmental in general and obligatory to ensure ecological status of the flow itself, in strictly respect of law 111/2012 “On Integrated Management of Water Resources”.

In light of the currently under-developed monitoring network, limited data availability (lacking validation) together with a limited technical and financial capacity make it virtually impossible for the immediate full enforcement of the Albanian Law. **The proposed Programme of Measures (Chapter 12 of this document) and the Outline 6-Year Action Plan for the Competent Authority (Chapter 14, Table 14.7 of this document) include the necessary steps to improve the current situation.**

4.1.6 Agricultural pollution

Agriculture run-off also remains a challenge for river pollution. Among the three regions, Shkoder has the most developed agriculture sector since Kukes and Dibra are mostly mountainous regions. In flat agricultural areas like those of Shkoder region, changes in the economic system of the country have also been accompanied by changes in the agriculture sector of Albania. Consequently, today, the agriculture sector has been shifting from a family-based system to an intensive agriculture system. This has been translated in reality by an increase in agriculture inputs such as pesticides, herbicides and nutrients. In fact, in 2015, Albania imported 67% more chemical fertilizers compared to the 2013 (152.207 tons in 2015 versus 102,483 tons in 2013)[38] and 71% more pesticides (1,365,346 tons in 2015 compared to 982,314 tons in 2013)[39]. On a national basis, Shkoder, Diber and Kukes are not the major users of chemical fertilizers. However, Shkoder uses about 6.66% of the chemical fertilizers followed by Dibër and Kukës with 5.58 and 1.39% respectively. When not properly managed, agricultural inputs risk water pollution of the rivers.

[38] INSTAT, 2016

[39] General Customs Directory (Drejtoria e Pergjithshme e Doganave), 2015

4.1.7 Pollution to groundwaters

In addition to surface waters, groundwater has also been susceptible to pollution over the last years. The primary causes of pollution are related to lack of protected areas around wells that could serve for hygiene and sanitation protection, irrespectively to the region. The protected areas have not been defined around legal and illegal wells in compliance with the law. Relating to industrial wells, data is missing. Other causes of pollution are overexploitation of aquifer water, mostly in summer where demand for water increases while the aquifer water level is low. In addition, a long-term withdrawal (over exploitation) of water for public supplies, industry, and agriculture has also caused pollution of several aquifers by increasing the salt concentration in the water. Sediment extraction from Drini-Buna tributaries in areas where the river feeds the aquifers has disturbed the balance and infiltration path between the river and the water of the aquifer leading to pollution. Pollution through rivers is also a challenge. In many cases, the river imparts pollution with the aquifer through the areas that are called hydro-geological windows. These are the areas where the river feeds the aquifer. Lastly, heavy industry remains a continuous threat to water resources. Albania has not disciplined groundwater use for industrial purposes and also industrial behaviours in relation to aquifers that are found in areas of economic interest for the industry.

4.1.8 Tourism

It is anticipated that pressure on the coastal area will continue due to the further development of tourism. Comparing to other users of water (e.g. agriculture, industry, energy, households) the contribution of tourism sector to the total water demand in the Drini-Buna River Basin is minimal. However, this sector is important because it is characterised by significant variability in water demand, namely temporal variability with significant peaks during the summer period when water availability is at its lowest; and spatial variability with the tourism industry being concentrated along the coasts, which can experience significant water imbalances and water quality deterioration of coastal bathing zones.

Increasing water demand due to tourism

The main causes of the tourist demand for freshwater are:

- Higher water consumption due to tourist population

In certain tourist areas and especially in the dry season of summer the local population of a destination (for example a coastal municipality) can increase many times (sometimes more than ten). This increase in population means a proportional or over proportional increase in water consumption. In some areas water demand during the peak tourism months can be much higher than the demand of local population in a whole year. According to EEA (2000)[40] a tourist staying in a hotel uses on average one third more water per day than a local inhabitant. Hamele and Eckhardt (2006)[41] using data of an extended international research conclude that tourists use on average 174 litres/per night in a camping place, 281 litres/per night at a bed and breakfast and 294 litres/per night at a hotel. This results in average water consumption per year on a camping site of 14,200 m³, in a bed-and-breakfast 944 m³ and in a hotel 9,713 m³. Within such establishments (includes all 3 categories), average water consumption at cafes or bars is around 35 litres per guest. In overnight establishments with swimming pools, guest use on average 60 litres more per overnight stay as compared to establishments without swimming pools. It is estimated that tourists visiting Mediterranean countries (which can be used as a proxy for the Adriatic) consume on average between 300 and 880 litres per day (depending on star rating), double quantity than local residents. The above-mentioned data clarify that in many tourist regions the tourism sector is a very important consumer of freshwater and in the instance of water supply shortages in these regions it causes heavy imbalances between water demand and water supply.

[40] EEA, (2000), Europe's environment: the third assessment, European Environmental Agency Copenhagen
[41] HAMELE, H. and S. ECKHARDT (2006), Environmental initiatives by European tourism business Instruments, indicators and practical examples, ECOTRANS, Germany

- Higher water demand due to tourist facilities

There are a variety of constructions and tourist facilities (e.g. swimming pools, golf courses, water parks, extensive landscaping) that imply additional water demand. This means for hotels 20%, for camping sites 40% more consumption and cost than in the businesses of their colleagues without pool (Ecologic 2007)[42].

- Higher water demand due to the urbanization of tourist areas

In most cases, tourism development forces urbanization of tourist areas. Tourists need a lot of services and facilities like transport, trade, banking, post, hospitals, leisure etc. which are offered by people that have to leave in the tourist area. This leads to an increase of the local population (at least during the tourist season) that has important implications no only on water demand but also on land use. Additional pressures on water recourses and on land are caused by the growth of second homes in inlands and coastal regions during the past decades.

- Higher water demand due to tourism supporting activities

In many tourist areas the development of tourism can cause a boost in activities like construction and intensive agriculture which use more water than in the case without tourism.

Impacts of tourism on water resources

- Over-exploitation of groundwater

In many touristic coastal regions, the main source of fresh water is groundwater and not surface water. By means of example, many relevant studies and reports show that overexploitation of groundwater is considerable in many tourist destinations (EEA 2003)[43]. That means that the volume of abstracted groundwater cannot be renewed and without a change of this trend the groundwater will disappear. Additionally, over-exploitation of groundwater provokes saline water intrusion that has negative impacts on the quality of drinking water and increases the salinity of agricultural land leading to less production and/or increased use of fertilizers. Last but not least wetlands whose hydrological dynamic are directly linked to aquifers can suffer by a decrease in the groundwater table.

- Degradation of the quality of water

Pollution of surface and groundwater in tourist areas can be caused by urbanization, solid waste, agricultural and other economic activities or by insufficient or non-existent waste water treatment. In many tourist areas hotels and other facilities have no own treatment plans and are not connected to any sewage system. In other cases, the increase of waste water during the tourist season cannot be absorbed by the public treatment systems because of restraint capacity reducing the effectiveness of treatment. Pollution of surface and groundwater has negative impact on the quality of freshwater but also on the quality of the water of wetlands as well as sea water. According to EEA (2000)[44], tourism contributes to 7% of all pollution in the Mediterranean basin, with a similar or greater figure (due to lack of wastewater treatment facilities) anticipated in the Adriatic Sea.

- Increased investments for water management

In order to satisfy the great demand of water due to tourism public authorities (local, regional or national) are enforced to invest money in different projects like studies, dams, drillings, new hydrological plans, extension or

[42] ECOLOGIC (2007), EU Water saving potential, Final Report, Institute for International and European Environmental Policy, Berlin.
[43] EEA, (2003), Europe's Water, An indicator-based assessment, Copenhagen
[44] EEA, (2000), Europe's environment: the third assessment, European Environmental Agency Copenhagen

regeneration of water supply networks. Apart of problems with public financing, some projects like dams are often cause severe environmental problems.

- Pressures on wetlands areas and other aquatic systems

Both wetlands and also the marine ecosystems are in danger because of tourist activities like hotel buildings, infrastructure, urbanization, water consumption, water pollution, solid waste, exploitation of protected areas and species for tourist purposes etc.

4.1.9 Conclusions and possible contradictions

Interestingly, from the viewpoint of the potential point source from municipalities and industry and diffuse source pollution from agriculture, it would be expected that both the surface and groundwater would be heavily impacted. However, the data for surface and groundwater water quality does not entirely reflect this fact, e.g. the results of surface water monitoring reveal that the quality is generally good, with the exception of the Drini-Lezhë section and the Topojan station in Drini i Zi. Similarly, for groundwaters the water quality of the 4 main aquifer types is generally acceptable for use as a source of drinking water according to monitoring results.

In order to confirm the water quality results, the project has employed, through fieldwork, a rapid biological assessment (RBioA) methodology that has been used to date in a variety of countries in the EU. The RBioA method provides an assessment of the actual biological species in the surface waters and thereby highlights any areas impacted by pollution, irrespective of the source (See Section 7.2 and Annex 3).

4.2 The Impact of Current and Future Hydrological Conditions in the Drini-Buna River Basin

The Terms of Reference for the preparation of the Drini-Buna River Basin Management Plan calls for an assessment of water resources balances for the basin. The assessment should include the following:

- An estimate of surface water and groundwater availability at annual and seasonal time scales.
- Estimates of present and future consumptive water demands by the main water using sectors, including environmental flow requirements.
- Estimates of river flow requirements for such non-consumptive uses as hydropower, navigation, fisheries, and tourism, as applicable.

In addition, the water balance assessments should account for changes in the river run-off due to projected impacts of climate change.

To address these questions, four scenarios have been prepared:

- Present climate, present demands: This scenario assumes that the hydrological conditions affecting surface water and groundwater availability are similar to conditions that have been observed in the recent historical record. Consumptive and non-consumptive demands are equal to current demands. This scenario establishes a baseline approximating present conditions that is used to estimate the impact of changes expected in the future.
- Present climate, future demands: This scenario also assumes that hydrological conditions affecting surface water and groundwater availability are similar to conditions that have been observed in the recent historical record. Consumptive and non-consumptive demands are equal to projected future demands. This scenario estimates the impact of demand growth on the basin water balance if significant changes to the climate do not take place.
- Future climate, present demands: This scenario assumes that hydrological conditions affecting surface water and groundwater availability reflect changes to the climate that may be expected in the future. Climate changes are estimated using global and regional climate models. Consumptive and non-consumptive demands are assumed to equal current demands, except in the irrigation sector, where

consumptive water use requirements are assumed to change because of changes to rainfall and evaporation resulting from climate change. This scenario estimates the impact of climate change on the basin water balance assuming no other changes to consumptive and non-consumptive water demands.

- Future climate, future demands: This scenario assumes that climate change will affect hydrological conditions and that consumptive and non-consumptive water demands will also change in the future. This scenario estimates the joint impact of climate change and changes to demand patterns.

The four scenarios are implemented in a simulation model of the basin that has been developed using the modelling software MIKE HYDRO Basin. The simulation model is used to estimate the impact of changes to climate and demand assumptions on basin water balances. Details of the model structure and calibration are available from MARD on request. The assumptions for each scenario are shown in Table 4.1

Table 4.1: Scenario assumptions for input to the MIKE HYDRO Basin model[45]

Category	Assumptions			
	Baseline Scenario Present Climate, Present Demands	**Scenario 1** Present Climate, Future Demands	**Scenario 2** Future Climate, Present Demands	**Scenario 3** Future Climate, Future Demands
Rainfall	1986-2005 observations	1986-2005 observations	2046-2065 projections	2046-2065 projections
Evaporation	1986-2005 observations	1986-2005 observations	2046-2065 projections	2046-2065 projections
Temperature	1986-2005 observations	1986-2005 observations	2046-2065 projections	2046-2065 projections
Irrigated area	2015 observed	1990 observed	2015 observed	1990 observed
Irrigation demand	2015 observed area + 1986-2005 rainfall and temperature	1990 observed area + 1986-2005 rainfall and temperature	2015 observed area + 2046-2065 rainfall and temperature	1990 observed area + 2046-2065 rainfall and temperature
Irrigation losses	40%	40%	40%	40%
Domestic demand	2015 observed	2031 projected	2015 observed	2031 projected
Domestic losses	2015 observed	2031 projected	2015 observed	2031 projected
Hydropower demands, Drini cascade	Average of 2014-2016 observed	Average of 2014-2016 observed	Average of 2014-2016 observed	Average of 2014-2016 observed

4.2.1 Modelling results

Results shown in Table 4.2 below are estimated for irrigation, domestic and industrial water demand and potential hydropower deficits using river basin models developed using the MIKE HYDRO Basin modelling software package. Details of the software package and modelling approach are available in the accompanying model calibration from MARD on request.

[45] The DHI MIKE HYDRO model was used during the project to i) establish a calibrated model simulating rainfall runoff processes, river flows reservoir operations and water use; ii) Compute important statistical measures of hydrological averages and variability; iii) Carry out statistical procedures on climate model outputs to generate rainfall and evaporation inputs to model developed in previous step; iv) Run simulation with climate change inputs to estimate climate change impacts; v) Provide estimates of demands, environmental flow requirements and non-consumptive flow requirements to estimate extent to which supplies are sufficient to meet demands given hydrological conditions that have been observed in the past; vi) Provide estimates of demands, environmental flow requirements and non consumptive use requirements to estimate extent to which supplies are sufficient to meet demands given hydrological conditions that may exist in the future if climate change takes place.

Table 4.2: Supply-demand balance in the Drini-Buna River Basin under different assumptions about hydrological conditions (supply) and water use (demand)

Water Use	Assumptions			
	Baseline Scenario Present Climate, Present Demands	**Scenario 1** Present Climate, Future Demands	**Scenario 2** Future Climate, Present Demands	**Scenario 3** Future Climate, Future Demands
Irrigation	No water demand deficits are simulated at any of the irrigation locations. In other words, model results suggest that water resources of the basin are sufficient to meet irrigation water demand given the assumptions described previously about hydrology and irrigation water use.	Irrigation demand deficits are simulated in two years of the simulation period for one catchment (catchment 4[46]) when future irrigated areas are assumed. The catchment is located in the upper portion of the basin, along the Black Drin	Deficits are simulated at the catchment 4, aggregated irrigation location. The pattern of deficits is different from the pattern simulated in the present climate, future demands scenario	Irrigation deficits limited to catchment 4. However, climate change increases the frequency and severity of shortages relative to the present climate, future demands scenario
Domestic and Industrial	No water demand deficits are observed at any of the domestic and industrial locations	No water demand deficits are observed at any of the domestic and industrial locations	No water demand deficits are observed at any of the domestic and industrial locations	No water demand deficits are observed at any of the domestic and industrial locations
Hydropower	Hydropower deficits are observed at each of the major facilities in the Drini cascade that are simulated in the baseline version of the model. These deficits may result from the application of reservoir rules intended to reduce release in dry periods in order to conserve storage	Only small changes to power deficits are observed in the present climate, future demands scenario, due to small changes to the timing of river flows due to changes in upstream demand patterns	Simulated hydropower deficits significantly increase in all of the three major HPPs as a result of climate change	Simulated hydropower deficits significantly increase in all of the three major HPPs as a result of climate change. A further small change in hydropower production is simulated relative the future climate, present demands scenario, as a result of change to upstream water abstraction

4.2.2 Conclusions and recommendations of scenario modelling

It appears that the water resources of the Drini-Buna basin are sufficient to meet current and future consumptive use requirements, regardless of whether climatic changes alter hydrologic conditions in the basin. However, the basin is also a major source of energy production in Albania, and power production through the Drini cascade may be diminished as a result of climate change.

The following conclusions proceed from the assessment of supply-demand balances:

[46] The location of catchment 4 of the Drini-Buna River Basin can be viewed in Figure 3.6, Section 3.4.3

- Supplies appear to be sufficient to meet domestic and industrial demand in the basin under both present and future conditions. While investment in reducing distribution system losses may be useful for reducing production costs for water supply systems, it should not be motivated by a perception of water scarcity.
- Supplies are sufficient to meet irrigation demands in the Drini basin. However, water scarcity may exist in smaller upstream irrigated areas, and it is likely that this scarcity will be increased under climate change conditions. Therefore, investment in small storage facilities in upstream areas may be useful for mitigating water scarcity.
- Hydropower production is likely to decrease under climate change conditions as a result of reduced runoff. Basin planners should consider actions to mitigate these impacts, such as reformulating reservoir-operating rules to increase operational efficiency.

The conclusions presented above are based on a number of assumptions incorporated in the formulation of the scenarios. These include:

- The estimates of future demands in the domestic/industrial sector assume that distribution system losses will be reduced to 35% of demands. In most cases, this off-sets the projected demand increase to a considerable extent. If water agencies are unable to reduce distribution system losses, it could be that future demands in the domestic/industrial sector will be considerably higher. In this case, the conclusion that shortages are unlikely in this sector may no longer be valid.
- A single global climate model, regional climate model, and greenhouse gas concentration scenario were selected to project future climate conditions in the basin. The combination used here was selected after comparison with local data. However, other climate models and concentration scenarios may give different projections that could lead to different conclusions.
- The method used to estimate unit irrigation demands does not differentiate between different crop types or the moisture holding capacity of different soil types, which could affect the magnitude and timing of irrigation demands. The simple method used here was selected because of inadequate information about soil types and cropping patterns in the basin; in addition, it was thought that any prediction of future cropping patterns would be too uncertain to yield useful information.
- No effort was made to estimate future hydropower demands because such an estimate should consider the role of hydropower in the overall energy mix. Because hydropower energy sources are readily activated and deactivated, these sources often play a key role in covering peak power demands and also providing for load balancing. Such as assessment is beyond the scope of this project. However, given the significance of potential climate impacts on hydropower, such an assessment could be useful in the future as part of Albania’s planning efforts in the energy sector.

4.2.3 Future determiniaton of hydrological regime (ecological flow) in relation to environmental objectives

The WFD Working Group through Guidance Document No. 31 have adopted the term of “ecological flows” with the following working definition:

Ecological flows are considered within the context of the WFD as “a hydrological regime consistent with the achievement of the environmental objectives of the WFD in natural surface water bodies as mentioned in Article 4(1)”.

Considering Article 4(1) of the WFD, the environmental objectives refer to: (i) non deterioration of the existing status, (ii) achievement of good ecological status in natural surface water body, (iii) compliance with standards and objectives for protected areas, including the ones designated for the protection of habitats and species where the maintenance or improvement of the status of water is an important factor for their protection, including relevant Natura 2000 sites designated under the Birds and Habitats Directives.

River straightening for flood control and/or navigation purposes, water abstractions, water flow regulations (dams, weirs, sluices, and locks), morphological alterations, and the disconnection of flood plains are all hydromorphological pressures (Fehér et al. 2012) that alter the natural flow regime of rivers.[47].

Where water bodies can be designated as heavily modified water bodies and/or qualify for an exemption, related requirements in terms of flow regime are required by including the technical feasibility and socio-economic impacts on the use that would be affected by the implementation of ecological flows.

Tennant Method of environmental flow estimation assumes that some proportion of the average annual flow (mean annual flow - MAF - which is used hereafter) is required to sustain the biological integrity of a river ecosystem. Specifically, 10% of the MAF is considered to be the lowest instantaneous flow to sustain short-term survival of aquatic life, 30% of MAF is considered to provide flows where the biological integrity of the river ecosystem as a whole is sustained, while flows higher than 60% of the MAF provide excellent to outstanding habitat conditions.[48].

The obligation to determine the e-flow for each hydrological network or river is present in the Albanian law 111/2012 as an obligation to be included in the RBMPs. With this in mind, it is important to note that in 2015 when Guidance Document 31 was issued, there was no shared understanding in the EU Member States of ecological flows and the ways to use them in the RBMPs, hence the necessity of the guidance. At present there is currently no uniform implementation of the e-flows at MS level, each country who approached the matter having defined its own way to address it, although there are the following main methodologies: hydrological, hydraulic-habitat, and holistic.

Hydrological methodology is recommended to be based on 15 years of data for statistical integrity provided by monitoring stations covering the river basin. In other words, the proper definition and efficient implementation of ecological flows require a significant amount of hydrological data derived from monitoring the hydrological regime; modelling approaches may to some extent supplement insufficient monitoring data.

The assessment of hydrological pressures and impacts must also assess the significant pressures altering the flow regime which result in an impact on biology likely to contribute to the failing of environmental objectives.

Ecological impacts of hydrological alterations and their significance should be ultimately assessed with biological indicators built on monitoring data that are specifically sensitive to hydrological alterations. In case the available biological metrics do not detect hydrological pressures or are not specific enough to isolate their contribution to the overall impact on the status, and because hydrological regime is well acknowledged as a key driver for river ecosystem quality, the evaluation of the significant impact of hydrological pressure can rely to a large extent on an assessment of hydrological alterations of the river flow. Most severe hydrological alterations can in many cases already be detected with some simple tools considering the extent of the pressures or the spatiotemporal alteration of habitats.

The introduction of the e-flow for each hydrological network or river requires that monitoring programmes should be adapted to provide an improved picture of hydrological alterations and their impact on habitat/morphology and biology and to effectively support the achievement of ecological flows. The aim of such monitoring is to collect sufficient hydrological information to enable estimation of the current flow regime and how it deviates from the natural flow regime. The first step to address climate change is to know how hydrology is affected and evolves in the long-term; hydrology included in the surveillance monitoring will inform about the long-term evolution of natural flow regime.

White Drini and Black Drini subbasins appeared to be more vulnerable based on the current conditions since more water is needed to fulfill the WFD requirements especially on the summer months.[49]

In order to achieve WFD environmental objectives in natural rivers, the programmes of measures (PoM) should ensure the protection of ecological flows and their restoration. Being part of the basic measures, controls on surface and groundwater abstractions, impoundments and other activities impacting

[47] "Thematic report on Ecological Flows in the extended Drin Basin", February 2019.

[48] "Thematic report on Ecological Flows in the extended Drin Basin", February 2019.

[49] "Thematic report on Ecological Flows in the extended Drin Basin", February 2019..

hydromorphology form a strong basis to protect and restore ecological flows, through the authorization process and regular review of permits.

Many supplementary measures may be needed to support the achievement of WFD environmental objectives. In many cases, the combination of hydrological measures (ensuring the maintenance of ecological flows by all abstractions and regulation) and morphological measures (improving the aquatic habitats in order to make them less vulnerable to flow impairments) may be the most cost-effective approach. The Programme of Measures (PoMs) must support the development of knowledge on river ecosystem flow requirements both at large scale and at site level where appropriate.

The Tennant methodology indicated minimum Ecological Flows, during the dry period of the year, that fluctuate from approx. 7 m3/s in White Drin to 260 m3/s in Buna/Bojana. During the wet period of the year the same methodology indicated Ecological Flows that range from 11 m3/s in White Drin to 526 m3/s in Buna/Bojana. The Global Evaluation Flow calculation GEFC tool, indicated ecological flow regimes that follow the natural hydrologic variations and fluctuate, during the dry period in White Drin, from 10 m3/s to 80 m3/s (moderate modifications) and during the wet period, from 10 m3/s to 100 m3/s (moderate modifications in White Drin,[50]

Hydrological alterations without substantial change in morphology can in very specific circumstances justify the provisional designation of heavily modified water bodies (HMWB), which should generally only be based on the identification of a substantial change in morphology. The definition of ecological flow and identification of the necessary measures to deliver it and achieve ‘good ecological status’ should, where hydrology is significantly altered, be considered as part of the designation test for HMWB and justify that these measures cannot be taken. This has obvious implications with respect to the granting of permits for the construction and operation of small HPPs. To date, the legislation in Albania requires the maintenance of a standard minimum flow in each stream or river. However, for the determiniation of the e-flows, this approach requires (i) further assessment of monitoring data (via the hydrological network), (ii) a complete hydromorphological assessment of the River Basin, and (iii) the availability and reliability of previous climate change data. The determiniatin of e-flows, with particular regard to the issuing of HPP permits is included in the PoMs (Table 12.3, 1f).

Nevertheless, in cases where ecological information is insufficient, hydrological indices can be used to provide an adequate estimation of environmental water requirements in rivers.[51]

A careful assessment of the hydrological regime to be delivered should be carried out in the definition of good ecological potential together with the mitigation measures to improve the flow conditions; depending on the nature and severity of morphological alteration, the hydrological regime consistent with ‘good ecological status’ may be very close to the ecological flows.

[50] “Thematic report on Ecological Flows in the extended Drin Basin”, February 2019.

[51] “Thematic report on Ecological Flows in the extended Drin Basin”, February 2019..

5 Protected Areas

5.1 Introduction

The water bodies of the Drini-Buna River Basin District like the lakes, wetlands and lagoons play an important role in the life cycle of several birds, fish species and the biodiversity in general. Many species are endemic and resident to these areas while others are migratory. Some of the Drini-Buna ecosystems are important at regional, national and international level. Shkoder Lake, for instance, is an area of special conservation interest (Emerald site), a wetland of international importance (RAMSAR site) and also a very important bird and biodiversity area (IBA). Similarly, Ohrid Lake is a national protected landscape, and an Emerald and IBA site.

Albania has made progress in transposing the international and EU legislation related to protected areas included also in WFD (Table 5.1). However, the country is having difficulties in implementing them, which is translated in practice in lack of designation of protected areas and of the register of the protected areas in Drini-Buna River Basin District.

Table 5.1: International and bilateral Conventions and Agreements signed by the Albanian Government on Species and habitat protection[52]

International Conventions/Protocols	Legal framework that transposes Conventions/Protocols into the Albanian legislation
Convention on Biological Diversity, 1992	Konventa mbi Diversitetin Biologjik (KDB)
Bern Convention on the Conservation of European Wildlife and Natural Habitats, 1994	Ligji nr. 8294, DATE 2.3.1998 Për ratifikimin e konventës për ruajtjen e florës dhe faunës së egër dhe mjedisit natyror të Europës (Konventa e Bernes)"
Convention on the protection of marine environment and coastal area of the Mediterranean Sea, as well as its 6 accompanying protocols, Barcelona 1997	Law no. 8690 Date 16.12.2000 “On the accession of the Republic of Albania to the convention “On the protection of marine environment and coastal area of the Mediterranean Sea, as well as its 6 accompanying protocols”
The Cartagena Protocol on Biosafety to the Convention on Biological Diversity, 2003	Ligji nr .9279, datë 23.9.2004 Për aderimin e Republikës së Shqipërisë në Protokollin e Kartagjenës për biosigurinë të Konventës "Për larminë biologjike"
The Nagoya – Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety, 2011	Ligji nr. 112/2012 Për aderimin e Republikës së Shqipërisë në Protokollin shtesë të Nagoja-Kuala Lumpurit "për përgjegjësi dhe dëmshpërblim të Protokollit të Kartagjenës për biosigurinë" të Konventës së Biodiversitetit
Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973	Ligji nr. 9021, datë 6.3.2003 Për aderimin e Republikës së Shqipërisë në “Konventën për tregtinë ndërkombëtare të specieve të rrezikuara të florës dhe faunës së egër (CITES)
The Convention on Wetlands (the RAMSAR Convention), 1971	Konventa mbi Ligatinat me rëndësi ndërkombëtare veçanarisht si habitate të shpendeve ujore
Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) (Bon), 2012	Ligji nr. 8692, datë 16.11.2000, Për aderimin e Republikës së Shqipërisë në Konventën e Bonit: Mbi ruajtjen e llojeve migratore të kafshëve të egra dhe Marrëveshjet e kësaj Konvente

[52] Source: Abkons/Mott MacDonald

Sections 5.2 to 5.6 below provide a summary of the current situation of the Protected Areas (PA) in Drini-Buna River Basin District with respect to the Water Framework Directive (WFD). The WFD requirements for protected areas monitoring and a roadmap to include monitoring of protected areas in the River Basin monitoring programme in the future are presented in Section 6.6.

5.2 Protected Areas Under the WFD

WFD considers water related protected areas separately as water bodies that need extra protection for the purpose of the conservation of habitats and/or species, and for the protection of human health by protecting drinking water, bathing waters, etc.

Annex IV of the WFD identifies protected areas the following[53]:

i) Areas designated for the abstraction of water intended for human consumption (Article 7). Under the Drinking Water Directive (98/83/EC), water for human consumption means all water either in its original state or after treatment, which is:

- Intended for drinking, cooking and food preparation or other domestic purposes; or
- Used in any food production business for the manufacture, processing, preservation or marketing of products or substances intended for human consumption unless the competent national authorities in relation to drinking water quality are satisfied that the quality of water has no influence, directly or indirectly, on the health of consumers concerned.

Drinking Water Protected Areas are:

- Bodies of water used for the abstraction of water for human consumption which provide more than an average of 10 m^3 a day in total or which serve more than 50 persons;
- Bodies of water intended for such level of use in the future.

ii) Areas designated for the protection of economically significant aquatic species;

iii) Bodies of water designated as recreational waters, including areas designated as bathing waters (Directive 76/160/EEC);

iv) Nutrient-sensitive areas, including areas designated as vulnerable zones (Directive 91/676/EEC) and areas designated as sensitive areas (under Directive 91/271/EEC), and

v) Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC (1) and Directive 79/409/EEC (2).

Law 111/2012 On Integrated Water Resource Management[54] amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 “on the Integrated Water Resources Management”,

[53] EU WFD Directive, Annex IV

[54] Article 34

transposed the WFD and established the protected areas that need specific protection measures in a river basin. This Law assigned WRMA and responsabile Environmental Institution the responsibility for identifying protected areas in compliance with WFD. The Council of Ministers, with the proposition of WRMA and responsabile Environmental Institution, approves the protected areas in compliance with the WFD requirements[55]. The River Basin Councils and WRMA are responsible for creating, managing and updating the Register of the Protected Areas, as part of the RBMP[56]. The situation of the protected areas under WFD in terms of designation in the Drini-Buna River Basin District is reported below.

5.3 Sanitary Protected Areas

Drinking water is mainly derived from groundwater in Albania. Thus, protection of the areas designated for the protection of drinking water becomes paramount. Law 111/2012 assigned to the line ministries the responsibility to designate the areas around surface and groundwater bodies that are used for abstraction of drinking water for urban and rural population while the Council of Ministers approves these borders, (DCM 379 dated 25.05.2016).[57] The Administrator of the Water Supply Companies at municipality level are responsible for the sanitary protected areas.[58] In the case of individual wells, it is the responsibility of the owner of the well to designate the sanitary protected area around it via the Albanian Geological Service or other specialized companies in hydrology.[59] Protection of the areas around industrial wells is not discussed in the Albanian legislation.

At this moment, areas designated for the sanitary protection area of drinking water have not been designated for both the wells used for the abstraction of water by the Water Supply Companies and private wells. Consequently, WRMA and the Drini-Buna River Basin Council do not have a register of the sanitary protected areas. Table 5.2 provides the list of all springs and wells in the Drini-Buna River basin that must be protected under EU law.

Table 5.2: Location of springs and wells in the Drini-Buna River Basin designated for the abstraction of water intended for human consumption

No.	Administrative Unit	Location	Type of Source	Type of Aquifer	Quantity of water (l/sec)	Population
1	Municipality Puke	Well Zez- Krrab	Spring	ultrabasic	20 - 24	5,421
		Mece (reserve)	Spring	ultrabasic	15	
		Pezhve	Spring	ultrabasic	6	
2	Water Supply V.Dejes	Deja	Spring	gravel	60	5,106
		Lac	Well	gravel	45	
3	Municipality Tropoje	Vrella Shoshan	Spring	gravel	30	8,500
		Valbone Suku I Dunishes	Spring	carbonate	60	8,500
		Rragam Vrella Man Rexhes	Spring	gravel	12	460
		Dezdart Vrrella	Spring	gravel/conglomerates	15	1,750
4	Municipality Pogradec	Bash Pogradec	Spring	carbonate	60	38,873
		Tushemisht	Spring	carbonate	3	600

[55] Art. 86, Law No. 111/2012 “On Integrated Water Resource Management”

[56] Article 34

[57] Art. 57, Law No. 111/2012 “On Integrated Water Resource Management”

[58] Art. 11 DCM No. 379, dated 25.05.2016 “On the Quality of Drinkable Water”

[59] Art. 11 DCM No. 379, dated 25.05.2016 “On the Quality of Drinkable Water”

No.	Administrative Unit	Location	Type of Source	Type of Aquifer	Quantity of water (l/sec)	Population
		Buçimas	Spring	carbonate	20	5,800
		Rëmenji	Spring	carbonate	3.5	2,580
		Vërdove	Spring	carbonate	7	3,850
		Guras	Spring	carbonate	12	1,890
		Gështenjas	Spring	carbonate	8	3,100
		Baçallëk	Spring	carbonate	2	420
5	Water supply Shkodër	Bashk. Shkoder Dobrac	Well	gravel	920	117,432
		Rrjolli Koplik group sources.	Spring	carbonate	150	
6	Water supply village Pukë	Source nr.1	Spring		1.5	
		Source nr.2, Qerret Luf Commune	Spring		1	
		Village Verrith	Spring		0.1	
		Village Kaftall	Spring		0.1	
		Village Gomsiqe	Spring		0.5	265
		Village Tejkoder	Spring		0.1	
		Village Plet	Spring		0.1	
		Village Kishagji	Spring		0.3	
		Village Filipaj	Spring		0.1	
		Village Qerret	Spring		2	419
		Village Iballe	Spring	carbonate	4	928
		Village Qafa e Mugut, 2 Sources	Spring		0.4	
		Village Shopel	Spring		1.1	150
		Village Levozh	Spring		1.2	182
		Village Majsa	Spring		0.5	
		Village Gjegjan	Spring		3.2	976
		Village Dom	Spring		0.5	
		Village Kalivare	Spring	carbonate	0.9	233
		Village Shkoz	Spring		0.3	
		Village Gojan i Madh, 1Source	Spring	ultrabasic	1.01	885
		Village Gojan i Vogel 1Burim	Spring	ultrabasic	1.6	499
7	Water supply village Shkodër	Well Trushe-VeliPoje	Well	gravel	25	
		Well Mali Kolaj	Well	carbonate	3 4	
		Well Mali Mabe	Well	gravel	12	
		Well Berdice	Well	gravel	25	
		Well Badica Zogaj	Well	carbonate	5	374
		Well Badica Zues	Well	gravel	10	570
		Well Hajmel	Well	gravel	5	585

No.	Administrative Unit	Location	Type of Source	Type of Aquifer	Quantity of water (l/sec)	Population
		Well Pistull	Well	gravel	5	325
		Well Pacram	Well	gravel	4	440
		Well Kullaj	Well	carbonate	10	3,148
		Oblik	Well	gravel	10 15	265
8	Water supply Fushë Arrëz	Ndershej	Spring	ultrabasic	7	3,000
		Micojt	Spring	ultrabasic	5	
9	Water supply Peshkopi	Source of Izvirit Radomire	Spring	carbonate	25	19,123
10	Water supply Has	Water Supply Krumes	Spring	carbonate	41	
		Water Supply Harhull (Vranisat)	Spring	carbonate	1.1	
		Water SupplyCahanit	Spring	carbonate	1.6	
11	Water supply Malësi e Madhe	Rrjolli	Spring	carbonate	90	8333
		Source Tamare	Spring	carbonate	5	
		SourceLuisi	Spring	carbonate	0.2	
12	Municipality Kukës	Gurra Kolosjan	Spring	carbonate	10 25	40,000
		Source Domaj	Spring	carbonate	30 80	
		Source Lajme	Spring	carbonate	10 25	

5.4 Areas Designated for the Protection of Economically Significant Aquatic Species

The Law N. 64/2012 On Fishing[60] identifies the following as areas that intend to protect fishing and they are:

- *Limited fishing areas* that are water bodies and/or section of water bodies that are legally declared as areas where fishing is not allowed or areas that have limited fishing capacity;
- *Areas of co-management* are fishing areas that MARD manages in collaboration with a fishing organization in order to guarantee sustainable use of fishing resources and protect aquatic biodiversity[61]. The organization that obtains the right to co-manage the fishing area with MARD is involved in the design and implementation of these areas' management plan.[62]
- *A protected fishing area* is an area where fishing is not allowed for a limited time – and sometimes forever – in order to protect water sources or the water ecosystems.
- *In the coastal and sea protected areas fishing for commercial purposes is not allowed, as referring to the legislation provisions into force for fishing and aquaculture. Commercial fishing is allowed in the coastal and sea protected areas, part of category IV, V and VI, once approved with the order of the General Director of NAPA*[63] *according to the conditions of fishing to be applied in this area*

The Council of Ministers approves the three types of protected areas with the proposition of MARD.[64] In order to guarantee sustainable use of fishing resources and protect the economically significant aquatic species,

[60] Ligji Nr. 64/2012 "Për Peshkimin"

[61] Art. 53

[62] Art. 54

[63] The National Agency of Protected Areas (NAPA) is the central state institution, which is responsible for the protected areas, which has the duty to administer and control protected areas throughout the whole territory of the Republic of Albania.

[64] Art. 11, Law N. 64/2012 "On Fishing"

MARD establishes[65] the number and dimensions of fishing boats including engine details, and type of fishing equipment that are allowed in such an area; prohibition of fishing in a determined area; amount of fish allowed to fish and number of fishing permits in a defined area.

In the Drini-Buna River Basin, MARD has established two areas of co-management as reported in Table 5.3. MARD has not established limited fishing areas and/or protected fishing areas.

Table 5.3: Areas of co-management in Drini-Buna River Basin[66]

No.	Water Body/Area	Decision of the Council of Ministers
1	Shkodër Lake and Buna River	Vendim Nr. 469, datë 22.6.2016 Për shpalljen e Liqenit të Shkodrës dhe Lumit Buna si zonë bashkëmenaxhuese peshkimi
2	Ohrid Lake	Vendim 283, datë 13.4.2016 Për shpalljen e Liqenit të Ohrit si Zonë Bashkëmenaxhuese Peshkimi

5.5 Bodies of Water Designated as Recreational and Bathing Waters

Local Government, Ministry of Health and Social Care (via the State Health Inspectorate) and NEA are responsible for the Identification and adoption of protection zones for bathing waters on a yearly basis[67]. Generally, these are beaches in the coast of Adriatic Sea. The management of bathing areas is the responsibility of these institutions.

In the Drini-Buna River Basin District, the main bathing areas are the Beach of Velipoje and the Beach of Shengjin. However, all the coastal area of the Adriatic Sea in the Drini-Buna River Basin is used for bathing in summer the summer time.

5.6 Nutrient-Sensitive Areas, Including Areas Designated as Vulnerable Zones

Albania has not transposed the Nitrate Directive. Thus, there is not a specific law that regulates protection of water resources from nitrates. Instead, various laws refer to pollution from nitrates, either directly or indirectly, as is the case of the Law on Protection of Agricultural Land and Law 111/2012 amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 “on the Integrated Water Resources Management”,. The former aims at the protection of water resources from pollution from agricultural inputs through the adoption of good agricultural practices by the farmers[68]. Law 111/2012 amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 “on the Integrated Water Resources Management”, identifies WRMA as the institution responsible for the protection of water resources from agricultural pollution.

As to wastewater discharge sensitive areas, Ministry responsible for Environment is responsible for the identification of the wastewater discharge sensitive areas and preparation of the list of sensitive water bodies[69].

In Drini-Buna River Basin District, nutrient-sensitive areas, including areas designated as vulnerable zones have not been designated. Similarly, the wastewater discharge to sensitive areas have not been designated.

[65] Art. 15 of the above law

[66] Source: MARD

[67] Art. 4, DCM No. 797, dated 29.9.2010 “On approval of hygiene-sanitation regulation "On management of bathing water quality”

[68] Art. 16, Law No. 9244, date 17.6.2004 “On Protection of Agricultural Land”

[69] Art. 14 Law No. 9115, date 24.7.2003 “On Waste Water Treatment”

5.7 Areas Designated for the Protection of Habitats or Species

The Law on Protected Areas[70] applies to the six Protected Area Management Categories, which classify protected areas according to their management objectives in compliance with the International Union for Conservation of Nature – IUCN.

The categories include:

- Category I: Natural Strict Reserve/ Scientific Reserve;
- Category II: National Park;
- Category III: Natural Monument;
- Category IV: Managed Natural Reserve/Natural Park;
- Category V: Protected landscape;
- Category VI: Protected Area of the Managed Resources

The Ministry of Tourism and Environment in cooperation with the line ministries, municipalities, the interested public, civil society, and private landlords whose properties lie in the Protected Area, approves the Management Plan for each protected area, drafted by NAPA. The Management Plan of a Protected Area is the main document for protecting and developing the area and it is implemented by the administration of the protected area. The PAMPs are part of governmental policies, programmes, and activities at national and regional and local level. The PAMPs are managed by the Administration of the protected area, which is approved by the Council of Ministers.

In the Drini-Buna River Basin, the habitat and species Protected Areas are numerous and include the six types of IUCN Categories (Table 5.4). Currently, Albania has grouped the Protected Areas on a regional basis. Thus, many Protected Areas are shared between River Basins. There are also 52 Nature Monuments (Category III) in the Drini-Buna River Basin, which are detailed in Table 5.5.

[70] Law No. 81/2017 dated 04.05.2017 “On the Protected Areas”.

Table 5.4: The register of Protected Areas relevant from the aspect of habitat and species conservation in the Drini-Buna River Basin

No.	Cat.	Region (Qark)	District	Protected Area	DCM Approval Date	Surf (ha)	PAMP	UNESCO Heritage	Emerald Network	RAMSAR
1. Natural Strict Reserve (NSR) / Scientific Reserve										
1	I	Kukës	Tropojë	Lumi i Gashit	DCM nr. 102, date 15.01.1996	3,000.00	Yes	Yes		
2	I			Gashi River[71]			Being prepared			
2. National Park (NP)										
1	II	Shkodra	Shkodra	Thethi	DCM nr. 96, date 21.11.1966	2,630.00	Yes			
2	II	Dibër	Dibër	Lura	DCM nr. 96, date 21.11.1967	1,280.00				
3	II	Kukës	Tropojë	Lugina e Valbonës	DCM nr. 102, date15.01.1996	8,000.00	Yes			
4	II	Dibër	Mat	Zall Gjoçaj	DCM nr. 102, date15.01.1997	140				
5	II	Elbasan, Dibër		Shebenik-Jabllanice	DCM nr. 640, date 21.05.2008	33,927.70	Being prepared			
		Elbasan	Librazhd	Shebenik-Jabllanice	DCM nr. 640, date 21.05.2009	33,760.10	Being prepared	Yes[72]		
		Dibër, Kukës	Bulqize	Shebenik-Jabllanice	DCM nr. 640, date 21.05.2010	167.6	Being prepared			
6	II	Korçë	Korçë	Prespa	DCM no. 489, date 06.13.2013	27,750.00	Yes[73]	Yes		Yes
7	II			Theth			In draft[74]			
8				Valbonë Valley			In draft[75]			
9				Lurë						
10				Korab – Koritnik			Yes[76]			
11				Zall Gjocaj						

[71] Planned to be included in the Alps Park

[72] UNESCO heritage, it is not included the whole area Shebenik – Jabllanice, but only Rrjaca beech forest with a surface of 2129 ha and buffer zone 2569 ha

[73] Management Plan approved by Order of the Minister of Environment no. 1792, dated 09.05.2014

[74] The final draft of the Management Plan completed in June 2014 (planned to be included in the Alps Park).

[75] The final draft of the Management Plan completed in June 2014 (planned to be included in the Alps Park).

[76] Management Plan approved by Order of the Minister of Environment no. 2029, dated 31.12.2014

No.	Cat.	Region (Qark)	District	Protected Area	DCM Approval Date	Surf (ha)	PAMP	UNESCO Heritage	Emerald Network	RAMSAR
3. Nature Monument (NM) (Bio & Gjeo)										
1	III	Dibër	Dibër	Vlashaj	DCM nr. 102, date15.01.1996	50				
4. Managed Nature Reserve (MNR) / National Nature Park										
1	IV	Kukës	Has	Tej Drin i Bardhë	DCM nr.102, date 15.01.1996	30				
2	IV	Shkodra	Shkodra	Liqeni i Shkodrës	DCM nr. 684, date 02.11.2005	26,535.00			Yes	
3	IV	Lezhë	Lezhë	Kune-Vain-Tale	DCM nr.432, date 28.04.2010	4,393.20			Yes	
4	IV	Diber, Kukës		Korab-Koritnik	DCM nr.898, date 21.12.2011	55,550.20	Yes		Yes	
	IV	Dibër	Dibër	Korab-Koritnik	DCM nr.898, date 21.12.201	20,663.40	Yes		Yes	
	IV	Kukës	Kukës	Korab-Koritnik	DCM nr.898, date 21.12.2011	34,886.80	Yes		Yes	
5	IV	Shkodra	Shkodra	Lake Shkodra			Yes[77]			
6	IV			Kune - Vain -Tale			Yes[78]			
5. Protected Landscape (PL)										
1	V	Korçë	Pogradec	Pogradec (Ohri Lake)	DCM nr. 80, date 18.02.1999	27,323.00	Yes		Yes	
2	V	Shkodra	Shkodra	Lumi Buna-Velipojë	DCM nr.682, date 02.11.2005	23,027.00			Yes	Yes
3	V	Velipojë	Velipojë	Buna River			Being prepared			
4	V			Lake of Pogradec			Yes[79]			
6. Protected Area of Managed Nature Reserve (PAMNR)										
1	VI	Dibër	Dibër	Luzni-Bulaç	DCM nr.102, date 15.01.1996	5,900.00				

[77] Management Plan approved by Order of the Minister of Environment no. 815, dated 21.11.2012
[78] Management Plan approved by Order of the Minister of Environment no. 405, dated 09.06.2011
[79] Management Plan approved by Order of the Minister of Environment no. 2026, dated 31.12.2014

No.	Cat.	Region (Qark)	District	Protected Area	DCM Approval Date	Surf (ha)	PAMP	UNESCO Heritage	Emerald Network	RAMSAR
2	VI	Lezhë	Mirditë	Bjeshka e Oroshit	DCM nr.102, date 15.01.1998	4,745.00				
EMERALD* Network (Areas of Special Conservation Interest - ASCI)										
1	IV			Managed Nature Reserve of Shkodra Lake		26,535				
2	II			Alps (proposed national park)		77,458				
3	II			Kurora e Lures - Kunore-Valmore-Zall-Gjocaj (proposed national park)		16,596				
4	V			Pogradec Protected Landscape		24,350				
5	V			Protected Landscape of Buna River-Velipoja		22,479				
6	V			Protected Landscape of Korabi		31,360				
RAMSAR										
1		Shkodra	Shkodra	Liqeni i Shkodrës-Lumi i Bunës	DCM nr. 683, date 02.11.2005	49,562.00	On-the process of being prepared			

Table 5.5: Nature monuments (Category III) in the Drini-Buna River Basin[80]

Category III - Nature Monument (NM)

[80] Source: NAPA, 2017

No.	Protected Area	Location	Brief Description
1	Vukli Springs	Kelmend, Malësi e Madhe District	Karstic springs that feed Cemi River in Vukli. Waters used for drinking and irrigation.
2	Shtraza Springs	Close to Theth Village, Shalë, Shkodra District	Karstic spring
3	Bellova Springs	In proximity to Bellova village, Melan, Dibër District	Karstic springs
4	Brudi Springs	In proximity to Brud Village	Karstic springs
5	Kiri Springs	In proximity to Kir Village, Pult, Shkodra District	Karstic springs serving as the source of Kiri River
6	Koprishti Spring	In proximity to Selcë Village, Kelmend, Malësi e Madhe District	Karstic spring serving as the source of Cemi River
7	Okoli Springs	Theth (Nikgjonaj), Shalë, Shkodra District	Karstic spring
8	Valbona Springs	In proximity to Valbona Village, Margegaj LGU, Tropoja District	Karstic spring
9	Sopanika Spring and Cave	In proximity to Fushë Çidhnë Village	Karstic spring
10	Driloni Spring	Next to Tushemisht Village, Pogradecit District, Southeast of Ohrid Lake	The spring is fed by Prespa Lake and the Dry Mountain. The spring is surrounded by rich wetland ecosystems
11	Kërçini Spring	In Kërçini Mountain, in proximity to Kërçisht Village	Karstic spring
12	Kolesiani Spring	In proximity to Kolosian Village, Bicaj LGU, Kukës District	Karstic spring
13	Kruma Spring	Southeast side of Krumë City	Karstic spring
14	Quku i Dunishës Spring	In proximity to Valbona Village, next to Rasa e Pecmara Vally	Karstic spring that feeds Valbona River. It is surrounded with vegetation
15	Shoshani Spring	In proximity to Shoshan Village, Margegaj LGU, Tropoja District, next to Valbona riverbed	Karstic spring
16	Uji i Ftohtë - Vleshë	In proximity to Vleshe Village	Karstic spring
17	Vraka Spring	Next to Gruemirë, Shkodra District	Karstic Spring that is used for irrigation and drinking water for the population of the nearby villages
18	Qireci Karstic Spring	In the valley of Qirec Spring, Lekbibaj, Tropoja District	Karstic spring
19	Thermomineral Spring of Peshkopisë (Llixhat)	East of Peshkopi City, right of the Thermal Spring (Llixha)	
20	Glacial-fluvial depositions of Shëmtira	Close to Shëmtira Bridge	Glacial-fluvial deposition

Category III - Nature Monument (NM)			
No.	**Protected Area**	**Location**	**Brief Description**
21	Glacial-fluvial depositions of Shoshaj	Close to Shoshan Bridge, Margegaj LGU, Tropoja District, next to the bridge of Shoshan Village	Glacial-fluvial deposition
22	Domaj Spring	In proximity to Domaj Village, Golaj LGU, Has District	Karstic spring
23	Vranisht Spring	Vranisht Village, Fajzë LGU, Has District	Karstic spring which is fed by the groundwater of the Dry Has karstic aquifer
24	Canyon of Bashkimi – Vermosh	In proximity to Vermosh Village, Kelmend LGU, Malësi e Madhe District	A canyon that is formed by the corrosive activity of the Vermosh River water. A karstic ecosystem
25	Canyon of Grunas	Theth Village, Shkodra District	A canyon that is formed by the corrosive activity of the Theth River water and the karstic processes
26	Canyon of the Holy Bridge	Next to Holy Bridge Village, Postribë LGU, Shkodra District	A canyon that is formed by the corrosive activity of the Kir River water. A karstic ecosystem. A bridge has been built in this Canyon which connects Shkodra city with Prekal Village and further
27	Canyon of Vanas	Midstream of Luma River (White Drini Tributary), Topojan Village, Kukës	A karstic canyon
28	Canyon of Shoshan	Midstream of Valbona River	A canyon that is formed by the corrosive activity of the Shoshan River water
29	Kukës Wetland	In proximity to Black Drini Riverbed, between Kukës and Bicaj, close to Bushat Village, Kukës	A quaternary-era lake that is disappearing. It is a wetland ecosystem
30	Canyon of Poica (Canyon of the Dry Stream - Përroi i Thatë)	Close to Zagorë Village, Malësi ë Madhe	A narrow gorge formed by the corrosive activity of the Dry Stream waters and the Karstic process
31	White Stream	In proximity to Shishtavec, northwest of Tërfojë Apex, 1750 asl, Turaj Village, Topojan LGU, Kukës	Karstic spring
32	Red Stream - Gjallicë	In proximity to Shishtavec, Northwest of Gjalicë Mountain, Dërshanë, Topojan LGU, Kukës District	Karstic springs
33	King's Stream – Serakol	Close to Dobërdol Village	Karstic spring
34	Glacial Lakes of Dobërdol	Çerem Village, Margegaj LGU, Tropojë District	A glacial lake. It is rich in fauna, typical for alpine Lakes
35	Glacial Lakes of Sylbicë	In the glacial valley of Gash Mountain Area	A glacial lake. It is rich in fauna, typical for alpine Lakes
36	Flower's Lake (Lurë)	In Lura National Park, 1600m	A glacial lake. It is rich in fauna, typical for alpine Lakes
37	Jezerca Lake	Jezerca Mountain	A glacial lake. It is rich in fauna, typical for alpine Lakes

Category III - Nature Monument (NM)			
No.	**Protected Area**	**Location**	**Brief Description**
38	Big Lake (Lurë)	In Lura National Park	A glacial lake. It is rich in fauna, typical for alpine Lakes
39	Big Lake (Lurë)	Next to Peja	A glacial lake, rich in flora and fauna
40	Lake of Ponarë Lake of Markajs)	On Iron Apex in East Alps, Shoshan Village, Margegaj LGU, Tropoja District	A Glacial and Karstic lake
41	Black Lake (Lurë)	In Lura National Park	A Glacial Lake. It is rich in fauna, typical for alpine Lakes
42	Black Lake (above Radomirë)	In Korab Mountain, in proximity to Radomirë Village	A Glacial Lake. It is rich in fauna, typical for this type of lakes
43	Glacial Valley of Motina (Valbone)	East Alps, in proximity to Dragobi Village, Margegaj LGU, Tropojë District, between Iron Mountain and the Open Valley	Glacial-Karstic valley
44	Glacial Valley of Kukaj	Close to Ragam Village, Margegaj LGU, Tropojë District	Glacial-Karstic valley
45	Shala Doors	Breglumë Village, Shalë LGU, Shkodra District	A canyon-like shape which was formed by the corrosive activity of Shala river waters into the Kalcistic rocks
46	Forest of Franc Jozef iceland (coastal waters)	Delta of Bunës, nothrwest of Velipojë Village, Shkodra	Rich in wetland vegetation. It is also an important habitat for bird nesting
47	Drini Delta (next to Kashta wetland, on the left)	In proximity to Shëngjin Iceland	Wetland habitat rich in fauna. Birds are the more common which risk extinction
48	Thrown Sand	Northwest of Shëngjin Harbour	Sand accumulated by wind erosion.
49	Gjoni Spring (eye)	In proximity to Grudë-Fushë Village, Gruemirë, Malësi e Madhe	Karstic Spring. Used for drinking water and irrigation. Rich in aquatic flora in the surface
50	Kryeziu Waterfall	Close to the center of Kryezi Village, Qafë – Mali LGU, Pukë District	Waterfall formed by the waters of Orosh Spring in the magmatic Rocks
51	Thethi Waterfall	In proximity to Theth Village, Shalë LGU, Shkodra District	Karstic spring
52	Glacial-fluvial depositions of Shoshaj	Close to Shoshan Bridge, Margegaj LGU, Tropoja District, next to the bridge of Shoshan Village	Glacial-fluvial deposition

6 Water Quality Monitoring Networks

6.1 Introduction

The Law on Integrated Water Resource Management amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management", has given WRMA the primary responsibility for designing Water Monitoring Programmes for river basins. The Law also gives the River Basin Councils the primary responsibility for implementing the Water Monitoring Programmes in compliance with the WFD[81]. Consequently, both WRMA and the River Basin Councils have become key monitoring institutions for surface and groundwater monitoring for the Drini-Buna River Basin. The NEA monitors water at the national level.

6.2 Surface Water Monitoring Requirements under the WFD

The Water Framework Directive covers i) inland waters that include both surface water and groundwater, ii) transitional and coastal waters up to one sea mile, and iii) for the chemical status also territorial waters, which may extend to 12 sea miles, from the territorial baseline of a Member State independent of the size and the characteristics[82].

6.2.1 Water monitoring network

The Directive requires states to establish a surface water-monitoring network that provides a coherent and comprehensive overview of ecological and chemical status in each river basin. Data on surface water monitoring serves also the purpose of supplementing and validating the risk assessment procedure, supporting the design of future monitoring programmes, assessing long-term changes in natural conditions and those resulting from anthropogenic activities, estimate pollutants loads transferred across international boundaries or discharging into seas, assess changes in status of those bodies identified as being at risk in response to the application of measures for improvement or prevention of deterioration, ascertaining causes of water bodies failing to achieve environmental objectives where the reason for failure has not been identified, ascertaining the magnitude and impacts of accidental pollution, use in the intercalibration exercise, assessing compliance with the standards and objectives of Protected Areas; and, quantifying reference conditions (where they exist) for surface water bodies[83].

The ecological status of water bodies in a River Basin is defined based on biological, hydromorphological and general physico-chemical quality elements (Table 6.1)[84]. The quality elements applicable to artificial and heavily modified surface water bodies are those applicable to whichever of the four natural surface water categories above most closely resembles the heavily modified or artificial water body concerned[85]. Subject to funding, states

[81] Law No. 111/2012 On Integrated Water Resource Management, Art. 85, amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 "on the Integrated Water Resources Management",

[82] Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance Document No 7, Monitoring under the Water Framework Directive, European Communities 2003

[83] Directive 2000/60/EC, Annex V

[84] Directive 2000/60/EC

[85] Directive 2000/60/EC, Annex V

are required to monitor parameters, which are indicative of the status of each relevant quality element and include estimates of the level of confidence and precision of the results in the monitoring program.

For rivers, lakes, transitional waters and coastal waters the ecological status of water can be determined as high, good and moderate status while for artificial and heavily modified surface water bodies it can be classified as good ecological potential and good surface water chemical status. Waters achieving a status below moderate are classified as poor or bad[86].

The WFD requires States to establish surveillance, operational and investigative monitoring types. As a general guide, the surveillance and the operational monitoring program are required for each period to which a river basin management plan applies. The investigative monitoring programme is required in cases of accidences or when there is need to ascertain the causes of a water body to achieve the environmental objectives or to ascertain the magnitude and impacts of accidental pollution[87]. A brief description of the three types of monitoring is provided below.

6.2.2 Surveillance monitoring

The objective of surveillance monitoring is to identify water bodies at risk in order to establish a quantitative baseline for future assessments of long-term natural or anthropogenically induced changes[88]. Surveillance monitoring is required for each monitoring site for a period of one year during the period covered by a RBMP for *parameters* indicative of all biological quality elements, all hydromorphological quality elements and all general physico-chemical quality elements (Table 1). In case there is lack of monitoring information about the overall surface water status within each catchment and sub-catchment of the river basin district, the WFD suggest states to undertake a surveillance monitoring each year, at least during the first three years in order to achieve concision and confidence in monitoring data. In case there are no changes in the ecological status of the water bodies in a River Basin, States are left the flexibility to conduct a surveillance monitoring in three River Basin Plans (once in 18 years).

[86] Directive 2000/60/EC, Annex V/1.2

[87] Directive 2000/60/EC, Annex V, 1.3

[88] European Community 2003, Guidance Document No 7

Table: 6.1: Surface water quality elements for the classification of the ecological status according to WFD[89]

Monitoring elements (parameters) for surface water bodies			Surface water bodies			
			Rivers	**Lakes**	**Transitional waters**	**Coastal waters**
Biological elements		Composition and abundance of aquatic flora	√	√	√	√
		Composition and abundance of benthic invertebrate fauna	√	√	√	√
		Composition, abundance and age structure of fish fauna	√	√	√	
		Composition, abundance and biomass of phytoplankton		√	√	√
Hydro-morphological elements	Hydrological regime	Quantity and dynamics of water flow	√	√		
		Connection to groundwater bodies	√	√		
		Residence time		√		
	Morphological conditions	River continuity	√			
		Depth and width variation	√	Depth variation	Depth variations	Depth variations
		Structure and substrate of the bed	√	Quantity, structure and substrate of bed	Quantity, structure & substrate of bed	√
		Structure of the riparian zone	√	Structure of lake shore	Structure of the lake shore	Structure of intertidal zone
	Tidal Regime	Freshwater flow			√	
		Wave exposure			√	√
		Direction of dominant currents				√
Chemical and physico-chemical elements	General	Transparency		√	√	√
		Thermal conditions	√	√	√	√
		Oxygenation conditions	√	√	√	√
		Salinity	√	√	√	√
		Acidification status	√	√		
		Nutrient conditions	√	√	√	√
	Specific pollutants	Pollution by all priority substances identified as being discharged into the body of water	√	√	√	√
		Pollution by other substances identified as being discharged in significant quantities into the body of water	√	√	√	√

[89] Directive 2000/60/EC, Annex V

Monitoring stations: The WFD requires countries to monitor in the following points where:

- The rate of water flow is significant within the river basin district as a whole; including points on large rivers where the catchment area is greater than 2,500 km^2,
- The volume of water present is significant within the river basin district, including large lakes and reservoirs,
- Significant bodies of water cross a Member State boundary,
- Sites are identified under the Information Exchange Decision 77/795/EEC, and
- At such other sites, as are required to estimate the pollutant load which is transferred across Member State boundaries, and which is transferred into the marine environment.

6.2.3 Operational monitoring

This type of monitoring_focuses on water bodies that surveillance monitoring has identified as being at risk of failing their environmental objectives and is conducted to assess the changes that occur in the "at risk" water bodies after the implementation of the programme of measures[90]. The monitoring includes characteristics that are indicative of the pressures to which the bodies are subject[91]. The WFD emphasizes the need to monitor the water bodies that are most sensitive to or are exposed more to such pressures by selecting the following type of monitoring stations[92]:

- Reference stations (where the impact of human activity is at a minimum to measure high and good status);
- Representative stations, (which are representative of the whole water body);
- Flux stations (representing pollutant discharge loads and for international comparisons and exchange of information);
- Sensitive area waters (for protection of drinking water sources, bathing waters, fish, birds, habitats, wetlands, etc.);
- Hot-spot or impact monitoring stations (to evaluate the impact of point or diffuse sources of pollution);
- Key stations (for large or important water bodies).

Parameters: The WFD recommends monitoring parameters that are indicative of the biological and hydromorphological quality elements most sensitive to the pressures to which the body is subject, all priority substances discharged and other substances discharged in significant quantities[93].

6.2.4 Investigative monitoring

This monitoring is case specific and thus is required in specified cases of accidences (of Environmental Objectives), where there is need to ascertain the causes of a water body or water bodies failing to achieve the environmental objectives, or to ascertain the magnitude and impacts of accidental pollution. Considering the specific nature of this type of monitoring, the WFD requires to design it on a case-by-case need.

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[90] European Community 2003, Guidance Document No 7

[91] European Community 2003, Guidance Document No 7

[92] European Community 2003, Guidance Document No 7

[93] European Community 2003, Guidance Document No 7

6.2.5 Monitoring frequency

WFD recommends the monitoring frequencies reported in Table 6.2 for the required parameters in the monitoring programme. For Operational Monitoring, states have the flexibility to determine the monitoring frequency and parameters with the condition to not exceed the recommended monitoring intervals unless it is justified on the basis of technical knowledge and expert judgment.

Frequencies shall be chosen so as to achieve an acceptable level of confidence and precision. Monitoring frequencies shall be selected after taking into account the variability in parameters resulting from both natural and anthropogenic conditions. The times at which monitoring is undertaken shall be selected so as to minimize the impact of seasonal variation on the results[94], and thus ensure that the results reflect changes in the water body as a result of changes due to anthropogenic pressure. Additional monitoring during different seasons of the same year shall be carried out, where necessary, to achieve this objective.

Table 6.2: Monitoring frequency of quality elements in surface water bodies according to WFD[95]

Quality Elements	Surface Water Bodies			
	Rivers	**Lakes**	**Transitional**	**Coastal**
Biological quality elements				
Phytoplankton	6 months	6 months	6 months	6 months
Other aquatic flora	3 years	3 years	3 years	3 years
Macro invertebrates	3 years	3 years	3 years	3 years
Fish	3 years	3 years	3 years	n/a
Hydromorphological elements				
Continuity	6 years			
Hydrology	continuous	1 month		
Morphology	6 years	6 years	6 years	6 years
Physico-chemical elements				
Thermal conditions	3 months	3 months	3 months	3 months
Oxygenation	3 months	3 months	3 months	3 months
Salinity	3 months	3 months	3 months	3 months
Nutrient status	3 months	3 months	3 months	3 months
Acidification status/pH	3 months	3 months	3 months	3 months
Other pollutants	3 months	3 months	3 months	3 months
Priority substances	1 month	1 month	1 month	1 month

[94] Directive 2000/60/EC, Annex V, 1.3.5
[95] Source: WFD, Annex 5/1.3.4

6.2.6 Determining environmental quality standards (EQS) for chemical quality elements

WFD defines an environmental quality standard as the concentration of a particular pollutant or group of pollutants in water, sediment or biota, which should not be exceeded in order to protect human health and the environment[96]. The directive recommends countries to set EQS for *water, sediment and biota* intended for the protection of the aquatic life although WFD does not require countries to monitor pollution in the sediment of the water bodies[97].

EQS are specifically required for the main pollutants included in the indicative list provided in Annex VIII of the WFD[98], which includes organohalogens and substances which may form such compounds in the aquatic environment, organophosphorous and organotin compounds, substances and preparations, or the breakdown products of such, which have been proved to possess carcinogenic or mutagenic properties or properties which may affect steroidogenic, thyroid, reproduction or other endocrine-related functions in or via the aquatic environment, persistent hydrocarbons and persistent and bioaccumulable organic toxic substances, cyanides, metals and their compounds, arsenic and its compounds, and biocides and plant protection products[99].

6.2.7 Monitoring of transboundary waters

For the Drini-Buna River Basin where use of water may have transboundary effects, the requirements for the achievement of the environmental objectives established under the EU WFD, and in particular all programmes of measures, should be coordinated for the whole river basin. The EU WFD contributes to the implementation of Community obligations under international conventions on water protection and management, notably the UNECE Water Convention.

It is imperative that suitable institutional arrangements at the international, national and local levels are a precondition for monitoring and assessment of transboundary waters, to ensure cooperation among various governmental entities, the private sector and others. In making these arrangements, it is important to note that the responsibility for groundwater monitoring and assessment with regard to water quality and quantity may lie with geological survey organizations rather than environmental or water agencies. Cooperation among water, environmental and health authorities is needed to ensure the collection and use of data related to human health and safety.

Hydrometeorological services play an essential role in transboundary water monitoring by providing water-quantity data and early warning information for extreme hydrological events. Organizations which operate response systems for emergencies involving water regulation structures and industrial plants are important partners in providing data to mitigate the adverse impacts of failures of such installations on transboundary waters. Industrial enterprises that monitor their own water abstractions and wastewater discharges provide data for compliance purposes. Assessment of watercourses also requires socio-economic data, including population and economic statistics, which are collected by statistical offices.

It is particularly important for the monitoring of transboundary waters that a quality system should be set up, as it is essential for ensuring the reliability of information obtained by monitoring. The quality system should be organized around all the elements of the monitoring –and assessment cycle, starting with documenting procedures for the specification of information needs and developing an information strategy. Standards, established under the auspices of the International Organization for Standardization (ISO), the European Committee for Standardization (CEN) and other organizations for sample collection, transport and storage, and

[96] Directive 2000/60/EC, Article 2

[97] Directive 2000/60/EC, Annex V, 1.2.6

[98] Directive 2000/60/EC, Annex VIII

[99] Directive 2000/60/EC, Annex VIII

laboratory analysis, are the basis for the quality system. Protocols for data validation, storage and exchange as well as data analysis and reporting should be established and documented. Riparian countries should, where appropriate, assign to their joint bodies responsibilities related to quality systems. Transboundary cooperation at the local level should be encouraged and promoted, including direct contacts between laboratories and institutions involved. As many decision makers are not aware of laboratory quality systems, it is essential to stress that the trend throughout the broader analytical community is to strengthen laboratory quality assurance in a step-by-step approach: from simple internal quality control measures to laboratory accreditation, and finally to international standards such as ISO/IEC 17025 covering general requirements for the competence of calibration and testing laboratories.

According to the provisions of the WFD and the Aarhus Convention, riparian countries should give each other access to relevant information on surface water and groundwater quality and quantity. Arrangements for the exchange of information among riparian countries should be governed by rules jointly agreed by these countries. The arrangements should specify the format and frequency of reporting. Information should be exchanged free of charge. Also, arrangements for the provision of information to the public should be jointly agreed and should include the establishment and maintenance of a joint website.

The costs of monitoring should be estimated before monitoring programmes begin, or when major revisions are planned. If the information needs are well defined, the estimate can be rather detailed. Monitoring costs can be divided into the following components: - Network administration, including design and revision; - Capital costs of monitoring and sampling equipment, construction of observation boreholes or surface water sampling sites and gauging stations, transport, data processing hardware and software; - Labour and other operating costs involved in sample collection and field analysis; - Labour and other operating costs involved in laboratory analyses; - Labour and associated hardware and software costs involved in data storage and processing; - Data interpretation and reporting; production of outputs, including geographic information systems (GIS) or presentation software and report printing costs.

The WFD requires countries to make monitoring results of the biological elements comparable between countries by expressing them in Ecological Quality Ratio (EQR). EQR represents the relationship between the values of the biological parameters observed for a given body of surface water and the values for these parameters in the reference conditions applicable to that body. The ratio shall be expressed as a numerical value between zero and one, with high ecological status represented by values close to one and bad ecological status by values close to zero (See Annex 3 for more details). Ecological quality ratio scale should be divided for each surface water category into five classes ranging from high to bad ecological status by assigning a numerical value to each of the boundaries between the classes. The value for the boundary between the classes of high and good status, and the value for the boundary between good and moderate status shall be established through the inter-calibration exercise.

States are also required to start collaboration for common monitoring of transboundary waters or the intercalibration exercise. The latter consists mainly in:

- *Identifying at least two monitoring stations for biological elements* in the proximity to the border. The sites can be selected on the basis of the expert judgment based on joint inspections and all other available information. It is stated that at least two sites corresponding to the boundary between good and high status and two sites corresponding to the boundary between good and moderate status should be selected for an intercalibration network for each water body type within each eco-region. Because of the natural variability between the same types of water bodies, the number of sites may have to be much larger to be able to define the borderlines between the status groups and the variability of this borderline.
- *Undertaking measurements simultaneously*: Member States sharing the same natural water body are required to undertake measurements simultaneously in the identified sites in order to permit a real comparison of the assessment of ‘good’ status;
- *Applying a Member State’s monitoring and assessment system* to the appropriate identified sites and water bodies in one or more other Member States.

The intercalibration exercise is intended to be a one-off exercise although countries are required to repeat it. An intercalibration exercise will also be required once the accession countries join the EU[100]. The Commission has committed to play the role of the facilitator in the intercalibration exercise.

The design of a transboundary monitoring programme for the Drini-Buna River Basin between Albania Macedonia, Montenegro, Kosovo and Greece will not be possible until the following conditions outlined above have been addressed, namely: suitable institutional arrangements at the international, national and local levels, the clear role and function of hydrometrological services, the design and implementation of a quality system (sampling, laboratory analysis and data management), the determination of costs to conduct meaningful and WFD compliant monitoring, and the official agreement of data sharing as required by international law. Until these conditions are met, the designation of national monitoring stations is meaningless in terms of determining transboundary water quality. Section 14 provides clear recommendations for the Government of Albania to follow in order to prepare for transboundary monitoring of the Drini-Buna River Basin.

6.2.8 Reference conditions for surface water bodies

Member States[101] are required to establish reference conditions based on existing high-status water bodies where they still exist[102]. In this case monitoring will be required to define the values of the biological quality elements, type-specific hydromorphological and physico-chemical conditions for each water body type at high ecological status. Type-specific hydromorphological, physicochemical and biological reference conditions can be derived from spatially based or modelling based methods, a combination of both or based on the expert judgment[103].

Whenever the variability of the water body is high, that water body can be excluded from the assessment of the ecological status. In the case of the heavily modified or artificial surface water bodies references to high ecological status is construed as references to maximum ecological potential. The values for maximum ecological potential for a water body need to be reviewed every six years[104]. In addition, reference stations, for which there are long time series of data, which indicate stable conditions under the present conditions, may not need high sampling frequencies.

6.2.9 Monitoring standards/methods

Standardised methods for sampling techniques, sample preparation and analysis are essential in order to make data comparable scientifically [105]. For this reason, the WFD requires states to monitor surface water preferably based on standardized methods such as ISO, EN, or national standards and recommends the development of appropriate standards for those aspects of monitoring for which there are no internationally agreed standards or techniques/methods[106].

[100] European Community 2003, Guidance Document No 7, 2.12.2

[101] European Community 2003, Guidance Document No 7

[102] European Community 2003, Guidance Document No 7

[103] Directive 2000/60/EC, Annex II

[104] Directive 2000/60/EC

[105] Directive 2000/60/EC, Annex V

[106] European Community 2003, Guidance Document No 7

6.3 WFD-compliant Surface Water Monitoring Programme for the Drini-Buna River Basin

6.3.1 Overview of the monitoring programme

The Monitoring roadmap has been prepared to support WRMA in the path toward monitoring Drini-Buna River Basin surface water in compliance with the WFD. The Drini-Buna River Basin Monitoring Programme was designed while considering the following:

- The need to start monitoring the River Basin as part of the RBMP implementation in addition to the National Water Monitoring Programme implemented by NEA;
- The need to have an efficient system that satisfies the WFD requirements to establish surface water quality status, and;
- The realization that the Programme will be implemented under the constraints of limited financial resources, human resources and sampling and analysis facilities.

6.3.2 Monitoring programme objectives

The primary objectives of the Drini-Buna River Basin monitoring programme are the following:

- Collect physico-chemical, hydromorphological and biological data to determine water quality status in order to assess the degree it supports aquatic life;
- Collect physico-chemical, hydromorphological and biological data to support an analysis and development of the Programme of Measures and the development of the water monitoring programme in the coming years;
- Collect physico-chemical, hydromorphological and biological data over the long term to determine trends in water quality that could also support programmes of measures and the Monitoring Programme;
- Identify point source and diffuse source pollution to support protecting measures;
- Measure the effectiveness of the Programme of Measures to improve water quality in the coming six years.

6.3.3 Design of surveillance water monitoring

The Drini-Buna River Basin monitoring programme has been developed for a period of six years 2017-2023 and has benefited from the project expertise, the support of NEA and WRMA and other related institutions. The project has also benefitted from the knowledge and expertise of the GIZ regional initiative[107] and also through the CEMSA project[108].

River Basin Councils will implement this monitoring programme in collaboration with the Administration Office of Basin Water. The Law on Integrated Water Resource Management has given River Basin Councils the primary responsibility for implementing the River Basin water quality-monitoring programme in compliance with the WFD[109].

The design of surveillance monitoring within Drini-Buna River Basin is based on WFD Annex V, 1.3.1. The monitoring network is based on the national monitoring networks and it is considered that there will be a harmonization between the national and basin wide monitoring to minimize the efforts and maximize the benefits.

Finances allowing, the future monitoring design requires an extensive water monitoring network that covers all water drainage from the River Basin sub-catchment areas. The monitoring programme proposes a

[107] Initial Characterisation of Lakes Prespa, Ohrid and Shkodra/Skadar: Implementing the EU Water Framework Directive in South-Eastern Europe (November, 2015)

[108] Consolidation of the Environmental Monitoring System in Albania "CEMSA"

[109] Law No. 111/2012 On Integrated Water Resource Management, Art. 85

comprehensive surface-water monitoring network for Drini-Buna River Basin that comprises 25 monitoring stations for rivers and streams, 12 for lakes and reservoirs, 3 for coastal lagoons and 4 for transitional waters. The monitoring sites can be monitored in the best financial scenario for the purpose of the surveillance monitoring. The locations of the surface monitoring stations are shown in Figure 6.1. Details about the monitoring stations are provided in Annex 2.

The monitoring sites have been prioritized (priorities 1, 2 and 3) in order to allow the River Basin monitoring authority to focus primarily in zones or sections of the River Basin that have primary priority. The prioritisation is based on the following criteria[110]:

- *1→ High priority*: Priority 1 stations need to be monitored because they are the most important stations. They are mainly located downstream of centres of high human activity. The majority of these stations have several consecutive years of data. Propose date of monitoring commencement is 2020;
- *2→ Medium priority*: Priority 2 stations need to be added to the monitoring network to provide comparable data to measure pollutant impact assessment;
- *3→ Low priority* (Reference Conditions): Priority 3 stations are included in the monitoring network to identify the overall quality status of water bodies and include relatively unimpacted waters and comply with WFD requirements.

Table 6.3 below provides the number of the monitoring stations based on prioritization per each surface water body. The sampling points are further illustrated in Figure 6.1.

The criteria for selecting monitoring points have been modified to meet the needs of the Drini-Buna River Basin, to be able to provide an assessment of the overall surface water status within the District. A number of criteria have been identified that are principally based on the need to protect human health and environment. More precisely, they refer to:

- Monitoring in sections where surface water interacts with aquifers
- Determining anthropogenic impact in the River Basin through target monitoring
- Establishing reference conditions
- Monitoring reservoirs/heavily modified water bodies
- Monitoring protected areas
- Monitoring transboundary waters

Proposed quality elements:

- Physico-chemical elements
- The biological element (including the microbiological analysis[111])
- The hydromorphological element

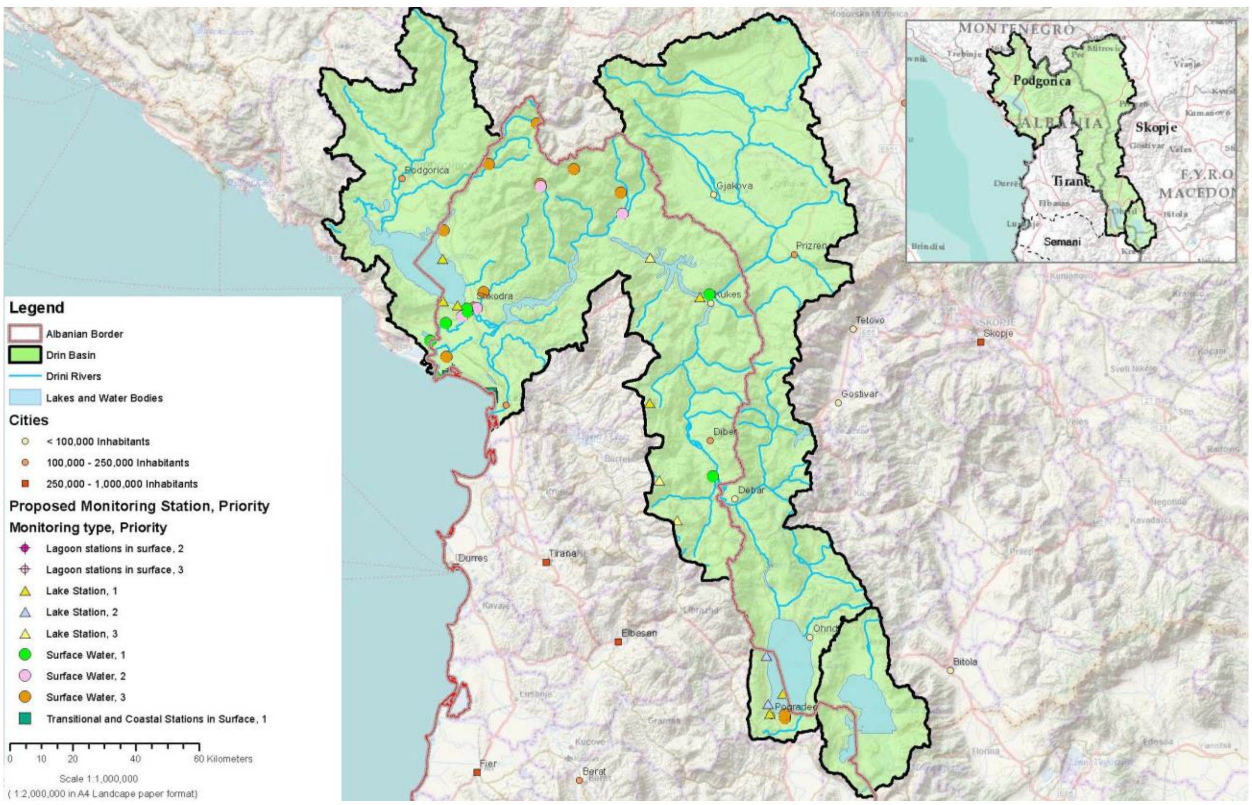
[110] The prioritization follows the same criteria established by CEMSA project, 2012

[111] The addition of microbiological analysis is required when referring to water bodies used for drinking water, referring to Article 10 DCM 379 dated 25.05.2016

Table 6.3: Summary of the proposed monitoring sites in the Drini-Buna River Basin based on prioritization[112]

Priority	Number of Rivers & Stream Stations	Number of Lake & Reservoir Stations (AWBs & HMWBs)	Number of Coastal Lagoon Stations	Number of Coastal and Transitional Stations
Priority 1	7	12		4
Priority 2	4	0	1	
Priority 3	11	3	2	
Total	22	15	3	4

Figure 6.1: Proposed surface water monitoring sites in the Drini-Buna River Basin



6.4 Groundwater Monitoring Requirements for the WFD

The main objective of the WFD is to protect water bodies as the main source of water for human consumption. For this reason, particular attention is paid to Ground Water Bodies (GWB) used for abstraction of water in a River Basin District. These include:

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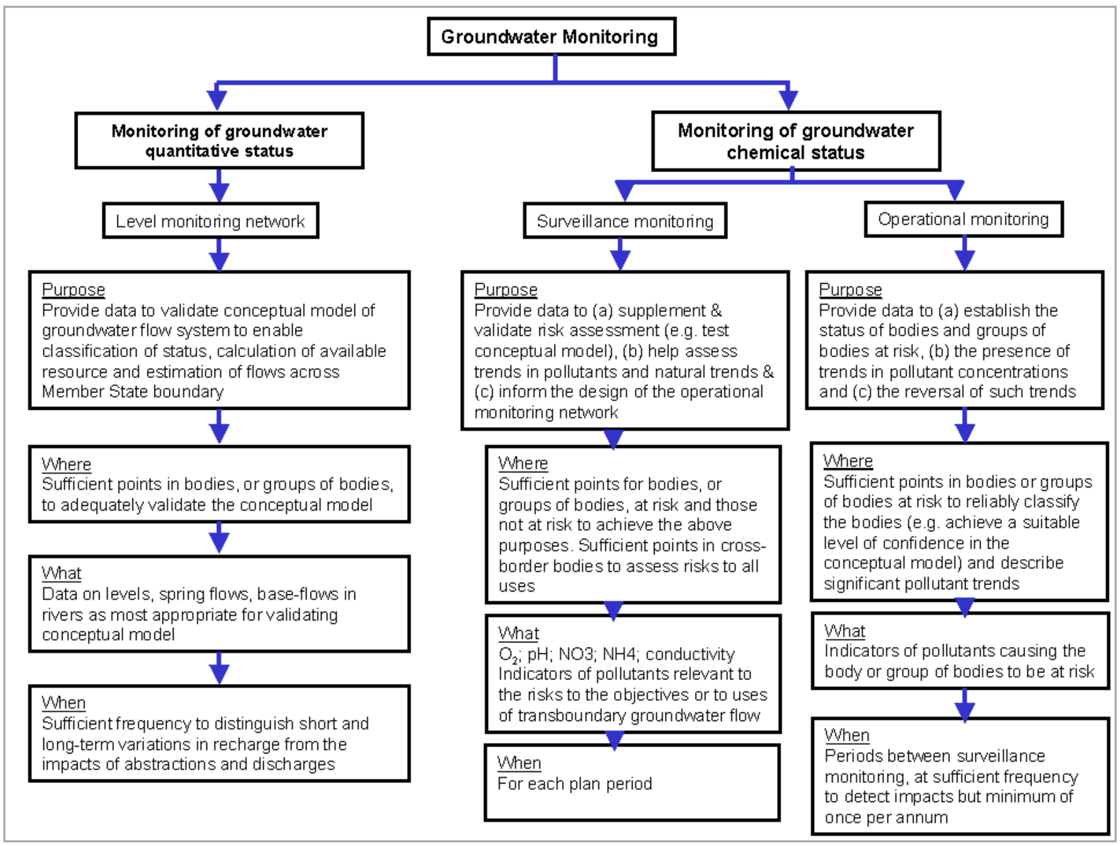
[112] Source: Consolidation of the Environmental Monitoring System in Albania “CEMSA”

- Bodies of water that are used for the extraction of water intended for human consumption providing more than 10m^3 a day as an average or serving more than 50 persons, and
- Bodies of water intended for such future use[113].

WFD requires states to establish a monitoring programme for groundwater that provides a coherent and comprehensive overview of water status (Article 8 of the Directive). In practice, the groundwater monitoring aims at obtaining data that support the establishment of the water status of the GWB in a river basin via monitoring of quantitative and chemical status.

Table 6.4: Summary of the purposes of, and requirements for, the groundwater monitoring programmes specified in Annex V of Directive[114]



A River Basin Monitoring Plan is based on a deep understanding of groundwater system, thus, before designing a monitoring programme, WFD requires states to characterize water bodies in order to support an effective, efficient and affordable groundwater-monitoring programme.

The primary target of the monitoring programme according to Annex V of the WFD is the *bodies of water that provide more than 100 m^3 a day as an average*. As stated previously, the programme is required to include monitoring of quantitative and qualitative (chemical) elements for the groundwater bodies.

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[113] Directive 2000/60/EC, Article 7

[114] Source: EC, Guidance No. 7

6.4.1 Groundwater quantitative monitoring

This consists of monitoring the groundwater level (articles 7 and 8). The purpose of this is to assess the water balance for each water body. The data on groundwater level regime supports principally the establishment of the groundwater body quantitative status, the anthropogenic and natural impact on a WB in short and long-term such as water abstraction, and degree of environmental objectives achievement specified under Article 4 for associated surface waters or other significant diminution in the status of such waters. It also supports the characterization of the water bodies according to Annex II.

Monitoring sites: The directive requires the Monitoring programme to be able to estimate the water level for each GWB or group of WB. Thus, it requires a wide network of representative monitoring wells that take into account short and long-term variations in recharge/discharge and, in particular, focuses on:

- Groundwater bodies identified as being at risk of failing to achieve environmental objectives under Article 4
- Groundwater bodies within which groundwater flows across a Member State boundary

In both these cases the Directive requires sufficient monitoring points to assess the impact of abstractions and discharges in GWB at risk and the direction and rate of groundwater flow across the Member State boundary in the case of transboundary GWB.

Monitoring frequencies: WFD requires monitoring at frequencies that ensure to capture water level variations in short and long term.

Groundwater Qualitative monitoring (chemical status) aims at determining the chemical water status of the GWBs in a river basin and detecting the presence of long-term trends in pollution caused by anthropogenic activities. The data is useful to also support the characterization and impact assessment of the GWBs to satisfy Article 7 and 8 requirements. For this purpose, the directive requires states to perform surveillance and operational monitoring. In general, the chemical status of a GWB is considered good when the results obtained from the monitoring of general aspects explained below and those of conductivity satisfy the Directive requirement.

Surveillance monitoring is required for each period to which a river basin management plan applies. The results of this type of monitoring are used to develop operational monitoring. The monitoring network needs to include sufficient monitoring sites, especially when it is the case of monitoring:

- GWB at risk following for the purpose of characterization undertaken in accordance with Annex II;
- Bodies which cross a Member State boundary

In terms of chemical elements, WFD requires to monitor for *oxygen content, pH value, conductivity, nitrate, and ammonium* and for those parameters which are indicative of impacts of pressures identified on the water body (concentration of pollutants).

The operational monitoring is subject to the surveillance monitoring. Similar to the surface water monitoring, operational monitoring focuses on water bodies at risk of failing to achieve the environmental objectives identified by the surveillance monitoring. The Directive requires the operational monitoring to be conducted in periods between surveillance monitoring programmes, in the remaining period of the River Basin Management Plan at a frequency sufficient to detect the impacts of relevant pressures but at a minimum of once per annum.

This type of monitoring data supports the establishment of the chemical status of all groundwater bodies or groups of bodies determined as being at risk, the presence of any long-term anthropogenically induced upward trend in the concentration of any pollutant.

The WFD and the Drinking Water Directive have also emphasized the need for the states to ensure that laboratories that are contracted to analyse water samples have a system of analytical quality control that is subject from time to time to checking *by a person who is not under the control* of the laboratory and who is approved by the competent authority for that purpose.

6.5 WFD-compliant Groundwater Monitoring Programme for the Drini-Buna River Basin

6.5.1 Current groundwater monitoring in Drini-Buna River Basin

The groundwater monitoring in the Drini-Buna River Basin is based on the national monitoring network. This serves as the basis for future monitoring of GWB in the River Basin, although it requires adjustments to meet WFD requirement.

As part of the National Monitoring Programme, groundwater monitoring in the Drini-Buna River basin includes 8 monitoring stations for physico-chemical parameters (Table 6.5) and 5 monitoring stations for the hydrodynamic parameters (Table 6.6).

Table 6.5: Monitoring stations for physico-chemical parameters in the Drini-Buna River Basin[115]

No.	Monitoring Station	City
1	Well No. 1, Dobraç, Shkodër	Shkodër
2	Well No.3 Big Church, Shkoder	Shkodër
3	Hot i Ri	Shkodër
4	Velipojë Station	Velipojë
5	Syri i Sheganit, Malesi e Madhe	Koplik
6	Tushemisht Spring, Pogradec	Pogradec
7	Lin Spring	Pogradec
8	Kolesjan Spring, Kukës	Kukës

[115] Source: AKM, 2016

Table 6.6: Monitoring stations for hydro-dynamic parameters in the Drini-Buna River Basin[116]

No.	Location
1	Well in Grudë-Fushë-Malësi e Madhe (Brajen Bar)
2	Shtoj i Vjetër Well, Shkodër
3	Central Well, Dobraç - Shkodër
4	Big Church - Shkodër
5	Kukës Well

As to parameters, the NEA monitors the following:

- Chemical analysis: Na, K, Mg, Ca, Fe, NH_4, HCO_3, CO_3, Cl, SO_4, PO_4, NO_3, NO_2, Mp, Fp, pH, O_2, Temperature;
- Heavy metals: Cu, Zn, Pb, Co, Cr, Ni, Mn, Cd

Standards of monitoring are Standard Methods for the Examination of Water and Wastewater, and Albanian Standard S SH EN ISO/IEC 17025:2006 based on "General requirements for the competence of testing and calibration laboratories"

6.5.2 Gaps in groundwater monitoring

Based on the information collected and in light of the WFD requirements to monitor GWB, the following gaps have been identified at the legal and institutional level, the level of the monitoring network and also with respect to parameters measures and the frequency of measurement.

6.5.2.1 Legal and institutional level

- *Legal background to monitor groundwater is incomplete*. Albania has not transposed the EU Groundwater Directive[117]. Consequently, Albania does not assess the chemical status of groundwater according to the Directive. This requires including the substances presented in the minimum list of pollutants[118] in the monitoring program and establishing threshold values for these pollutants according to procedures presented in the directive. Up to date, groundwater management and monitoring is disciplined by Law on Integrated Water Resource Management and the DCM on procedures to environmental monitoring, which established the monitoring institution and parameters.

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[116] Source: AKM, 2016

[117] Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration

[118] The list of pollutants are arsenic, cadmium, lead, mercury, ammonium, chloride, sulphate, man-made synthetic substances (trichloroethylene, tetrachloroethylene) and parameters indicative of saline or other intrusions (conductivity)

- *Responsibility of monitoring is shared between different institutions* (Ministry responsible for Environment via NEA which provides the operations monitoring costs and the Ministry responsible for Energy through AGS which performs the groundwater monitoring);
- *Monitoring data is available to be shared between institutions*. According to the Water Law, data from AGS is made available to all institutions that require it. NEA contracts AGS to monitor groundwater. However, AGS, in addition to monitoring for NEA, also monitors GWB as a service it provides to the regions.
- *Lack of institutional mechanisms that promote coordination between monitoring institutions*. Results from GWB monitoring data are not shared with other institutions. There are no legal or institutional mechanisms that make GWB monitoring data available to the River Basin Council (responsible for implementing the River Basin monitoring plan), WRMA (responsible for GWB characterisation) and the NEA (responsible for water monitoring at national level).

6.5.2.2 Monitoring network level

- *Identification of water bodies used for abstraction of water is performed on regional bases*. Identification of GWB on a river basin and trans-river basin level remains to identify in the future. Up to date, the country has only identified the location and boundaries of the groundwater bodies at regional level, identified the general character of the overlying strata in the catchment area where surface water interacts with ground water (from where groundwater body receives its recharge) and general characteristics of main water bodies.
- *Monitoring sites are currently insufficient* and do not cover the all GWBs that are used for water abstraction for human consumption. Almost all of them are located in Shkoder Region with exception to the monitoring site in Ohrid Lake. Thus, the monitoring is insufficient to establish the chemical and quantitative status of the GWBs.
- *Large areas of GWB are not covered*. The National Monitoring Programme monitors only the Aquifers in Shkoder Region and one spring in Ohrid Lake only.
- *Springs are represented in the monitoring network, although a very small number are represented* compared to the needed number.
- *Abstraction wells are included in monitoring programme* that is performed by AGS;
- *Monitoring data is only partially public*. Only monitoring data that NEA obtains from AGS is made public on a yearly basis[119]. AGS does not publish monitoring data on a regular basis;
- *Reference conditions for water bodies not established*. There is no information of reference conditions of a GWB or background level of heavy metals or other compounds related to geological setting.
- *Pressures not identified routinely*. AGS conducted a study in 2014 that identified water pressures on a regional base such as legal and illegal over-abstraction, pollution, and lack of safeguard zones to protect water resources as the main pressures on regional level. However, the pressures were not quantified, and pollution was not identified if it was point source or diffused. Projects to identify and determine safeguard zones, point source and diffuse source pollution and quantify legal and illegal water abstraction location, are needed. The illegal water abstraction is a serious challenge in the country and is impacting groundwater quality significantly[120].
- *Quantitative and qualitative groundwater monitoring network is insufficient* which makes identification of groundwater bodies ‘at risk’ or ‘not at risk’ challenging. This also creates difficulties in identifying anthropogenic impact and water level on a yearly basis.
- *Criteria for assessing good groundwater chemical status* in accordance with Annex V, Section 2 of the WFD is not defined;

[119] The data is published at the Report of the Environment Status that NEA publishes on a yearly basis

[120] AGS, 2014

- *Criteria for the identification of significant and sustained upward trends* and for the definition of starting points for trend reversals to be used in accordance with Annex V, Section 2 of the WFD.

6.5.2.3 Parameters and frequencies

- Monitoring parameters and frequencies are dependent on financial resources allocated for monitoring and they do not reflect local conditions and the pressures on a groundwater body;
- Monitoring parameters and frequencies are not reviewed or adjusted on a local or GWB based level.

6.5.3 Recommendation for groundwater monitoring programme design

The requirements to develop a WFD-compliant monitoring programme are various and Albania is just at the very first step. With the purpose of developing an efficient monitoring plan for the GWBs in the future, there is a need to see the involvement of the national government to fill the legislative vacuum in terms of ground water management and monitoring and that of the monitoring institution. Some key steps are identified below:

- Transposition of the Groundwater Directive (2006/118/EC), which provides clear guidelines on groundwater monitoring;
- Establish clear responsibilities and tasks between WRMA, Ministry responsible for Environment, and AGS for monitoring of groundwater bodies. Up to day, it is unclear if WRMA or the River Basin Council will need to establish a groundwater monitoring network for the River Basin in additional to the National Monitoring Programme. Implementation of the WFD benefits in case there is collaboration and coordination of the groundwater monitoring institutions between them;
- Coordinate also with drinking water monitoring institutions and water supply companies that are under the local government.
- Initial identification of GWBs on a river basin level, trans-river basin and transboundary level in compliance with the WFD before developing the groundwater monitoring programme and also identification of groundwater bodies for which there are directly dependent surface water ecosystems or terrestrial ecosystem.
- Development of a monitoring programme with clear objectives, type of monitoring, monitoring sites, frequencies, and parameters that are representative and indicative of local conditions.

6.6 Monitoring of Protected Areas in the Drini-Buna River Basin

Monitoring of Protected Areas under WFD requires WRMA to start with the designation and subsequently with the establishment of the Register of all types of Protected Areas in collaboration with the local government, National Agency of Water Supply and Sanitation (Ministry responsible for Infrastructure), NEA and NAPA (Ministry responsible for Environment), Ministry responsible for Economic Development, and the Albanian Geological Service (Ministry responsible for Energy). As of today, there is not a Register of the Protected Areas in the Drini-Buna River Basin and not many Protected Areas have a Management Plan[121]. Among all the types of Protected Areas, only areas of habitat and species protection have been designated in addition to two areas of co-management for fishing. NAPA[122] has clearly designated the areas of habitat and species protection at regional and national level. However, the Protected areas that are located within the Drin-Buna River Basin have approved

[121] Currently only Shkodra Lake and Kune-Vain Wetland have monitoring plans (akzm.gov.al)

[122] akzm.gov.al

Management Plans that are under the process of approval in accordance to Law No. 81/2017 “On the Protected Areas”.

The following steps for monitoring of all Protected Areas in the Drini-Buna River Basin, as designated under the WFD, are outlined below.

6.6.1 Sanitary Protected Areas

- Coordinate with National Agency of Water Supply and Sewerage and the corresponding Water Supply Companies at each municipality and the Ministry responsible for infrastructure to designate the Sanitary Protected Areas around the wells used for the abstraction of water for human consumption;
- Create the register of this type of Sanitary Protected Areas after the designation;
- Designate Sanitary Protected Areas around legal and illegal individual and industrial wells in collaboration with the Administration Office of Basin Water and local government and include them in the Register of the Protected Areas;
- Collaborate with the Water Supply and Sanitation Companies in each municipality to protect the Sanitary Protected Areas. As mentioned previously, Water Supply Companies are legally responsible for protecting these areas. As to Protected Sanitary Areas around individual and industrial wells, it is recommended to collaborate with the Local Government, the Ministry responsible for Environment and the Ministry responsible for Health to create a plan for the protection of this type of Sanitary Areas;
- Identify Sanitary Protected Areas inside the highly polluted areas or areas with high risk of pollution because of natural and/or anthropogenic activities and include these Sanitary Protected Areas in the monitoring plan of the Drini-Buna River Basin.

6.6.2 Areas designated for the protection of economically significant aquatic species

- Designate the areas for the protection of economically significant aquatic species;
- Create the register of the limited fishing areas, the protected fishing areas and the co-management areas;
- Collaborate with local governments and the Administrations of Shkoder Lake- Buna River and Ohrid Lake for their water monitoring. Both of them are areas of co-management for fishing and also protected areas of special interest;
- Include these Protected Areas in the River Basin Monitoring Plan.

6.6.3 Bodies of water designated as recreational and bathing waters

- Collaborate with Local Government, Ministry responsible for Health (via State Health Inspectorate) and NEA to create the register of these areas in the river basin;
- Collaborate with the above institutions for their monitoring.

6.6.4 Nutrient-sensitive areas, including areas designated as vulnerable zones

- Transpose the Nitrates Directive (91/676/EC);
- Designate the nitrate sensitive areas;
- Include the monitoring of these areas in the River Basin Monitoring Plan
- Collaborate with the Ministry responsible for Environment for the designation of wastewater discharge sensitive areas, and prepare the list of sensitive water bodies[123].

6.6.5 Areas designated for the protection of habitats or species

The areas designated for habitat and species protection are numerous (See Section 5.6). A list of the types of Protected Areas that need monitoring under WFD is presented below (Table 6.7). Each Protected Area is given a monitoring priority that is based on the following criteria:

- 1st priority monitoring: Lakes, lagoons, drinking waters and other water bodies that are Protected Areas of special importance nationally and internationally or Protected Areas such as karstic water bodies that are used for human consumption;
- 2nd priority monitoring: Landscapes of significant economic importance for the development of the area around the Protected Area and the region
- 3rd priority monitoring: Nature Monuments (karstic spring, etc.) are given third priority. Many nature monuments are karstic springs. It is important to collaborate with the NAPA as it is the responsible institution for their management, monitoring and administration. The Geological Service is also important for groundwater monitoring.

It should be noted that this is a temporary list. WRMA needs to collaborate with NAPA and the regional RAPAs in the Drini-Buna River Basin to have a permanent list of these types of Protected Areas in Drini-Buna River Basin.

6.6.6 Recommendations for the monitoring of Protected Areas

The main recommendations are as follows:

- Include areas of the first monitoring priority as soon as possible. High priority should be given to Gashi River, Valbona River, Kune-Vain-Tale Lagoon, and Drini Delta in the Surface Water Monitoring Plan of the Drini-Buna River Basin;
- Coordinate with the RAPAs of the respective regions in the River Basin District and mainly with the RAPA Shkoder for both Shkoder Lake and Buna River and RAPA Korçë for Ohrid Lake in order to identify the monitoring needs of the main water bodies from the perspective of species and habitat protection and also to coordinate in terms of efficiency and efficacy monitoring. Ohrid and Shkoder lakes already have identified their monitoring needs in the respective management plans[124].
- Include biological monitoring in the River Basin Monitoring Plan as soon as possible, especially for the Shkoder and Ohrid lakes and standing waters (Vane-Kune Wetlain).

Monitoring of protected areas in Drini-Buna River Basin in compliance with the WFD faces numerous challenges. These include the lack of Protect Area designation and lack of the Register of the drinking water Protected Areas, nitrate sensitive areas and vulnerable zones including areas designated for the protection of economically significant aquatic species, which remain immediate challenges.

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[123] Art. 14 Law No. 9115, date 24.7.2003 “On Waste Water Treatment”

[124] Management Plan of The Prespa National Park In Albania 2014-2024, Kfw

For this reason, for the first years covered by this River Basin Management Plan, the River Basin Management authorities will need to take coordinated efforts to primarily designate Protected Areas and to create the Register of the Protected Areas and then include them in the River Basin Water Monitoring Plan.

It is recommended for WRMA and the River Basin Authorities include sub-programmes for the monitoring of WFD-defined Protected Areas. The monitoring needs to take into consideration the Monitoring Plans for each Protected Areas. Contemporarily, it is important for the River Basin management authorities to collaborate with regional RAPAs for their monitoring.

Table 6.7: Protected Areas designated for the protection of habitats and species under WFD that require monitoring[125]

No.	Cat.	Region (Qark)	District	Protected Area	Surf (ha) / Description	Priority of monitoring
Strict Nature Reserve (SNR) / Scientific Reserve						
1	I	Kukës	Tropojë	Lumi i Gashit	3,000.00	1
National Park (NP)						
1		Shkodër	Shkodër	Thethi (includes also Thethi River)	2,630.00	1
2	II	Dibër	Dibër	Lura (includes Lura Lakes)	1,280.00	2
3	II	Kukës	Tropojë	Valbona Valley (Includes also Valbona River)	8,000.00	2
4	II	Korçë	Korçë	Prespa	27,450.00	1
Managed Nature Reserve (MNR) / National Nature Park						
1	IV	Shkodër	Shkodër	Shkodra Lake	26,535.00	1
2	IV	Lezhë	Lezhë	Kune-Vain-Tale	4,393.20	1
Protected Landscape (PL)						
1	V	Korçë	Pogradec	Pogradec (Ohri Lake)	27,323.00	1
2	V	Shkodër	Shkodër	Buna River-Velipoja	23,027.00	1
EMERALD* Network (Areas of Special Conservation Interest -ASCI)						
1	IV	Shkodra		Managed Nature Reserve of Shkodra Lake	26,535	1
2	V		Pogradec	Pogradec Protected Landscape	24,350	1
3	V	Shkodër		Protected Landscape of Buna River-Velipoja	22,479	1
RAMSAR						
1		Shkodër	Shkodër	Shkodër Lake and Buna River	49,562.00	1
Important Bird and Biodiversity Areas (IBAs)						
1		Shkodër		Shkodra Lake		1
2				Ohrid Lake		1

[125] Source: NAPA; Preparation: Mott MacDonald/Abkons

No.	Cat.	Region (Qark)	District	Protected Area	Surf (ha) / Description	Priority of monitoring
3				Belipoja Beach		1
4			Lezhë	Kune-Vain		1
Nature Monument (NM)						
1	III	Shkodër	Kelmend, Malësi e Madhe District	Vukli Springs	Karstic springs that feed Cemi River in Vukli. Waters used for drinking and irrigation.	1
2	III	Shkodër	Close to Theth Village, Shalë, Shkodra District	Shtraza Springs	Karstic spring	3
3	III	Dibër	In proximity to Bellova village, Melan, Dibër District	Bellova Springs	Karstic springs	3
4	III	Dibër	In proximity to Brud Village	Brudi Springs	Karstic springs	3
5	III	Shkodër	In proximity to Kir Village, Pult, Shkodra District	Kiri Springs	Karstic springs serving as the source of Kiri River	3
6	III	Shkodër	In proximity to Selcë Village, Kelmend, Malësi e Madhe District	Koprishti Spring	Karstic spring serving as the source of Cemi River	3
7	III	Shkodër	Theth (Nikgjonaj), Shalë, Shkodra District	Okoli Springs	Karstic spring	3
8	III	Kukës	In proximity toValbona Village, Margegaj LGU, Tropoja District	Valbona Springs	Karstic spring	3
9	III	Dibër	In proximity to Fushë Çidhnë Village	Sopanika Spring and Cave	Karstic spring	3
10	III	Korçë	Next to Tushemisht Village, Pogradecit District, Southeast of Ohrid Lake	Driloni Spring	The spring is fed by Prespa Lake and the Dry Mountain. The spring is surrounded by rich wetland ecosystems	1
11	III	Dibër	In Kërçini Mountain, in proximity to Kërçisht Village	Kërçini Spring	Karstic spring	3
12	III	Kukës	In proximity to Kolosian Village, Bicaj LGU, Kukës District	Kolesiani Spring	Karstic spring	3
13	III	Kukës	Southeast side of Krumë City	Kruma Spring	Karstic spring	3

No.	Cat.	Region (Qark)	District	Protected Area	Surf (ha) / Description	Priority of monitoring
14	III	Shkodër	In proximity to Valbona Village, next to Rasa e Pecmara Vally	Quku i Dunishës Spring	Karstic spring that feeds Valbona River. It is surrounded with vegetation	3
15	III	Shkodër	In proximity to Shoshan Village, Margegaj LGU, Tropoja District, next to Valbona riverbed	Shoshani Spring	Karstic spring	3
16	III	Shkodër	In proximity to Vleshe Village	Uji i Ftohtë - Vleshë	Karstic spring	3
17	III	Shkodër	Next to Gruemirë, Shkodra District	Vraka Spring	Karstic Spring that is used for irrigation and drinking water for the population of the nearby villages	1
18	III	Kukës	In the valley of Qirec Spring, Lekbibaj, Tropoja District	Qireci Karstic Spring	Karstic spring	1
19	III	Dibër	East of Peshkopi City, right of the Thermal Spring (Llixha)	Thermomineral Spring of Peshkopisë (Llixhat)		2
21	III	Kukës	In proximity to Domaj Village, Golaj LGU, Has District	Domaj Spring	Karstic spring	3
21	III	Kukës	Vranisht Village, Fajzë LGU, Has District	Vranisht Spring	Karstic spring which is fed by the groundwater of the Dry Has karstic aquifer	1
21	III	Shkodër	In proximity to Vermosh Village, Kelmend LGU, Malësi e Madhe District	Canyon of Bashkimi – Vermosh	A canyon that is formed by the corrosive activity of the Vermosh River water. A karstic ecosystem	2
21	III	Shkodër	Theth Village, Shkodra District	Canyon of Grunas	A canyon that is formed by the corrosive activity of the Theth River water and the karstic processes	2
21	III	Shkodër	Next to Holy Bridge Village, Postribë LGU, Shkodra District	Canyon of the Holy Bridge	A canyon that is formed by the corrosive activity of the Kir River water. A karstic ecosystem Kirit. A bridge has been built in this Canyon which connects Shkodra city with Prekal Village and further	2
29	III	Kukës	Midstream of Luma River (White Drini Tributary), Topojan Village, Kukës	Canyon of Vanas	A karstic canyon	2

No.	Cat.	Region (Qark)	District	Protected Area	Surf (ha) / Description	Priority of monitoring
30	III	Shkodër	Midstream of Valbona River	Canyon of Shoshan	A canyon that is formed by the corrosive activity of the Shoshan River water	2
31	III	Kukës	In proximity to Black Drini Riverbed, between Kukës and Bicaj, close to Bushat Village, Kukës	Kukës Wetland	A quaternary-era lake that is disappearing. It is a wetland ecosystem	2
32	III	Shkodër	Close to Zagorë Village, Malësi ë Madhe	Canyon of Poica (Canyon of the Dry Stream - Përroi i Thatë)	A narrow gorge formed by the corrosive activity of the Dry Stream waters and the karstic process	2
33	III	Shkodër	South of Shengjin Beach	Kashta Wetland	A wetland that is highly rich in flora and fauna	2
34	III	Dibër	In proximity to Shishtavec, northwest of Tërfojë Apex, 1750 asl, Turaj Village, Topojan LGU, Kukës	White Stream	Karstic spring	3
35	III	Kukës	In proximity to Shishtavec, Northwest of Gjalicë Mountain, Dërshanë, Topojan LGU, Kukës District	Red Stream - Gjallicë	Karstic springs	3
36	III	Kukës	Close to Dobërdol Village	King's Stream – Serakol	Karstic spring	3
37	III	Kukës	Çerem Village, Margegaj LGU, Tropojë District	Glacial Lakes of Dobërdol	A glacial lake. It is rich in fauna, typical for alpine Lakes	3
38	III	Kukës	In the glacial valley of Gash Mountain Area	Glacial Lakes of Sylbicë	A glacial lake. It is rich in fauna, typical for alpine Lakes	3
39	III	Diber	East of Balgjaj Mountain, (Allamanit), southwest of Kacni Village, Dibra District	Lakes of Kacnisa	A glacial lake. It is rich in fauna, typical for alpine Lakes	3
40	III	Dibër	In Lura National Park, 1600m	Flower's Lake (Lurë)	A glacial lake. It is rich in fauna, typical for alpine Lakes	3
41	III	Shkodër	Jezerca Mountain	Jezerca Lake	A glacial lake. It is rich in fauna, typical for alpine Lakes	3
42	III	Dibër	In Lura National Park	Big Lake (Lurë)	A glacial lake. It is rich in fauna, typical for alpine Lakes	3
43	III	Dibër	Next to Peja	Big Lake (Lurë)	A glacial lake, rich in flora and fauna	3

No.	Cat.	Region (Qark)	District	Protected Area	Surf (ha) / Description	Priority of monitoring
44	III	Kukës	On Iron Apex in East Alps, Shoshan Village, Margegaj LGU, Tropoja District	Lake of Ponarë (Lake of Markajs)	A Glacial and Karstic lake	3
45	III	Dibër	In Lura National Park	Black Lake (Lurë)	A glacial Lake. It is rich in fauna, typical for alpine Lakes	3
46	III	Dibër	In Korab Mountain, in proximity to Radomirë Village	Black Lake (above Radomirë)	A glacial Lake. It is rich in fauna, typical for this type of lakes	3
47	III	Kukës	East Alps, in proximity to Dragobi Village, Margegaj LGU, Tropojë District, between Iron Mountain and the Open Valley	Glacial Valley of Motina (Valbone)	Glacial-Karstic valley	2
48	III	Kukës	Close to Ragam Village, Margegaj LGU, Tropojë District	Glacial Valley of Kukaj	Glacial-Karstic valley	2
49	III	Shkodër	Breglumë Village, Shalë LGU, Shkodra District	Shala Doors	A canyon-like shape which was formed by the corrosive activity of Shala river waters into the calcistic rocks	3
50	III	Shkodër	Delta of Bunës, nothrwest of Velipojë Village, Shkodra	Forest of Franc Jozef iceland (coastal waters)	Rich in wetland vegetation. It is also an important habitat for bird nesting	1
51	III	Shkodër	In proximity to Shëngjin Iceland	Drini Delta (next to Kashta wetland, on the left)	Wetland habitat rich in fauna. Birds are the more common which risk extinction	2
53	III	Dibër	In proximity to Grudë-Fushë Village, Gruemirë, Malësi e Madhe	Gjoni Spring (eye)	Karstic Spring. Used for drinking water and irrigation. Rich in aquatic flora in the surface	1
54	III	Shkodër	In proximity to Kosan Village, Bajzë LGU, Malësi e Madhe District, next to Shkodra Lake	Syri i Sheganit (Sifoni i Virit)	Karstic Spring. There are fish and other species in the spring's waters	2
55	III	Kukës	Close to the center of Kryezi Village, Qafë – Mali LGU, Pukë District	Kryeziu Waterfall	Waterfall formed by the waters of Orosh Spring in the magmatic Rocks	2
57	III	Shkodër	In proximity to Theth Village, Shalë LGU, Shkodra District	Thethi Waterfall	Karstic spring	2

7 Water Status

7.1 Surface Water Quality Monitoring

7.1.1 Summary of surface river water quality in the Drini-Buna River Basin in 2015

The assessment of water quality in surface is based on analysis of the existing water quality database. This includes the identification of causes of water quality problems, including issues of industrial and agricultural pollution, and upper catchments degradation as sources of sediment load in the basin.

The monitoring results for 2015 for the Drini-Buna River Basin are presented in Table 7.1.

Table 7.1: Surface monitoring results for the Drini-Buna River Basin in 2015 (all units as mg/l)[126]

	Code	Stations	O_2	BOD_5	NH_4	NO_2	NO_3	P-Total	Class
Drini-Buna River Basin	D1	Topojan	9.4	4	0.018	0.003	0.3	0.04	III
	D2	Bahçallëk	9.3	2.3	0.025	0.001	0.6	0.03	II
	Bu 2	Ura Shkodër	9.1	2.7	0.087	0.006	0.1	0.03	II
	Bu 1	Muriqan	8.8	2	0.035	0.002	0.3	0.021	II
	DLe	Drini Lezhë	7.4	25.7	0.256	0.003	0.7	0.037	V
EQS[127]		Class III (Moderate)	>5	<7	<0.6	<0.12	<4	<0.2	
		Class II (Good)	>6	<3.5	<0.3	<0.06	<2	<0.1	

Based on NEA monitoring results in 2015, in relation to dissolved oxygen, the waters of Drini-Buna River Basin at the five stations are of good quality (Class II). There is sufficient dissolved oxygen to sustain aquatic life (above 5 mg/l) in the water of the Drini-Buna River Basin from Topojan to Drini i Zi, and in Buna, Drini-Lezhë and Drini in Shkoder. The highest concentration of DO is measured in Topojan with 9.4mg/l. A gradual decrease in DO is noted from Topojan to Drini-Lezhë. The latter has the lowest concentration, although within the EQSs.

BOD_5, NH_4, NO_3, NO_2, and P-total measured in the river basin are within the EQSs indicating that the water is of good quality. An exception is the level of BOD5 in Topojan (Class III) that indicates waters of moderate quality and the level of BOD_5 in Drini-Lezhe that exceed the EQS by 27%. In the rest of the stations, however, the levels of BOD_5 concentration in the Drini River decrease gradually from Bahçallëk to Muriqan and then increase significantly in the Drini-Lezhe. The concentration of BOD_5 in Topojan and Drini-Lezhe clearly indicates a poor chemical and biological quality of the river that could be attributed to discharges from wastewater, industrial effluents and agricultural run-off.

[126] Source: AKM, 2015

[127] AKM 2015, State of the Environment Report, 2015

The concentration of NH_4 reaches the highest levels in Ura Shkoder and Drini-Lezhë, although all results are within the EQS. The concentration of NH_4 in Drini-Lezhe is close to the moderate water quality limits. As for NO_3, although highest in Bahçallëk in comparison to the other stations, all sampling locations show a 'good' water quality.

To conclude, the measurements indicate a river with water quality that is generally good, with the exception of the Drini-Lezhë section and the Topojan station in Drini i Zi. In both tributaries, the measurements indicate high concentrations of BOD_5. Although within the EQS, the Drini-Lezhe station shows the highest concentration of all the parameters with the exception of NO2. The highest values of nitrite were monitored in Ura Shkoder at 0.06 mg/l. The O_2 concentrations measured in the river show an aquatic environment that is able to sustain aquatic life. Based on the above results, the status of Drini and Buna river waters can be classified overall as 'good' to 'moderate' quality (Classes II to III) waters. The monitoring results indicate the presence of discharges of industrial and urban wastewater and possibly agricultural run-off.

7.1.2 Water quality trends in Rivers in Drini-Buna Basin

The surface waters of the Drini-Buna River Basin have been analysed to understand the trends of its water quality over the last five years. The main results are the following:

- There has been an increase in the concentration of BOD_5 in all rivers due to untreated urban and industrial wastewater discharge. The Drini-Lezhë is more polluted than other sections of the river. However, since the Drini-Lezhë was not monitored in the previous years, this makes it difficult to compare it with the trends of the other tributaries of Drini.
- The NH_4 concentration remains constant, within the allowed levels, although there is a slight increasing tendency. With respect to NH_4, the waters of the Drini-Buna River Basin can be classified over the past 5 years as 'good' or 'very good'.
- The concentration of NO_3 varies among stations although the concentration remains within the allowed values. The use of agriculture inputs in agricultural land near or in the buffer areas along the river can cause nitrate pollution in addition to industrial and agricultural wastewater discharges.
- NO_2 concentrations are within the EQS, with values that remaining constant over the years. The status of the water is classified as 'good' with respect to nitrite.
- Overall, the waters of the River Basin can be classified during the last 5 years as having a 'good' to 'moderate' status.

7.1.3 Monitoring of Drini-Buna River Basin lakes

Lake Shkoder and Lake Ohrid are two of the three lakes that are monitored on a yearly basis in Albania. Table 7.2 provides a description of the national monitoring station of the two lakes.

An on-going initiative by the GIZ to characterise Lakes Prespa, Ohrid and Shkodra was designed to inform competent authorities, decision-makers, practitioners and experts in water resources management about biological and physico-chemical characteristics of the three lakes. The GIZ study has already enabled the major stakeholders to make proactive decisions to improve the monitoring and management of the lakes, which is important since ongoing or new developments such as urban encroachment may have immediate negative effects on the lakes' ecological status.

Table 7.2: National Lake Shkoder and Ohrid Lake monitoring stations[128]

No.	Lakes	Stations
1	Shkodër Lake	Koplik (Sterbec), near Kalldruni village (Kopliku); littoral, about 200 m from the lakeshore
2		Zogaj (Shkoder); littoral, adjacent to Zogaj, about 200 m from the lakeshore
3		Shiroke, (Shkoder); littoral adjacent to Shiroke, about 200 m from the lakeshore
1	Ohrid Lake	Ohrid 1, (Pogradec); about 200m from the lakeshore and up to 150m in depth (0, 20, 40, 60, 80, 100, 120, 150 m)
2		Ohrid 2, Guri i Kuq (Pogradec); 8m depth, (surface samples only)

7.1.3.1 Lake Shkoder

Only scattered and unverified physico-chemical data are available for the Albanian part of the lake. A transboundary water quality monitoring programme from 2007–2009 funded by the Research Council of Norway found total phosphorus concentrations of 1–35 µg TP.l-1 and total nitrogen concentrations of 200–600 µg TN.l-1. This study concluded that the lake is in mesotrophic conditions despite high nutrient inputs129.

During 2013– 2014 the GIZ130 conducted monitoring was undertaken at three stations, which are all located in the single identified lake water body (Koplik, Zogaj and Shiroka). Monitoring of biological elements together with an assessment of physico-chemical conditions was carried out during April, July, October and February, where possible, in accordance with the WFD guidelines.

Based on the results obtained by the GIZ and the recent national monitoring programme[119] for Lake Shkoder, the following observations can be made:

- Phytoplankton abundance, chlorophyll-a concentration and Trophic State Index (TSI) results suggest mesotrophic conditions, although a large amount of caution should be exercised over this conclusion because of the very small amount of data and limited timespan over which those data were collected. Macrophyte results, however, indicate a higher level of eutrophication. Macroinvertebrate results also suggest a relatively high level of organic enrichment at all sites[121].
- Even though type-specific reference conditions remain to be defined, it is evident that the composition and abundance of phytoplankton and macrophyte communities differ significantly from undisturbed conditions, and that the Albanian part of Lake Shkodra is likely to fail the environmental objective of achieving good ecological status.
- In terms of risk of failing to achieve good ecological status, individual BQEs were as follows: Phytoplankton – probably at risk, Macrophytes – at risk. Macroinvertebrates were not assessed and fish are probably the most uncertain biological quality element to assess the status of lake quality and no attempt has been made as yet to produce a classification scheme based on the results observed. Thus, fish have effectively been excluded from the ecological status assessment[121].
- Water clarity varies between stations, ranging fom 3.0-3.7m. Koplik has the highest values of water clarity. The measured values of conductivity classify the lake waters as mesotrophic.

[128] Source: AKM, 2015, State of the Environment report, 2015
[129] Skarbøvik E, Perovic A, Shumka S, Nagothu US (2014) Nutrient inputs, trophic status and water management challenges in the transbundary
[130] Initial Characterisation of Lakes Prespa, Ohrid and Shkodra/Skadar: Implementing the EU Water Framework Directive in South-Eastern Europe (November, 2015)

- The water is slightly alkaline with pH that varies from 8.12-8.4; Conductivity varies from 219-225 μS/cm; Alkalinity varies from 193-225 mg/l.
- The lake waters are rich in oxygen, which shows the ability of the lake to sustain lake flora and fauna (7.8-8.8 mg/l). Since the first monitoring, the oxygen levels in the lake had decreased due to increasing vegetation at the bottom of the lake.
- P-total concentration in the lake varies from 0.001 to 0.04 mg/l with higher concentrations resulting in Shiroke and Koplik station at a depth of 5m. P-total concentrations in the lake indicate the mesotrophic status of the lake (which is above oligotrophic levels). There is a risk that further increase of P levels could cause eutrophication of the lake.
- Ammonium ion concentration varies from 0.01-0.04 mg/l. The highest concentrations are measured in the surface of the lake in Shiroke and in Zogaj, at a depth of 5m. The concentrations are still below the EQS (0.2 mg/l).
- Nitrates vary from 0.14-0.17 mg/l, a level that can classify the lake as oligotrophic (<1mg/l) which suggests a lake with low algal production.
- COD values are higher in the three monitored stations with variation to the bottom of the lake where COD has the highest values. COD values are an indication of the mesotrophic state of the lake (8-9mg/l).
- As to chlorophyll a, the maximum concentration was found in September, while the station with the highest concentration was in Zogaj.

To conclude, the monitoring (survey) results to date indicate the status of an oligotrophic lake with the tendency of becoming mesotrophic at the end of summer and in fall, a period of the year that corresponds to the increase of number of tourists in the area and, consequently, with a highest level of pollution[131]. In addition, the water monitoring of the lake shows signs of municipal and industrial wastewater discharge, including agricultural inputs. This could be associated with the development of several economic activities in the area around the lake. Koplik has developed fishing activity and animal farms, while Zogaj is close to agricultural fields and tourism. Shiroke deals mostly with fishery activity.

7.1.3.2 Ohrid Lake

Ohrid Lake has been monitored nationally in two different stations, at the surface and at a depth of 150m. The GIZ have also positively contributed to the determination of water quality status of the lake[122]. During 2013– 2014 the GIZ[132] conducted monitoring was undertaken at three stations, which are all located in the single identified lake water body (Lin, Memlisht and Pogradec). Monitoring of biological elements together with an assessment of physico-chemical conditions was carried out during April, July, October and February, where possible, in accordance with the WFD guidelines.

The national monitoring results and the GIZ survey data reveal the following:

- Type Specific Reference Conditions for the lake are respresented as follows: Waters are well oxygenated (DO >7mg.l^{1}), alkaline in character (pH >7), and highly transparent (Secchi depth >10m). The lake is phosphorus-limited (N:P ratio >25:1) and naturally oligotrophic (total phosphorus= 4.0-4.5μg.l^{-1}). Consequently, phytoplankton abundance is low (chlorophyll-*a* concentration <3μg.l^{-1}). Phytoplankton community composition is typical for oligotrophic lakes, with Chlorophyta, Chrysophyta and Pyrrophyta dominating in the top 10 m of the water column, and small forms of Cyanophyta taking over between 10 and 30 m. However, the lake harbours highly specialised forms of pelagic diatoms which occur between

[131] http://rmbel.info/lake-trophic-states-2/
[132] Initial Characterisation of Lakes Prespa, Ohrid and Shkodra/Skadar: Implementing the EU Water Framework Directive in South-Eastern Europe (November, 2015)

20 and 50 m depth and become dominant between 40 and 150 m. The latter depth range would usually be considered to be below the euphotic zone[122].

- The lake is composed of three layers when it comes to temperature. At surface, the temperature was 19ºC, similar to air temperature. A significant change in temperature is noticed at depths of 60m and at 100m. As the temperature decreases with the increase of depth, the oxygen concentration increases. From the surface to a depth of 40m, the dissolved oxygen concentration is 8.9-10 mg/l, while the concentration remains constant at a depth of 60-100m (9.1-9.4 mg/l). At the third layer (100-150m) the O_2 concentration varies between 8.6-9.1 mg/l. The levels of O_2 in water are higher than the EQS for the fresh water (7mg/l) at all strata.
- The GIZ revealed that Heavy metal contents of sediments and water had been analysed within the framework of the Lake Ohrid Conservation Project. The level of pollution varied from moderate at Pogradec to severe at Hudenisht. Iron concentrations in the water column varied from 9.3 to 54.6 µg.l-1 and chromium concentrations from 1.0 to 17.9 µg.l-1. Nickel concentrations ranged from 4.9 to 12.3 µg.l-1, which is less than the Maximum Allowable Concentration (MAC)-EQS set by Directive 2013/39/EU (34 µg.l-1) but higher than the Annual Average (AA)-EQS of 4 µg.l-1.
- Chlorophyll-a concentrations varied between 0.48 µg.l-1 at Pogradec and 1.91 µg.l-1 at Lin. Trophic state index (TSI) results for most sampling stations and seasons were ≤ 30, indicating oligotrophic conditions.
- The vast majority of the Albanian sampling stations of the lake littoral carried out by the GIZ[122] showed poor or even bad ecological status.
- The macrophyte indices found on the west shore of the lake indicated oligotrophic to oligo-mesotrophic conditions with the exception of a site near to the peninsular village of Lin where conditions were mesotrophic. The trophic state was even more elevated (mesotrophic to meso- eutrophic) along the more urbanized south shore of the lake.
- In terms of risk of failing to achieve good ecological status, based on the GIZ studies, individual BQEs were as follows: Phytoplankton – not at risk, aquatic flora, benthic fauna and fish fauna are all regarded to be 'probably at risk'[121].
- The lake is also characterized by high transparency (9.7m), which indicates an oligotrophic status.
- As to P-total, the concentration increases proportionally with depth. The highest values are measured at a depth of 120m, indicating a mesotrophic status of the lake (0.027mg/l). A similar tendency is also noticed with nitrates and ammonium. The concentration increases with depth with the highest values measured at 100-150m. However, unlike P-total, nitrates indicate an oligotrophic state of the lake.
- COD values are high at surface. However, the overall values show also an oligotrophic state of the lake.
- In both the stations, the maximum concentrations of chlorophyll *a* were measured in spring, while in the rest of the seasons the concentration decreased gradually.
- Based on the monitoring results, Ohrid Lake can be classified as an oligotrophic lake with the tendency to mesoprophism. The lake is sensitive to human activities that affect its state.

According to the monitoring and survey data collected to date shows that water quality of Lake Ohrid is affected by agriculture and industrial activities, especially the metallurgical, chemical and mining industries. Several mines are located close to the lake (2.5 km), whereas four other coalmines (Alarup, Petrush, Vërdovë and Dardhas) can be found within a distance of 10 km from the lakeshore. Other threatening factors for water quality are chromium mining and naturally occurring serpentine soil from around Pojskë (Pogradec). The latter is potentially toxic due to its high content of heavy metals and high nickel availability.

About 10 % of waste waters are directly discharged into the lake without being treated due to constructions distributed along the shore without any planning, especially touristic buildings (hotels and restaurants). In the villages along the lake shore there is no sewage system except for Lin village which discharges the sewage into a wetland located north of it. Furthermore, illegal landfills and dumps are potential sources of diffuse pollution. Especially Çerrava landfill has an elevated risk potential.

7.1.3.3 Lake Prespa

The GIZ have contributed to the determination of water quality status of Lake Prespa[122]. During 2013– 2014 the GIZ[133] conducted monitoring was undertaken at two stations located in the single identified lake water body (Gollomboc and Pustec (Liqenas). Monitoring of biological elements together with an assessment of physico-chemical conditions was carried out during April, July, October and February, where possible, in accordance with the WFD guidelines.

The GIZ survey data reveal the following:

- Type Specific Reference Conditions for the lake are respresented as follows: Waters are relatively well oxygenated (DO 6–7 mg.l-1), alkaline in character (pH >7), reasonably transparent (Secchi depth >5 m), with moderate nutrient levels (total phosphorus = 15–25 µg.l-1; total nitrogen = <3 mg.l−1), and a moderate to high abundance of phytoplankton, (chlorophyll-a =>3.8 µg.l−1). Phytoplankton is the most characteristic feature of the pelagic zone of the lake, while macrophytes are characteristic of the littoral zone[125].
- The planktonic diatom flora is surprisingly uniform andvery rich in taxa. Predominant species are Cyclotella ocellata, Stephanodiscus rotula, Diploneis maule and Camplylodiscus noricus. However, as with the vast majority of lakes, the overall composition of the phytoplankton community changes on a seasonal basis. High densities of large and filamentous microalgae (Anabaena, Microcystis) occur in surface water during summer, indicating an ecosystem enriched with nutrients.
- In spring 2014, diatoms were by far the most abundant and species-rich group, comprising about 57 % of all algal cells and 60 % of the 30 species identified. Dinophytes (dinoflagellates) and chrysophytes (golden algae) were the second and third most abundant groups, respectively. Cyclotella ocellata and Gymnodinium mirabile were the most abundant species, comprising 80 % of all algal cells. However, overall abundance was low, ranging from 2.3 x 104 to 2.7 x 104 cells.l-1 at Gollomboc and Pustec, respectively.
- The Trophic State Index (based on chlorophyll-a) indicated oligotrophic to mesotrophic conditions at Gollomboc and predominantly mesotrophic conditions at Pustec. At both sampling stations, TSI values were highest in autumn, i.e. after the peak of the growing season, and lowest in spring. The predominance of mesotrophic conditions was also supported by transparency values of >40.
- The Macrophyte Index (average of all depth strata) was 3.85 at Gollomboc and 3.90 at Pustec, indicating high to very high nutrient enrichment and eutrophic conditions at both sites.
- During autumn 2013, both Albanian sites of the lake littoral showed bad ecological status. Average Score Per Taxon (ASPT) values amounted to 3.6 and 3.4, respectively, for Gollomboc and Pustec.Species richness and abundance were also low, indicating stressed conditions. The results suggest that macrozoobenthos at Lake Prespa is adversely affected by anoxic conditions resulting from eutrophication. Preliminary results from the spring sampling campaign in 2014 showed a slight recovery during winter. However, overall conditions remained poor or bad, depending on water depth.

The GIZ study concludes, with respect to physico-chemical conditions, higher concentrations of nutrients, BOD5 and COD are thought to be caused mainly by the discharge of untreated or insufficiently treated waste water into the lake. A higher degree of littoral nutrient/organic enrichment than that experienced in the deeper central part of the lake is usually an indicator of the pollution originating from more localised sources.

The GIZ data for the phytoplankton community suggests oligotrophic to mesotrophic conditions. This may not be so far from reference conditions. However, the presence of large and filamentous forms of phytoplankton as well as high Macrophyte Index values leave no doubt that eutrophication has widely taken place beyond natural levels owing to anthropogenic inputs of organic matter and nutrients. The poor status of benthic macroinvertebrates in the littoral zone, which become negatively affected by low oxygen status in summer,

[133] Initial Characterisation of Lakes Prespa, Ohrid and Shkodra/Skadar: Implementing the EU Water Framework Directive in South-Eastern Europe (November, 2015)

indicates that the objective of good ecological status is likely to fail to be achieved for this quality element as well. This conclusion was further corroborated by results for the biological element fish, which revealed the abundance and predominance of non-native species in both countries.

7.1.4 Marine water monitoring

The sea and coastal waters are monitored at beaches in Velipoje and Shëngjin, the sea and coastal waters were monitored for *Escherichia Coli* and *Enterococcus Intestinalis*. Both beaches indicted a status of very good quality of water as shown in Tables 7.3 and 7.4.

Table 7.3: Microbiological Monitoring at Velipoje Beach[134]

No.	Beaches	2012		2013		2014		2015	
		Concentration (per 100 ml)							
		IC-90%	EI-95%	IC-90%	EI-95%	IC-90%	EI-95%	IC-90%	EI-95%
1	Belavista	24	8	76	40	58	50	5	8
2	Hotel Adriatiku	104	11	76	45	85	41	4	11
3	B.R.Fantazia	148	33	127	40	186	207	6	29
4	Hyrja në plazh	347	474	66	93	204	207	13	29
5	Pallatet e reja	130	49	68	57	100	91	12	16
6	Lokali Dolce Vita	87	53	38	16	166	159	13	25
7	Para lagunës së Vilunit	49	7	16	40	59	54	4	15

Table 7.4: Microbiological Monitoring at Shëngjin Beach[135]

No.	Beaches	2012		2013		2014		2015	
		Concentration (per 100 ml)							
		IC-90%	EI-95%	IC-90%	EI-95%	IC-90%	EI-95%	IC-90%	EI-95%
1	Kabinat e vjetra	34	20	44	28	91	83	28	35
2	Hotel Dora	28	16	84	30	84	81	31	43
3	Hotel Kristian	22	13	33	15	63	62	20	34
4	B.R Gjahtari	16	5	27	11	204	375	52	72
5	Kune	12	9	20	10	195	365	23	37
	EQS/100 ml	250	100	250	100	250	100	250	100

In 2015, in both Velipoje and Shengjin, there has been an increase of beaches with very good water quality. For the year 2015, Velipoje and Shengjin were classified as the beaches with the cleanest water in Albania (Class A)[136].

[134] Source: INSTAT (Ministry of Environment)
[135] Source: INSTAT (Ministry of Tourism and Environment)
[136] AKM, 2015

7.2 Rapid Biological Assessment (RBioA) in the Drini-Buna River Basin

A field-sampling program targeting the aquatic macroinvertebrates was carried out in Drini-Buna River Basin during 23-27 November 2016. The general results, names and geo-coordinates of the investigated river and lake localities are presented in Table 7.5. The details of the approach to RBioA sampling are provided in Annex 3.

A general lesson learned during the sampling program was that high-water level and discharge resulted in the difficulty of littoral sampling in both the rivers and the reservoir sections. Beside this difficulty, it must be borne in mind that stable macroinvertebrate communities cannot develop on the accessible littoral zone of the running waters (especially in case of reservoir sections) during the limited duration of increased water level periods.

Table 7.5: Sampling Locations and RBioA Results in the Drini-Buna River Basin[137]

Locations	Coordinates		RBioA evaluation (%)[138]	Comments on Ecological Status
	Latitude	Longitude		
Rivers				
White Drini, Kukës	42.10007	20.41805	N/A	Typical headwater part of lake, where RBioA is not applicable.
Black Drini, Topojan bridge	41.57905	20.43555	95	High ecological status and potential type specific biological reference conditions
Black Drini, u/s Resk	41.93505	20.34257	95	High ecological status and potential type specific biological reference conditions
Black Drini and Tributary Confluence			75	Good ecological status
Tributary of Black Drini			80	Good ecological status
Gjadrit River, after Vau i Dejes	42.00183	19.63435	80	Good ecological status, headwater part of small reservoir
Kir River, u/s confluence to Drini River	42.09415	19.54151	95	Specific type of floodplain (temporary) calcareous rivers with river channel migration! High ecological status
Drini River, Lezhë	41.76558	19.63309	55	Moderate pollution status with toxicity in sediments
Buna River, d/s Shkoder Lake, near to old bridge	42,04455	19,48473	55	Moderate pollution status
Buna River, lower section	41,99305	19,43809	50	Moderate ecological status

[137] d/s – downstream, u/s - upstream

[138] Meaning of Code Colours: Blue= High Status; Green=Good Status; Yellow=Moderate Status

Locations	Coordinates		RBioA evaluation (%)[138]	Comments on Ecological Status
	Latitude	Longitude		
Lakes				
Shkodër Lake, at Shiroke	42,05845	19,45979	N/A	Expert judgment biological assessment should be good ecological status for this specific lake ecosystem

7.2.1 Characterization of the Drini-Buna River Basin

7.2.1.1 White Drini (Kukës)

This is not a typical river because the investigated section is a headwater reservoir part located at an altitude of approximately 300 m. It is characterized by big water discharge and water level fluctuations. A stable littoral community cannot develop because changes in water level. The dominant faunal element is zooplankton with water mites (Hydracarina). The RBioA is not applicable in such conditions.

Figure 7.1: Terrestrial Plants on the Bank of the Reservoir Section of the White Drini at Kukë

7.2.1.2 Black Drini (Upstream of Topojan bridge)

The sampling site of the river in this fast-flowing section is situated over 400 m above sea level where large boulders, stones and cobbles are the main substrate components of the river bed. The river section here is generally natural; the colour of water is greyish due to the suspended solids coming from the erosion.

The Black Drini River upstream near the Topojani Bridge provided an RBioA close to the 'reference conditions' in terms of pollution pressure. Macroinvertebrates are very sensitive indicators of organic load or mixed pollution (although not as effective for hydromorphological alterations). This sampling site can be used as a representative river ecosystem for semi-mountainous conditions.

Figure 7.2: The Bank Structure of the Black Drini at Topojani Bridge

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7.2.1.3 Black Drini (Upstream of Resk)

This stretch of Black Drini River is in natural conditions. The river flows through a mountain region, with the bottom substrate consisting of stony material (from large boulders to pebbles fraction) and some wide stretches with heavy sand deposition indicating a strong erosion pressure. The Black Drini River has very large water flow after a flood. This river stretch is unpolluted with a RBioA of 95 % (= high ecological status) and type specific reference conditions for both macroinvertebrates and fish.

Figure 7.3: Black Drini and a Small Branching Tributary Near Resk

7.2.1.4 Gjadrit River (After Vau i Dejes, Reservoir Section)

This sampling station is a lowland river with fine substrata and very slow velocity (headwater part of a ‘Mjede’ reservoir after the large ‘Vau i Dejës’ Reservoir). The RBioA index indicates good status with some local influences (RBioA = 80%). It must be noted that additional data are necessary for validation of this status.

Figure 7.4: Drini River at Vau i Dejes with Inundated Bank

7.2.1.5 Kir River (Upstream Confluence to Drini River)

The Kir river downstream is a temporary calcareous river with changing riverbed and gravel/cobble substrata (river channel migration). This river type is specific for Albania, and it needs special efforts for identification of biological reference conditions as well as for calibration of biological assessment methods. The Kir river downstream is both a meandering river and a braided stream with a serious flood risk (floodplain river stretch).

More field data is needed to validate the RBioA score because of lack of representative sampling of macroinvertebrates. The potential biological conditions are close to reference conditions, i.e. without pollution pressure. Benthic macro-invertebrate communities are usually damaged by the annual river channel migration, droughts and sedimentation/erosion processes. The RBioA index indicates a high status (additional data are necessary for validation of this status), and it is probably close to reference conditions in this specific case.

Figure 7.5: Sampling in a Branch of the Kir River

7.2.1.6 Drini River (Lezhë)

The Drini river downstream (before the estuary) is a typical ’large lowland river’ with fine substrata (mud, silt, sand). Specific benchmark conditions are presented for moderate status with some toxic influences. The velocity is very slow in this non-riffle river stretch. This is the longer (and smaller) arm of Drini River (after the bifurcation in Shkoder lowland).

The RBioA index value is 55 %, which equates to moderate quality with potential toxic influence in sediment.

The Drini river downstream (before the estuary) is a typical 'large lowland river' with fine substrata (mud, silt, sand). Specific benchmark conditions are presented for moderate status with some toxic influences. The velocity is very slow in this non-riffle river stretch. This is the longer (and smaller) arm of Drini River (after the bifurcation in Shkoder lowland).

The RBioA index value is 55 %, which equates to moderate quality with potential toxic influence in sediment.

Figure 7.6: Drini River at Lezhë (5.5 km before the estuary to the Adriatic Sea)

7.2.1.7 Buna River (Downstream of Shkoder Lake, Near to Old Bridge)

The Buna river (after Shkoder Lake) is a specific case of 'large lowland river'. The value of RBioA could be increased if sampling is better (lower water level) but more field data is needed. The RBioA index value is 55%, which represents a moderate status.

Figure 7.7: The Buna River Near Shkoder Lake

7.2.1.8 Buna River (Lower Section)

This lowland river (specific for Buna River) is identified with a gravel and sand substrata. The value of RBioA could be increased if sampling is conducted during a lower water level. More field data is needed to validate the RBioA score. The RBioA index indicates a moderate status (50%).

Figure 7.8: Buna River Downstream

7.2.1.9 Shkoder Lake (At Shiroke, Near Lake Outlet)

The biological assessment can be identified as good ecological status for this specific lake ecosystem according to an expert judgment approach. The RBioA system is not adapted yet to lake conditions, and is therefore not applicable. It is a very large lowland lake (specific type for Shkoder Lake). A special RBioA system for lakes must be adapted for the conditions of Shkoder Lake in future.

7.3 Conclusions Related to Surface Water Quality Status in the Drini-Buna River Basin

The overall the NEPA monitoring results and the field exercise carried under the Project indicate the following:

- General water quality on the Drini-Buna River Basin show that there is an increasing tendency for discharge of municipal, industrial wastewater and agricultural inputs into the river system, including the lakes.
- The highest impact of pollution is noticed in Drini-Lezhe, the Drini section in Shkoder, and also in Topojan, which are the most populated areas. Drini-Lezhe remains the most polluted section of the Drini-Buna River Basin.
- The impact of pollution is also high in Lake Prespa, Ohrid Lake and Lake Shkoder, but that impact remains seasonal. The months of summer where the number of the tourists reached its peak in all of the three lakes results in an increase of algal growth, which is an indicator of an overload of nutrients fed to the lake via wastewater discharge.

7.4 Assessment of Groundwater Quality

The Drini-Buna River Basin is characterised by three main types of aquifers: Quaternary, Carbonate and Magmatic. A detailed map of the main aquifers in the Drini-Buna River Basin is shown in Section 3.6, Figure 3.8. A quantitative assessment of groundwater is also provided in Section 3.6.

7.4.1 Shkoder quaternary aquifer

The Shkoder Quaternary Aquifer is monitored in Dobraç, Grude-Fushe, Old Shtoj and the Big Church (Shkoder) (Table 7.6).

Table 7.6: Ground water monitoring stations/wells in the quaternary aquifer of the Drini-Buna River Basin[139]

No.	Underground Water Monitoring Station/Wells
1	Shkodër-Dobraç
2	Grude, Fushë
3	Old Shtoj
4	The big church, Shkodër

The stations monitor various parameters that include the water level and flow, pH, temperature, total hardness, Na, dry matter, Ca, Mg, Fe, NH4, Cl, SO_4, NO_3, NO_2 and O_2 (Table 7.7). Microelements (Nickel, Magnesium, Manganese, Zink, Lead, Copper, Cobalt, Chromium, and Cadmium) are monitored only in Dobraç in Well 1. Each station is monitored twice a year (May and October).

[139] Source: AKM, 2015; Preparation: Mott MacDonald

Water quality of the water extracted from the quaternary aquifer can be summarized as follows:

- The pH of the aquifer is weakly alkaline, ranging from 7.28 – 8.03.
- Total mineralization in the aquifer varies from 140-326 mg/l. The waters can be classified as fresh waters. In Dobrac, which supplies Shkoder, the values for total mineralisation fluctuate from 296-360 mg/l. General mineralization on all the network monitoring is within the standard norm of Albania.
- In terms of total hardness this aquifer is classified with 'medium' hardness to waters with soft hardness. Total hardness varies from 4.42 - 11.42 Fp.° gj.
- The iron content ranges in value from 0.01-0.17 mg/l. Contents over years have no tendency to significantly increase.
- The content of NH_4 of the aquifer varies from 0.01-0.11 mg/l. The content of ammonia in most analysis is not present.
- The average NO_3 content varies 0.72-8.33 mg/l.
- The average NO_2 content varies 0.002-3.6 mg/l. The nitrite content varies sporadically around the values 0.05 mg/l and often above the recommended standards.
- The water quality of the aquifer can be classified as 'good'.

Table 7.7: Parameters monitored in groundwaters

No.	Parameters Monitored in Groundwater (mg/l unless stated otherwise)	Parameters of the Albanian legislation	Parameters of the EU legislation [140]
1	Flow measurement (l/s)		
2	Hydrogen Ion (pH unit)	6.5-9.5	6.5-8.5
3	Temperature (^{o}C)	8-20	12-25
4	Total hardness (Fp.° gj)	10-25	>60
5	Mineralization	1,200	
6	Sodium (Na)	20-200	20-150
7	Potassium (K)	10-12.0	
8	Calcium (Ca)	75-200	100
9	Magnesium (Mg)	20-50	30-50
10	Iron (Fe)	0.2-0.3	0.05-0.2
11	Ammonium (NH_4)	0.05-0.5	0.05-0.5
12	Chloride (Cl)		25
13	Sulphate (SO_4)		25-250
14	Nitrate (NO_3)	25-50	25-50
15	Nitrite (NO_2)	0.5	<0.1
16	Level of Oxygen (O_2)		
17	Heavy Metals (Ni, Mn, Zn, Pb, Cu, Co, Cr, Cd)		
18	Dry Residue	500-1000	1500

[140] Quality standards for drinking water are set out in DCM Nr. 379, dated 25.5.2016. This decision transposes the Directive 98/83/EC

Shkoder Aquifer was also monitored for heavy metals in Dobraç in 2015, as shown in Table 7.8. The results show the presence of Zn and Pb in the aquifer in levels that exceed the EQS for drinking water, indicating the possible infiltration of industrial waters in the aquifer or over-withdrawal from legal and illegal wells, which can also lead to pollution. In fact, recent studies have shown that the aquifer is susceptible to pollution from agricultural inputs used in the areas nearby due to the thin layer of protection between the surface and the aquifer, especially in Dobraçi. Pollution of the aquifer can also be caused by the intensive withdrawal of the water by the city or for other uses.

Table 7.8: Shkoder aquifer: heavy metal monitoring results at Dobraç, 2015[141]

Parameter	Detected concentrations (µ/l)	EQS (µ/l)
Ni	6	20
Mn	13	50
Zn	5	3
Pb	11	10
Cu	2	50
Co	8	2
Cr	1	50
Cd	1	5

7.4.2 Carbonatic aquifer

Water quality of the water extracted from the carbonatic aquifer can be summarized as follows:

- Total mineralization in aquifer varies from 142-280 mg/l. The waters of this aquifer are fresh waters.
- Total hardness varies from 4.42-10.01 Fp.° gj in Gurra e Kolesjanit, Kukës, Tushemit, Lin Pogradec, Syri i Sheganit, Shkoder springs. The hardness is within the Albanian standard.
- The pH of groundwater is weakly alkaline with a range from 7.4-7.69.
- The content of Ca, Na, K, Mg, Cl, SO_4 and total dissolved solids are all within the Albanian and EU standards.
- Levels of NH_4, NO_3 and NO_2 are within the standards required for drinking water.
- The water quality of the carbonatic aquifer is classed as ‘very good’.

7.4.3 Magmatic aquifer

For this aquifer, the only area of interest for groundwater exploitation lies in the massiv Krrabi where there are sources with a discharge of 5-25 l/s.

- The waters classified as fresh waters with a mineralisation of 250-350 mg/l.
- Water this aquifer as classified as soft waters with a range of total hardness varying from 8-10 Fp.° gj. The hardness is within the Albanian standard.
- The pH of groundwater is weakly alkaline, with a range of 7.5-8.0.
- Waters do not contain NH_4, NO_3 or NO_2.
- The water quality of the magmatic aquifer is classified as ‘very good’.

[141] Source: AKM, 2015; Preparation: Mott MacDonald

8 Water Infrastructure

8.1 Introduction

A key issue in the WFD is the introduction of a river basin management planning system. This will be the key mechanism for ensuring the integrated management of rivers, canals, groundwaters, modified water bodies, lakes, reservoirs as well as transitional and coastal waters.

This section provides information on the status and planning for water management and infrastructure in the Drini-Buna River Basin, which includes water supply, wastewater treatment, irrigation dams and hydropower plants.

8.2 Water Supply and Wastewater Treatment

The Albanian government has taken clear steps towards integrated management of water resources. The service sector of water supply, waste collection, disposal and treatment of wastewater is one of the sectors of particular importance and sensitivity, as it directly affects the quality of life of citizens.

In 2014, the Albanian Government started to implement one of the most important reforms on the local administration in order to improve the local governance and to increase efficiency, (Law no.115/2014 “For new administrative territory of local authorities in Republic of Albania”). The administrative reform reorganized the 373 existed Local Government Units (LGUs) into 61 LGUs (Municipalities). The main purpose of the reform is to enhance accountability by transferring service obligations and rights to the local government level. Amalgamation of LGUs is required in order to achieve a scale sufficient to attract the core competences needed to provide these services.

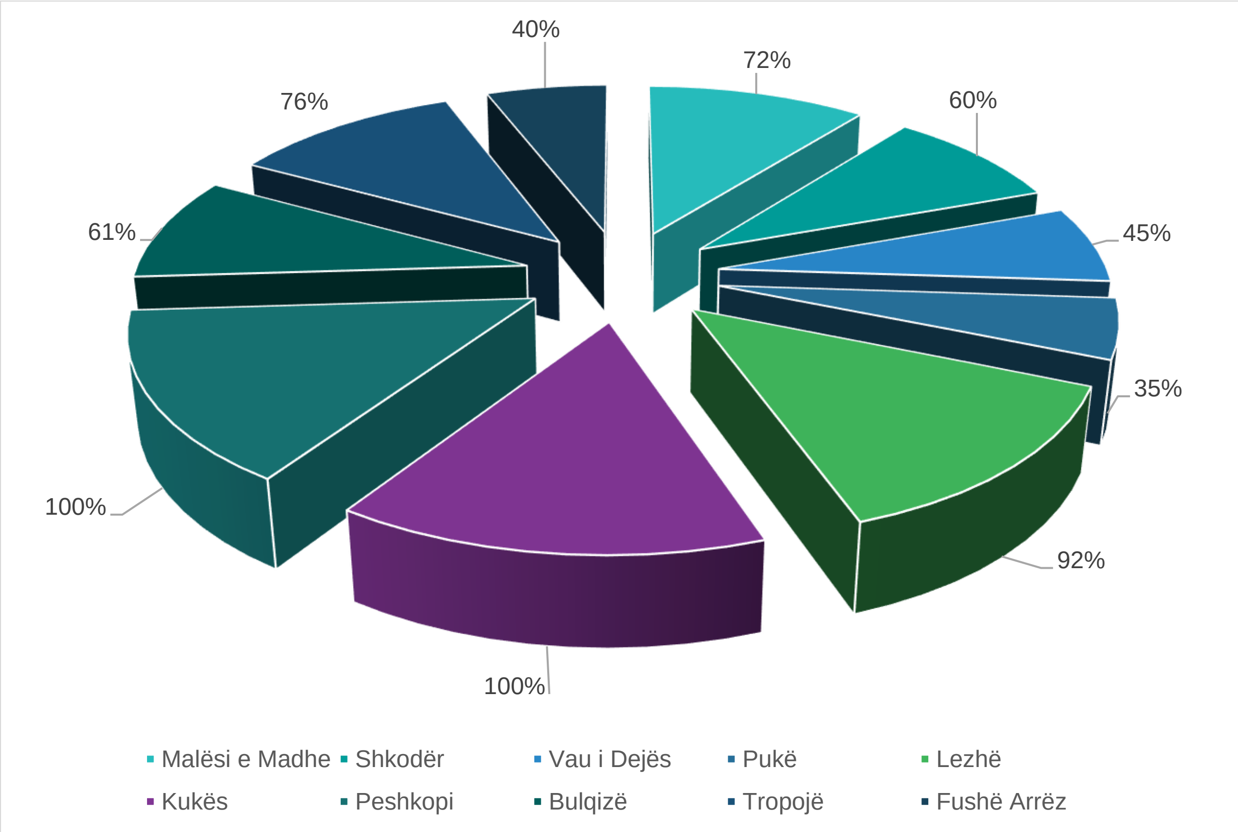
The Government has proposed alignment of the current water sector with the newly created LGUs in such a manner that one LGU has only one water supply and sewerage Utility, which is responsible for water and sewerage services throughout the territory of the LGU. This requires:

- A slight increase in the number of utilities from 58 licensed (which covered 80 % of territory with water supply service and 45 % with sewerage service) to 61 in national level, (which will be responsible to cover all territory with both services).
- A revision of utilities’ service areas will tend to match the limits of newly created LGUs. Water supply and sewerage utility of each city may have more than one water supply and sewerage network from previous organisation under the respective Municipality, offering services to different area of the city.

In general, the current management service deliver provides a poor service at a low cost, with only the Utility of Pogradec delivering a water supply close to 24hrs per day. Outside the previous service areas of the existing utilities in the so-called “out of jurisdictional areas”, service has been provided by communal systems and there is limited information available about the quality and quantities of water available. As part of the local government reform these “out of jurisdictional areas” will become the responsibility of the new Local Government Utilities.

Figure 8.1 shows the percentage of population served with water supply for each Municipality part of River Basin. A summary table of water supply and sewerage utilities for each municipality is provided in Economics of Water Use - Section 11.5, Figure 11.12.

Figure 8.1: Population served with water supply services for each city in the Drini-Buna River basin[142]



The rate of population covered with services varies from 35% for Puka Municipality to 100% for Peshkopia and Kukes. But even though the service may cover all areas, the daily time of services is in most cases is less than 24 hours. The reason of limited services is different from one city to another, but mismanagement and water losses are clearly apparent.

Due to the implementation of Decision 342 from May 2016 of the Council of Ministers of Albania[143], related to municipality boundaries and inventory of infrastructure, the locations of infrastructural bodies in each catchment will updated accordingly for delivery of assets to each municipality. This process was expected to be complete by 31st December 2016. The transfer process of assets to the new administration from local service providers to the licensed Utility, which will be responsible for the entire LGU territory, is still on-going.

On implementation of DCM no.63, date 27.01.2016 “On the reorganisation of operators that provide drinking water, collection, removal and treatment of wastewater services”, until the end of 2016, each newly formed LGU was expected to lead the process of assessment and registration of water supply and sewerage systems in their territory. Subsequent to the assessment and registration, the LGUs are required to transfer the assets and administration process and responsibility to deliver water supply and sewerage service to their respective utility. After finishing this process, the Utility will have to apply for new license in order to include all extended service area. The Utilities also need to prepare a business plan in order to harmonize in due time the service standards and tariffs of services.

[142] Water Supply and Sewerage Master Plan for Albania, financed by KfW; iC, igr – January 2013

[143] DCM no. 63, dated 27.01.2016 "On the reorganization of operators that provide drinking water, collection, removal and treatment of wastewater services".

According to information received from Water Regulatory Entity for the year 2016, only 8 utilities have received their licences for services, as is shown in and the rest are in process of completion of law requirements.

The Ministry responsible of Infrastructure is responsible for the sector of water supply and sewage systems in the planning of investment funds from the state budget and international financial institutions. For planning investment in the water supply and sanitation sector, a National Master Plan was formulated (financed by KfW) and adopted at the meeting of the National Water Council (December 2015), Under the water sector reforms, the Mayor of the Municipality (or Mayors if the Utility is owned by and serves more than one Municipality) will have considerably greater oversight authority to the management of the utility.

A transition plan for the service sector of water supply, waste collection, disposal and treatment of wastewater is planned to progress as follows:

- Provision of water supply and sanitation services shall be aligned along administrative territorial lines based on the Territorial Administrative Reforms (TAR).
- All services shall be provided by utilities formed as publicly owned joint stock companies, which provide both water supply and sewerage services.
- General Director of the utility hires the Technical Director and the Commercial Director of the Utility.
- Mayor serves as the shareholders' assembly and is the President of the assembly.

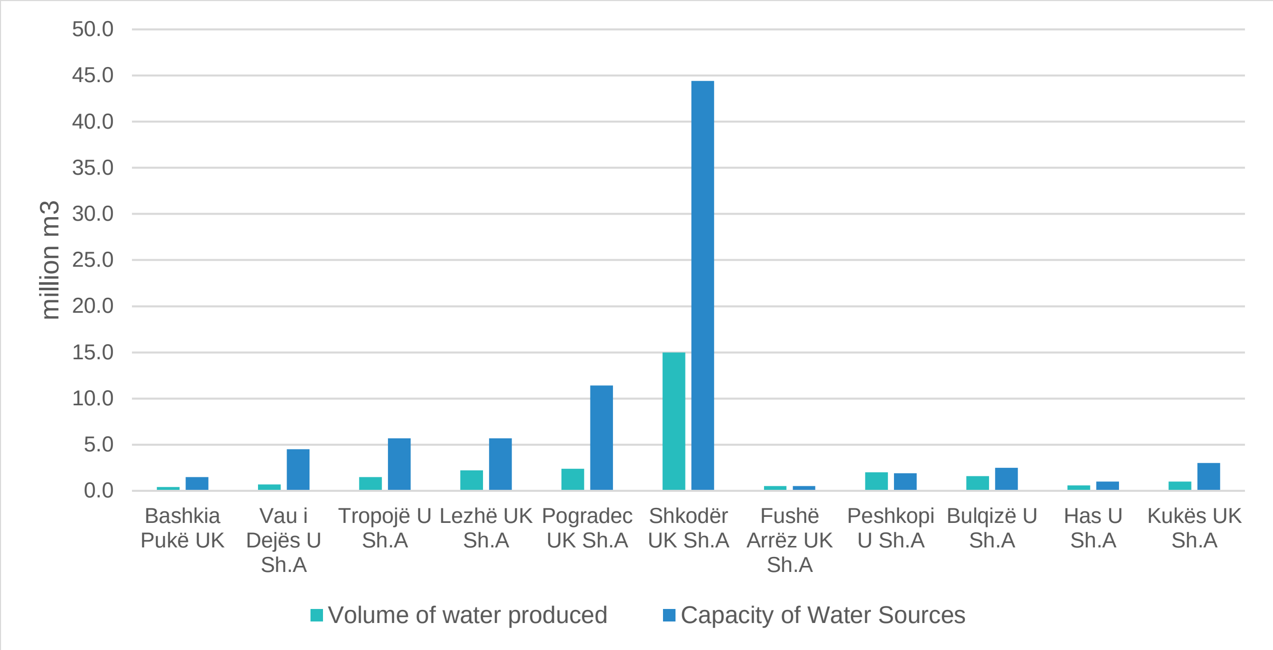
A National Water Supply and Sewerage Agency, (NWSSA) has been set up in 2016 with DCM no.504, date 06.07.2016 "For establishing of a National Water Supply and Sewerage Agency". NWSSA is a state body specialized in the field of water supply and sewerage and wastewater treatment. It acts as technically supports policies to the Ministry responsible of Infrastructure responsible for water infrastructure, in accordance with legislation and policies set out in the sectorial strategies, and relevant policies for water management and environmental protection of water quality.

NWSSA fulfils its objectives as part of its inside structure organizational through the Technical Directorate, Department of Commerce, Department of Foreign Projects, Monitoring Directorate, and three regional departments. Within its legal and technical authority, the NWSSA coordinate and monitor all sectorial activities, providing service to supply drinking water, sewerage and wastewater treatment, in cooperation with all institutions in the central and local level.

In the Drini-Buna River Basin there have been historically 43 water supply and sanitation services. However, after the reform only 12 water supply and sanitation services will be licensed, i.e. Shkoder, M. Madhe, V. Dejës, Pukë, Kukës, Has, Tropojë, Lezhë, Peshkopi, Bulqizë (partially), Librazhd (partially) and Pogradec (partially).

Figure 8.2 shows the capacity source and water produced in each city. Outside the previous service areas of the existing utilities in the so-called "out of jurisdictional areas", service has been provided by communal systems and there is limited information available about the quality and quantities of water available.

Figure 8.2: Water capacity and water use in each city of Drini-Buna River Basin[144]



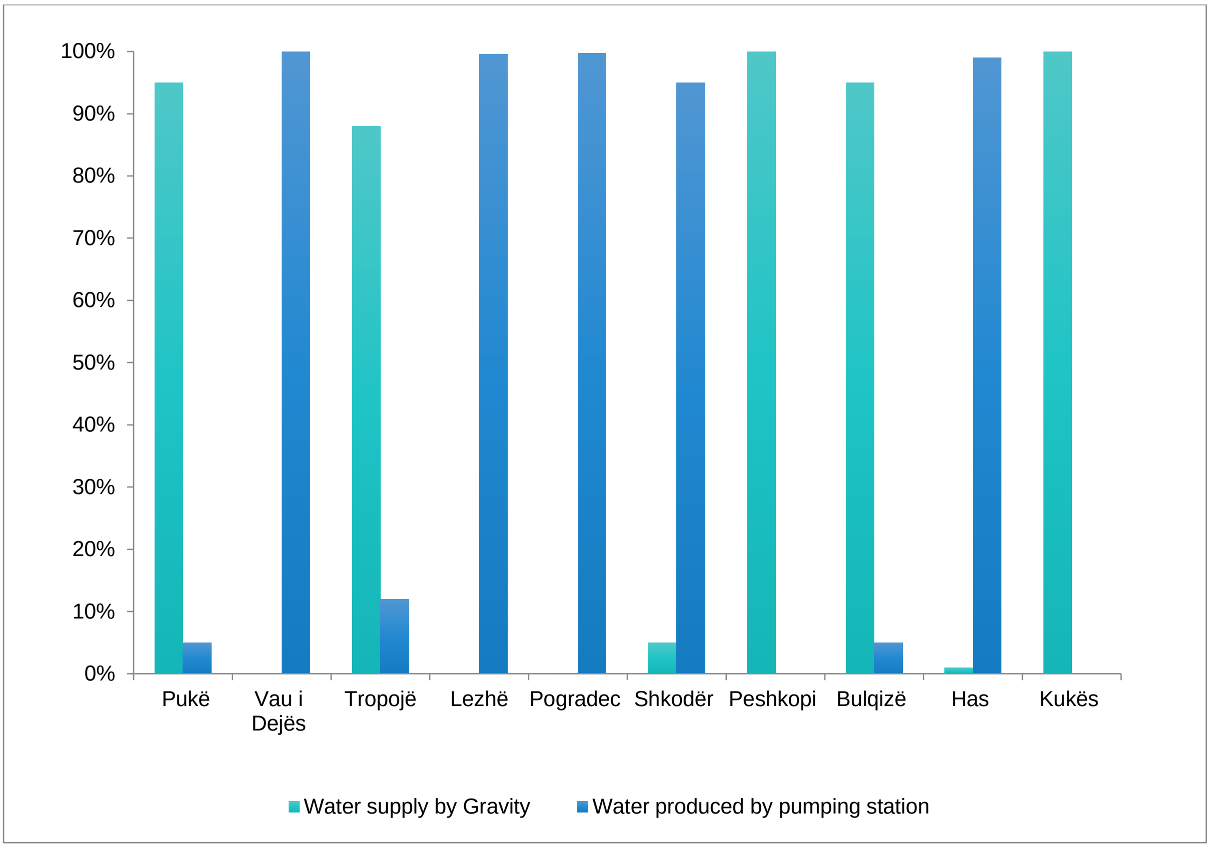
The estimated water demand calculated for the population living in the jurisdictional area of the monitored water companies, based on a daily norm per capita demand of 150 litres, with an allowance of 20% water losses. This is an average consideration although there are differences between Utilities. It is important to note that currently water losses are very high in most Utilities.

In addition to the safety measures applied at water sources, all water Utilities in the Drini-Buna River Basin use chlorination treatment to eliminate contamination from microorganisms. The safety of the water supply as per the requirements foreseen in DCM No. 379, dated 25.05.2016, has to be monitored through internal control of the water supplier, and outside control by the Regional Public Health Structures. The Minister responsible for health defines the minimal facilities and frequency of control by the Regional Public Health Structures as well as the minimal methodology and frequence of inspection by the State Health Inspectorate. Most tests are for residual chlorine at various points of use and for faecal coliform bacteria. The implementation of the legal requirements of this regulation is inspected through State Health Inspectorate's care."

Groundwater is the main water source for drinking purposes. In 2015, the percentage of water provided to cities in the River Basin using pumping station and gravity was approximately 56% and 44%, respectively, as shown in Figure 8.3. The data shows that there are 6 cities using more than 90% drinking water by pumping station, i.e. a higher water tariff in relation to the other cities where the percentage of gravity drinking water use is higher.

[144] Source: Albania Water Supply and Sanitation Sector Financing Strategy, (COWI)

Figure 8.3: The percentage of water supply provided by pumping and gravity in each city of the Drini-Buna River Basin[145]



There are 6 cities using more than 90% drinking water by pumping station, which are related to the high-water tariff in related to the other cities where the percentage of gravity drinking water use is higher.

The high percentage of households using pumping station for drinking water producing is directly affecting the water supply cost services for respective cities, creating difficulties to achieve reasonable percentage on revenue collection and in the same time extra cost and difficulties on maintenance of equipment and system itself.

The location of the main water supply points in the Drini-Buna River Basin is provided in Figure 8.4. An inventory of the known springs is shown in Figure 8.5.

[145] Source: National Agency of Water Supply and Sanitation

Figure 8.4: Location of the main water supply points in the Drini-Buna River Basin

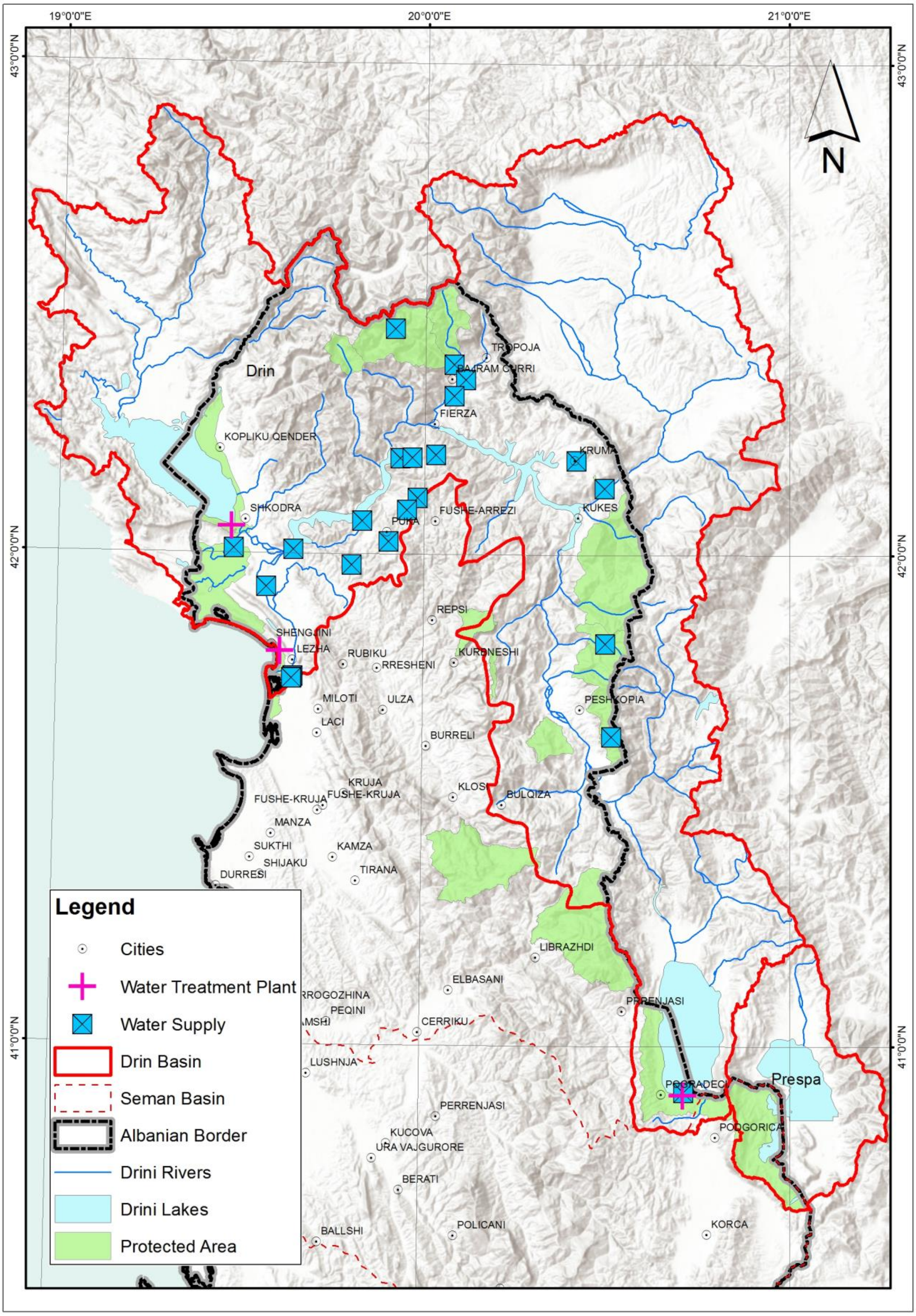
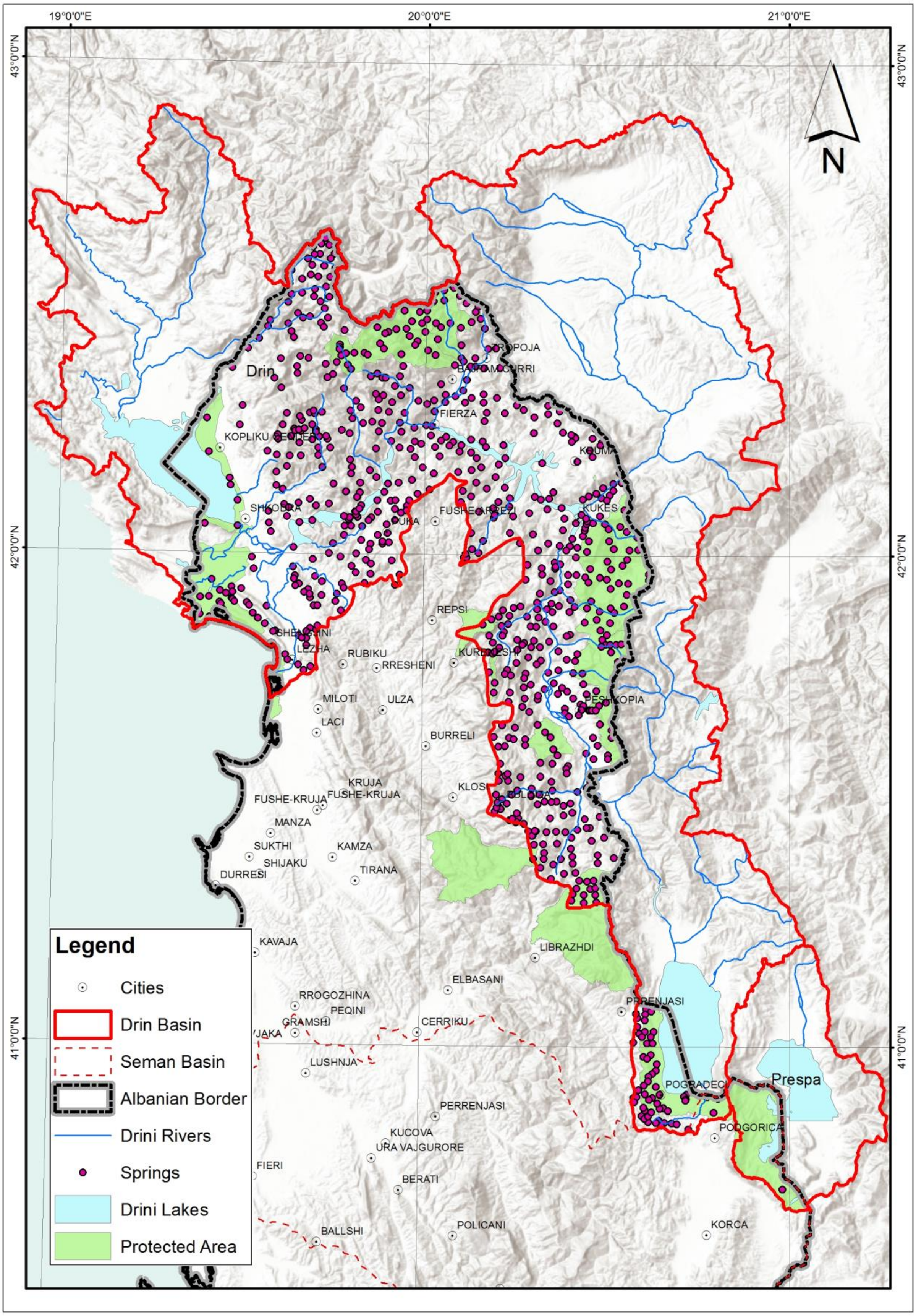


Figure 8.5: Location of the known springs in the Drini-Buna River Basin



In the cities of Has, Bulqize, Tropoje and Vau I Dejes the wastewater network is completely missing. The other cities are mainly covered by wastewater network but still sub urban areas are not yet covered with this service. In this condition, the use of septic tanks is the most common solution. Figure 8.6 shows the number of connection to the wastewater network in the Drini-Buna River Basin. Table 8.1 reveals the status of the wastewater infrastructure for the main Municipalities in the Basin.

Figure 8.6: Wastewater connections to the wastewater network for cities in the Drini-Buna River Basin[146]

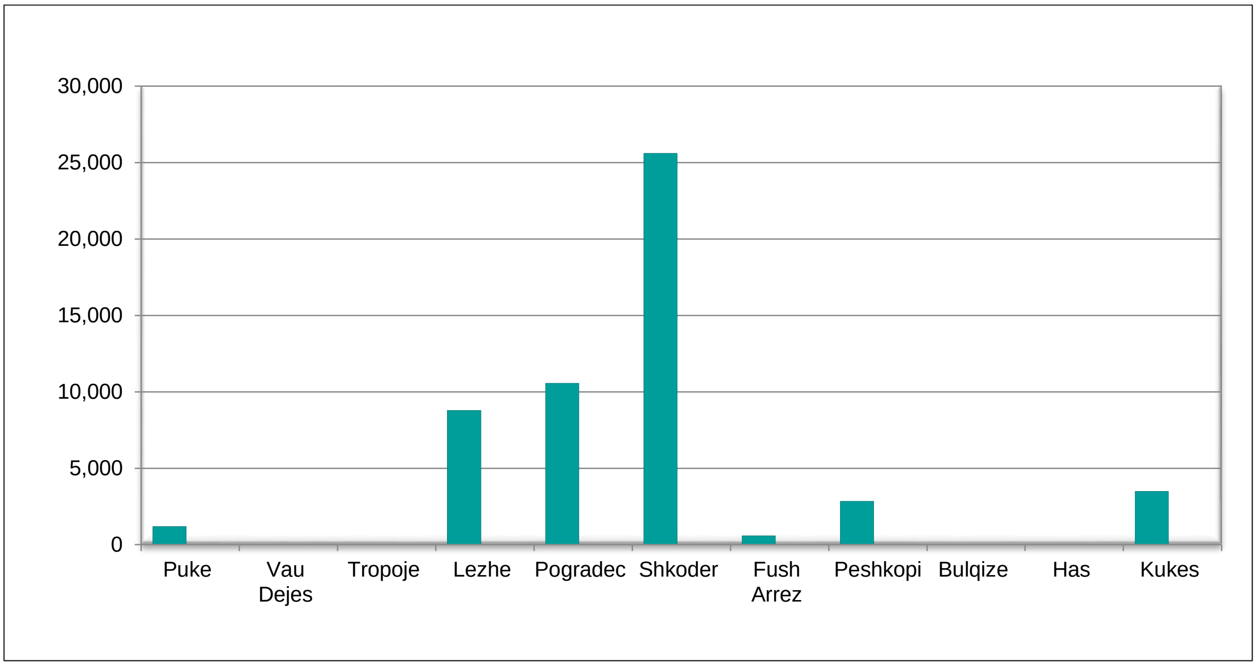


Table 8.1: Status of wastewater infrastructure for main municipalities in the Drini-Buna River Basin[147]

City	Population with wastewater network in %	WWTP Status	Population with WWTP in %
Pogradec	81%	Exists	50,000 inhabitants in Municipality area
Bulqizë	74%	Does not exist	-
Peshkopi	93%	Does not exist	-
Kukës	Only Municipality		
Tropojë	95%		
Fushë Arrëz	45%	Does not exist	-
Has	80%		
Pukë	60% (6% fshat)		
Malësi e Madhe	66%	Does not exist	-
Shkodër	100%	Proposed	-
Lezhë	49%	Exists	-
Vau i Dejës	44%		

[146] Water Supply and Sewerage Master Plan for Albania, financed by KfW; iC, igr – January 2013
[147] *Source: National Agency of Water Supply and Sanitation*

With respect to the water treatment plants (WTP) in the Drini-Buna River Basin has recently built, with donor support, four Waste Water Treatment Plants (WWTP) Lezhe (Shengjin), Pogradec, Velipoje and in Shiroke, Commune close to Shkoder Lake, with a capacity to cover existing city's urban population. Currently none of the plants are in full capacity of operation. However, it is important to note that their operational cost exceed the current financial capacity of water and sewerage utilities, which were facing a financial challenging situation already prior to the construction of WWTPs. These WWTPs are equipped with preliminary, primary, and secondary treatment units. In city of Shkoder there is currently a feasibility study undergoing concerning the building of a drinking water treatment plant and wastewater treatment plant for Shkoder City, with an estimated capital cost of 25MEuros[148].

Compliance with the Urban Wastewater Treatment Directive (UWWT) will be the costliest component of the PoM, which comprises measures to tackle organic and nutrient pollution, as well as hazardous substances.

Implementation of the UWWT Directive will require the construction of wastewater collection and treatment facilities in the River Basin for all agglomerations above 2,000 PE.

The Government has put tenets of European water legislation such as cost recovery, proper wastewater management and efficient use of natural resources, at the core of the Strategy, which aims at developing proper policies and committing sufficient resources to improve the provision of water supply and sewerage services in Albania, and to consistently move towards compliance with EU standards. A national Master Plan was subsequently prepared with the support of the German KfW, which outlined and prioritized capital investment needs up to 2040 for the sector which is closely related to the level of tariffs, water billing and execution of bills.

Table 8.2 below shows the level of water tariffs, which are far below an efficient and sustainable level. To remedy this situation, future action includes an ambitious program of efficiency improvements comprised of enhanced efficiency with respect to energy use, staff and other operational efficiency, collection efficiency and decreases in non-revenue water. However, it strongly recommended that the tariffs be increased to what is affordable for the average household. Although, in order to accept an increase in the price of a service, customers want to experience an improved service, whilst also agreeing that the service in question should be paid for.

At such a tariff level, the free cash flow from operations can finance approximately half of the investments needed over the 25-year period to 2040[149]. The remaining 50 per cent must be funded by bridge funding in the form of loans and grants for capital investments[150].

Currently, there is very little commercial funding available to the sector. International experience illustrates that even with an appropriate legal and institutional framework, commercial financing of the WSS sector in Albania (whether in the form of loans, concessions or other PPPs) will only be possible if very substantial tariff increases have been introduced to generate a cash flow that supports debt repayments.

[148] Source: Ministry of Energy and Infrastructure

[149]Source: Ministry of Energy and Infrastructure

[150] Albania Water Supply and Sanitation Sector Financing Strategy, COWI 2016

Table 8.2: Water fee tariffs for each water supply and sewerage in the Drini-Buna River Basin[151]

Utility	Drinking Water lek/m^3			Fixed tariff lek/client/month			For waste water		
	Family	State	Private	Family	State	Private	Family	State	Private
Bulqizë	17	55	75	100	100	100			
Has	25	60	80						
Kukës	25	60	80				7	15	20
Lezhë	58	135	145	200	200	200	18	22	27
Pogradec	22/62	37/111	37/111	100/200	400/100	400/150	11/33	12/36	12/36
Peshkopi	27	65	85				10	15	15
Pukë	35	130	140	100	100	100	8	16	16
Shkodër	40	110	110	100	100	100	15	20	20
Tropojë	19	60	80						

The targets in the national strategy continue to be official targets for the sector and have formed the starting point for the beneficiaries in its formulation of targets for a financing strategy for the WSS sector. The Albanian National Master Plan was subsequently prepared with the support of KfW on the assumption that EU requirements must be met in relation to the UWWT Directive. The Master Plan outlined and prioritized capital investment needs up to 2040 for the sector on the assumption of a consistent move towards compliance with EU standards.

Projects were prioritized by the KfW using a multi-criteria decision model with (i) technical, (ii) financial/economic, (iii) environmental, (iv) socio-economic, and (v) institutional criteria. Based on the priorities, a ranking in short-, mid- and long-term investment (investment plan) was defined[152].

The Government of Albania has announced a policy of “water for all”. The EU directives require that the environment is fully protected from pollution by wastewater and, in particular, that wastewater from agglomerations with more than 2,000 population equivalents (PE) is collected and treated.

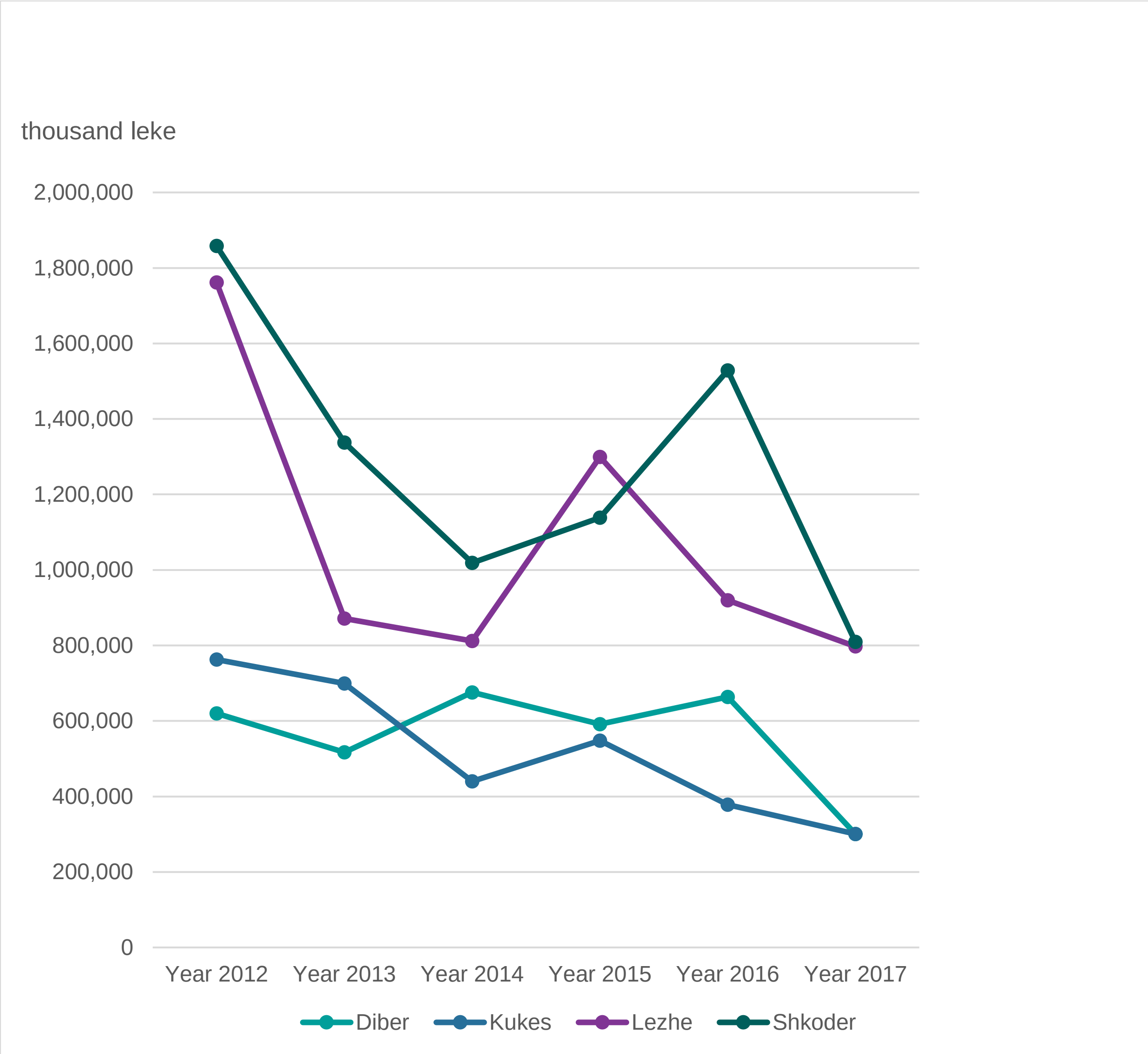
The Water Supply and Sewerage Master Plan is based on a bottom up approach where utilities have been asked about their needs. The utilities have calculated their needs based on an assumption of being able to supply water 24 hours per day to its customers and to be able to treat the wastewater in accordance with EU regulations.

During the recent years, investment in the water sector has been based mainly on donors’ investment. Figure 8.7 shows the actual level of funds allocated to cities in the Drini-Buna River Basin between 2012 and 2017. The short-term investment for eight water supply and wastewater projects in the main cities of Drini-Buna River Basin, as based on the Master Plan for Albania 2013, are shown in Figures 8.8 and 8.9, respectively.

[151] Source: (WRE) Repot 2016

[152] IC Consultant, 2013

Figure 8.7: Funds allocated in the water sector for the Drini-Buna River Basin between 2012 and 2017[153]



[153] Source: Support to the PMO in establishing an integrated approach and an effective SWG mechanisms to coordinate, implement and monitor reforms in the water sector Report, (MOG).

Figure 8.8: Water supply investment projects in the Drini-Buna River Basin[154]

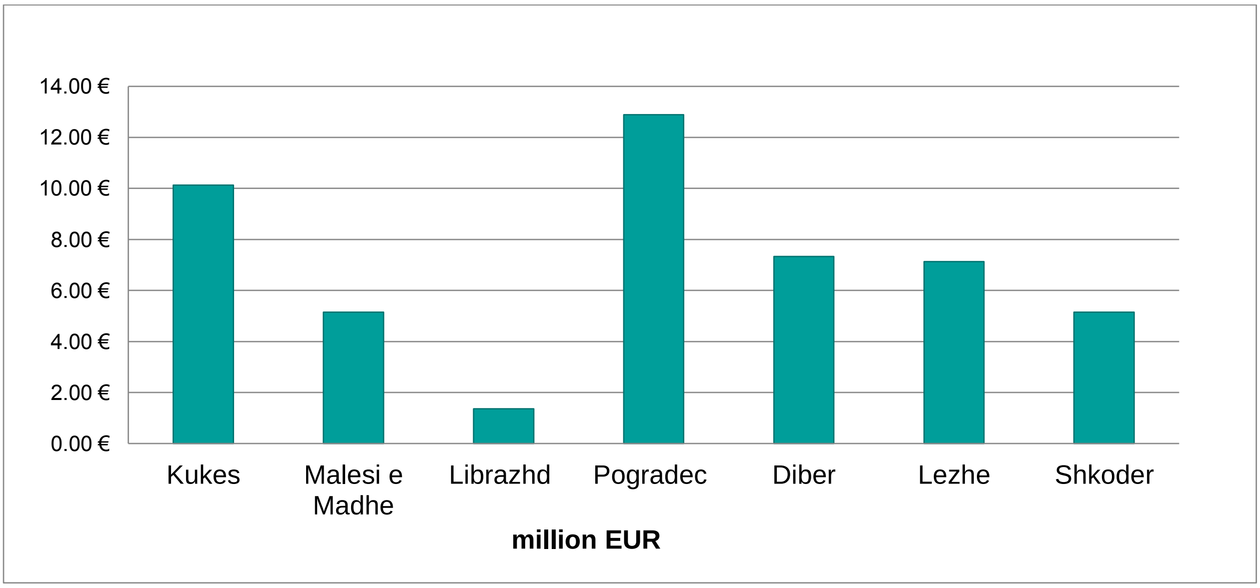
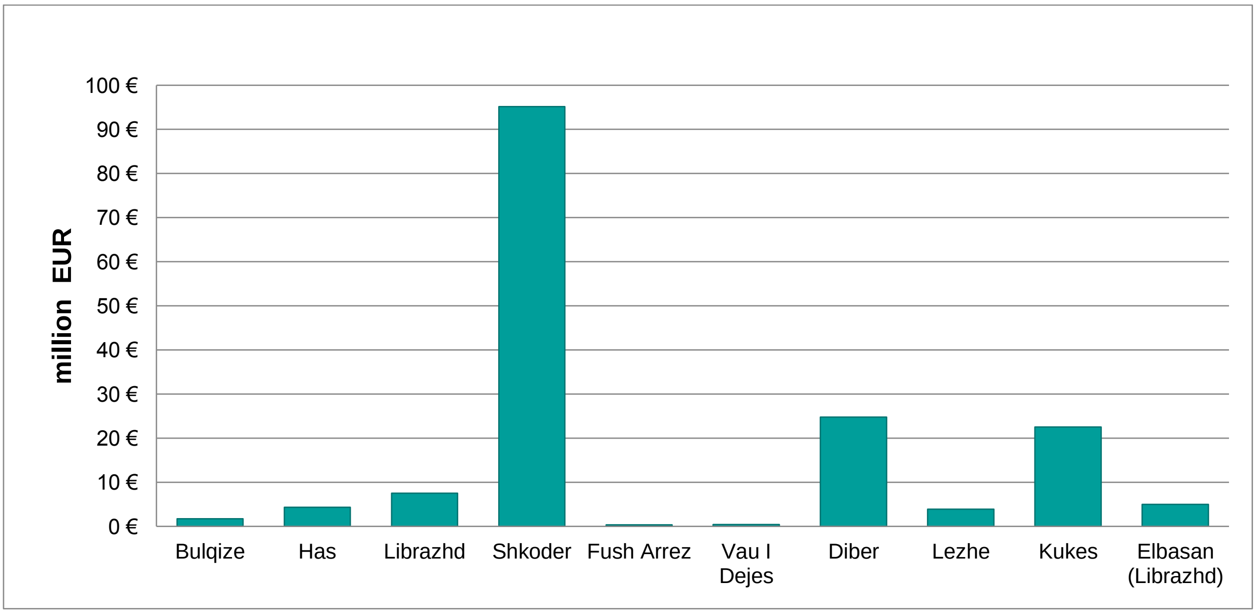


Figure 8.9: Wastewater projects in in the Drini-Buna River Basin[155]



8.3 Irrigation Sector

The total area of agricultural land in Albania is 695,000 ha, which covers 24% of the country, 80% of which is under private ownership and 20% is under state ownership[156]. The farm size is average 1.26 ha divided into about 4 agriculture plots, which means that the average family farm size is only 0.27 ha. The main crops are vegetables, fruit trees and vineyards, grains and olive groves.

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[154] Water Supply and Sewerage Master Plan for Albania, financed by KfW; iC, igr – January 2013

[155] Water Supply and Sewerage Master Plan for Albania, financed by KfW; iC, igr – January 2013

[156] INSTAT, 2013. Albanian Labour Market, Tirana

Agriculture in Albania requires additional water for irrigation in summer since rainfall during this season is only about 20% of the total annual precipitation. Water deficits between June and August vary between 400 and 500mm, making irrigation necessary for effective crop production. On the other hand, drainage is important in winter, to alleviate flooding, erosion and water logging.

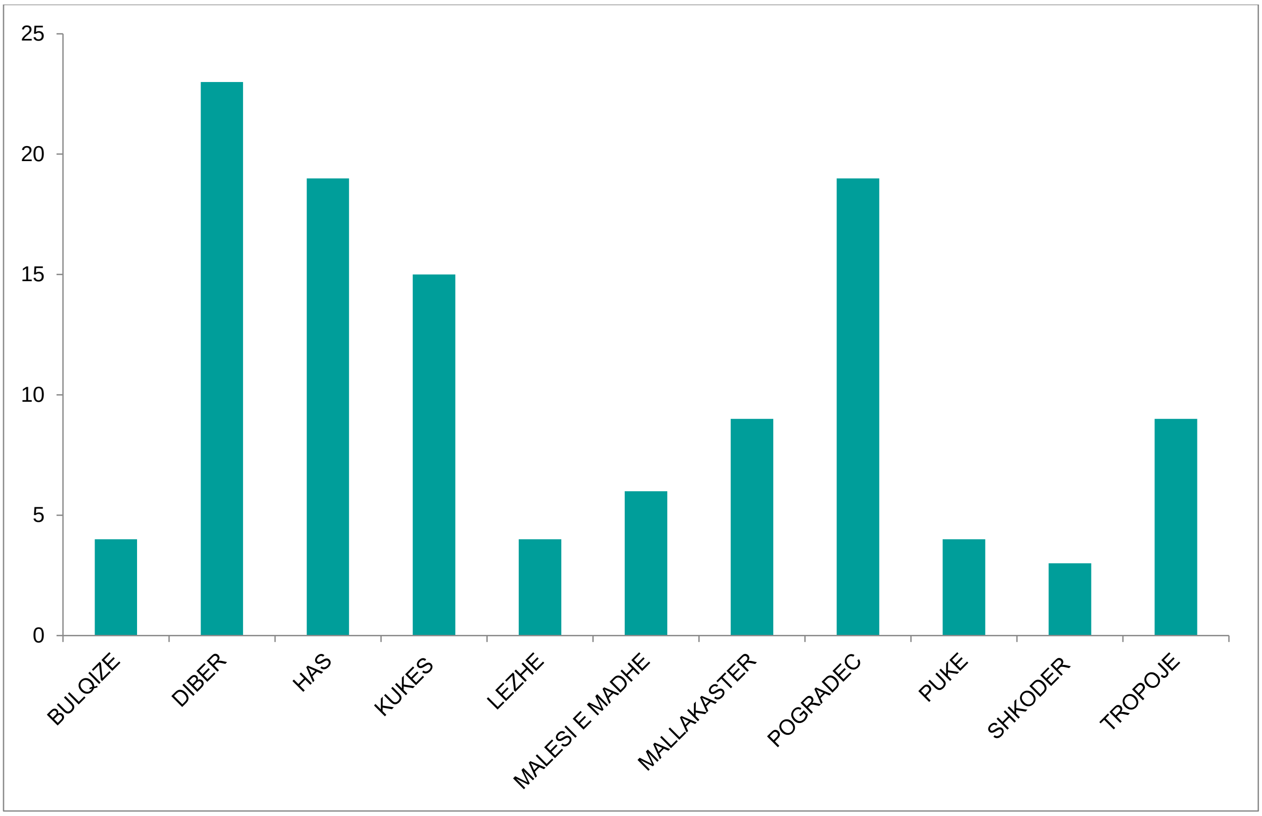
A considerable irrigation and drainage systems disintegrated due to lack of investment together with insufficient budget for operation and maintenance. Moreover, land privatisation resulted nationally in the creation of more than 400,000 small farms (between 0.5 and 3.0 ha). These small private farms have fundamentally changed the character of agriculture and complicated the agriculture services including irrigation process. This situation is similarly reflected in the Drini-Buna River Basin. In response, the Government of Albania adopted a policy to transfer the operational responsibilities of secondary irrigation canals to water users, through the establishment of Water Users Associations (WUAs). The operation and maintenance of primary canals and irrigation reservoirs remained the responsibility of state-owned Water Enterprises.

Efforts to rehabilitate and rebuild the irrigation systems have been on-going since the mid-nineties. The WUAs however, did not function as expected, as their capacity of irrigation service delivery was insufficient and WUAs were not able to cover the operation and maintenance costs. With Restructuration of Water Enterprise have been created 13 Drainage Boards.

As the irrigation and drainage services were still in need for improvement, there was a need to include Local Authority (municipalities and communes) in the essential role of decision-making regarding irrigation and drainage systems, i.e. DCM No. 1108 was issued on 30.12.2015 “For transferring irrigation and drainage infrastructure, personnel and assets from the Regional Drainage Boards”. As such, small irrigation infrastructure has been transferred from the Drainage Boards to Municipalities. Four new and restructured Regional Drainage Boards have been created from the previous 13 in national level, which will, together with MARD, administering only the main irrigation and drainage infrastructure including irrigation dams. The Drini-Buna river basin is covered mainly from Lezha Drainage Board.

The designed capacity of irrigation reservoirs after more 40 years of their life is reduced about 50%, according the data received from Ministry of Agriculture Rural Development and Water Administration. There is a total of 115 irrigation dams in Drini-Buna River Basin (Figure 8.10). The location of the irrigation dams of known locations is presented in Figure 8.11. However, due to the sedimentation total available water for irrigation is approximately 27.2 million m^3, with respective available volume of water for irrigation as is shown in Figure 8.12.

Figure 8.10: Irrigation dams for each municipality in the Drini-Buna River Basin[157]



[157] Ministry responsible for Irrigation and Drainage

Figure 8.11: Location of the main irrigation dams in the Drini-Buna River Basin

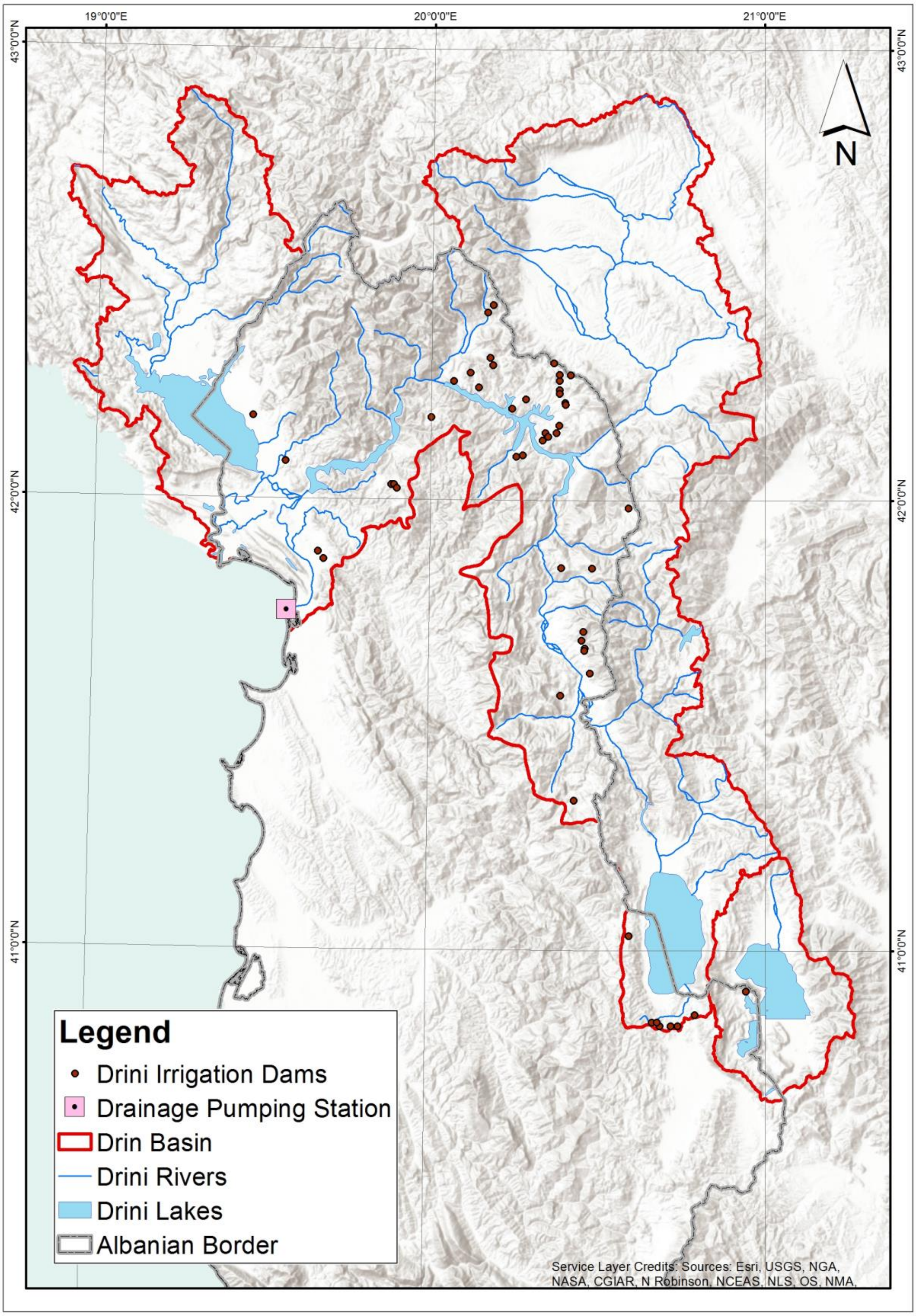
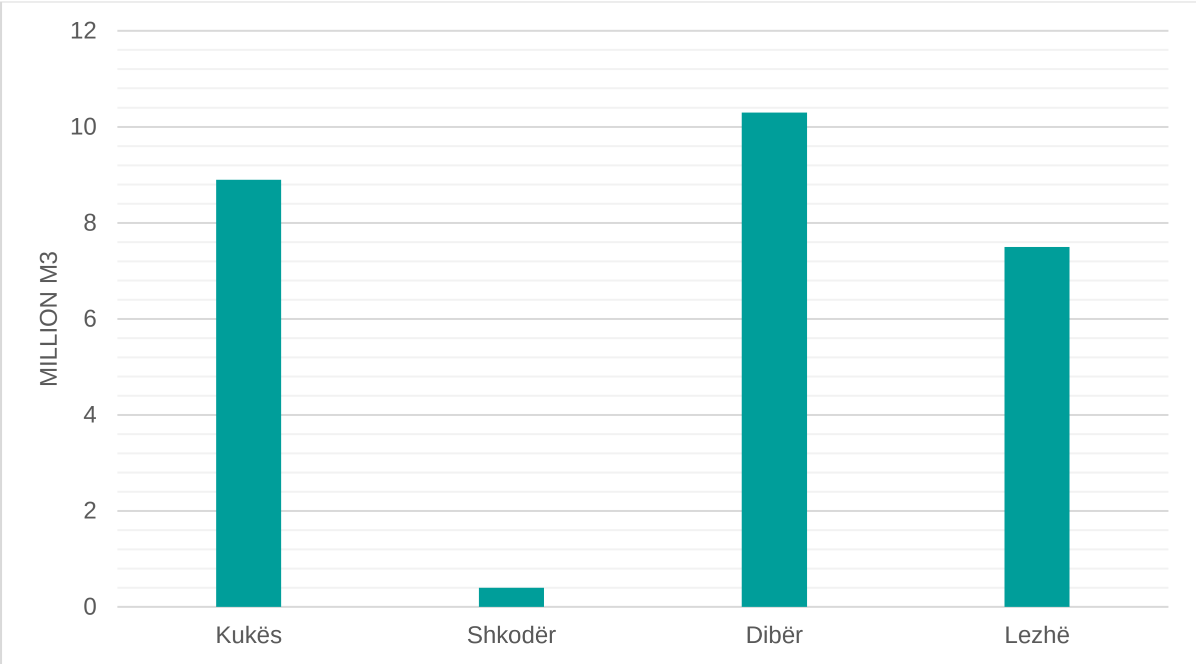
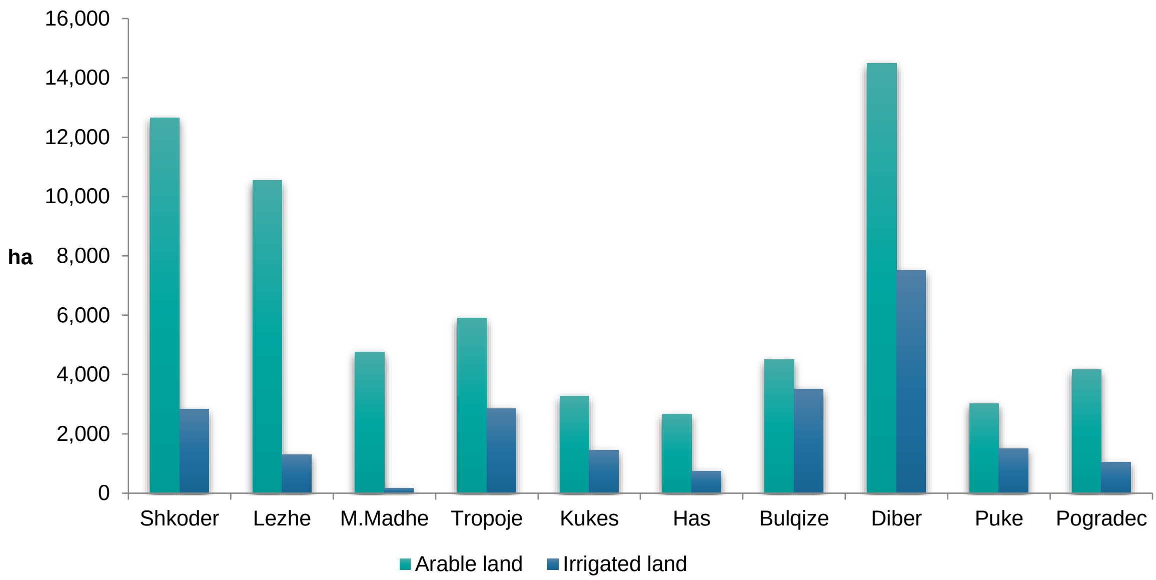


Figure 8.12: Available irrigation water for each city in the Drini-Buna River Basin[158]



At the scale of the River Basin, approximately 35% of agriculture land is irrigated land. Figure 8.13 below show the situation for each municipality in the Drini-Buna River Basin.

Figure 8.13: Irrigated land and total of arable land for each municipality in the Drini-Buna River Basin[159]



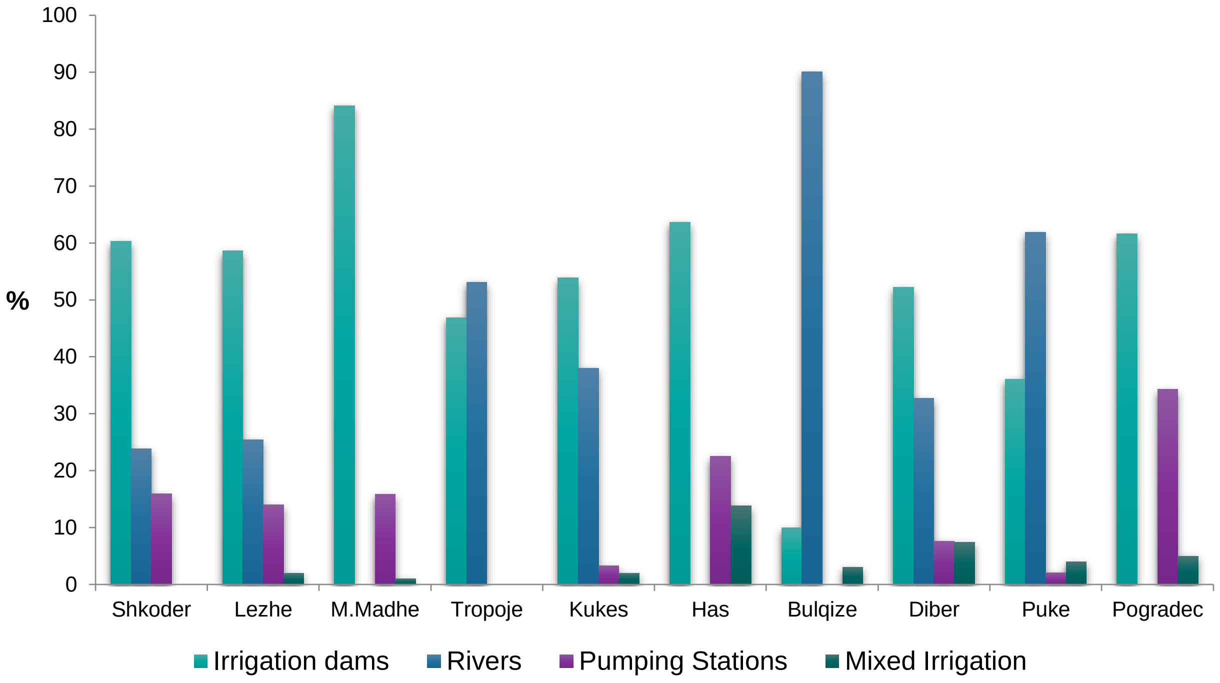
[158] Ministry responsible for Irrigation and Drainage

[159] *Source:* Ministry responsible for Irrigation and Drainage

Because of rapid infrastructure development during the last decade, currently only part of arable land can now be irrigated or used permanently for agriculture production. Figure 8.13 that the percentage of irrigated land varied from 10%-75% in the Drini-Buna River Basin.

The water sources of irrigation are irrigation reservoirs, rivers or groundwater using pumping stations, as shown in Figure 8.14 below. The type of irrigation is either by gravity or pumping stations, or sometimes combination of both. The main method of irrigation in country and in Drini-Buna river basin is irrigation by open canals or furrow irrigation, which distributes water thorough a secondary and tertiary network.

Figure 8.14: Source and type of irrigation in each municipality in the Drini-Buna River Basin[160]



Besides the cities of Bulqiza and Puka, which irrigate by rivers, the other cities are using irrigation dams for agriculture purposes. It is necessary to underline the fact that, in both cases, the use of pumping station are necessary, thus considering this as a combined or mixed irrigation method.

Based on DCM No. 1108, issued on 30.12.2015 *"For transferring irrigation and drainage infrastructure, personnel and assets from the Regional Drainage Boards"*, the main irrigation and drainage network, including irrigation dams, are under administration of Regional Irrigation and Drainage Boards. The majority of Drini-Buna territory is part of Lezha RDB, which includes even part of areas outside of Drini-Buna River Basin.

Drainage Pumping Stations (hidrovor) are used for drainage purposes, although many of them are currently out of operation due to damage, high electricity costs and poor maintenance. It has been assessed that tertiary canals are heavily silted, requiring considerable financing support for silt to be removed. This situation creates over saturation of agriculture plots and premises for flooding on rainy conditions. Drainage pumping stations are distributed on coast area, a part of them are now at the end of their lifespan[161]. In the Drini-Buna River Basin there are 10 drainage-pumping stations, distributed as shown in Figure 8.15.

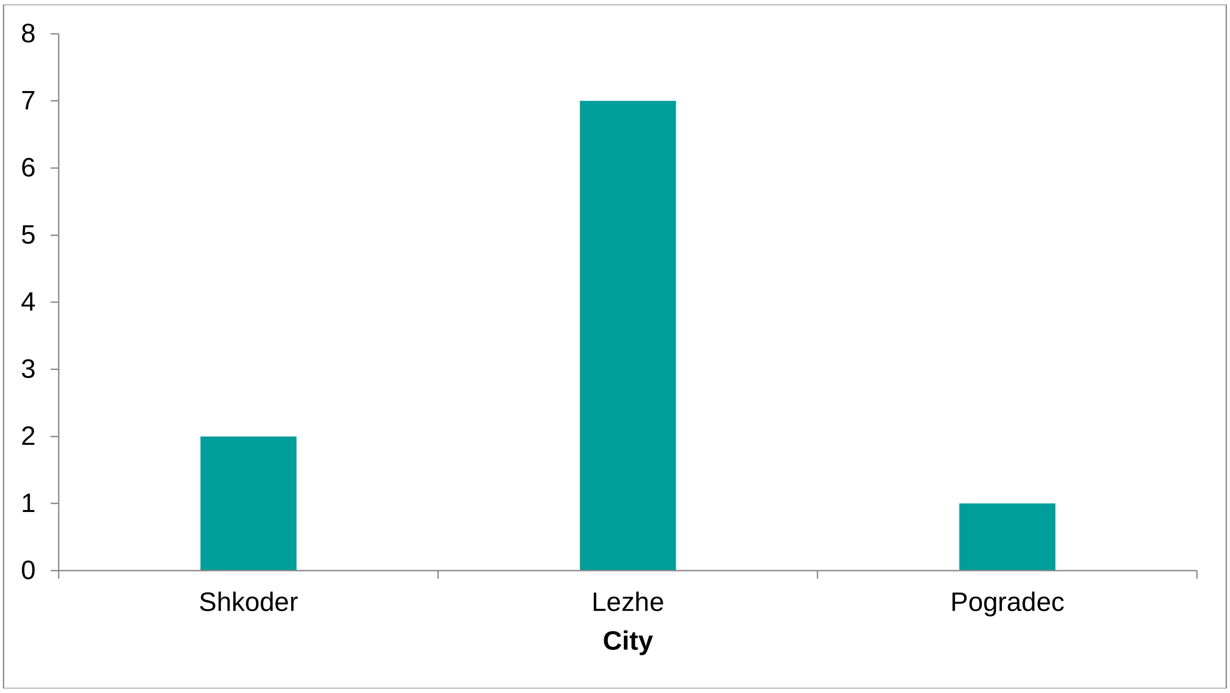
[160] Ministry of Agriculture and Rural Development

[161] MARD (2015), Draft Strategy for Irrigation, Drainage, Dam Safety and Flood Protection in Albania

One critical factor causing vulnerability in the agricultural sector is the excess of water from floods, which is the case for the Drini-Buna River Basin, is causing damage to agriculture production by limiting crop growth or destroying the plants.

The drainage service covers the majority of the agriculture land, built mainly before years 1990. In Drini-Buna river basin there are about 1,400 km main drainage canals and about 60,000 ha with drain network system, as is shown in Figures 8.16 and 8.17.

Figure 8.15 Number of drainage pumping stations (hidrovor) for the cities of the Drini-Buna River Basin[162]



[162] Ministry of Agriculture and Rural Development

Figure 8.16 Total length and main irrigation and drainage canals in the Drini-Buna River Basin[163]

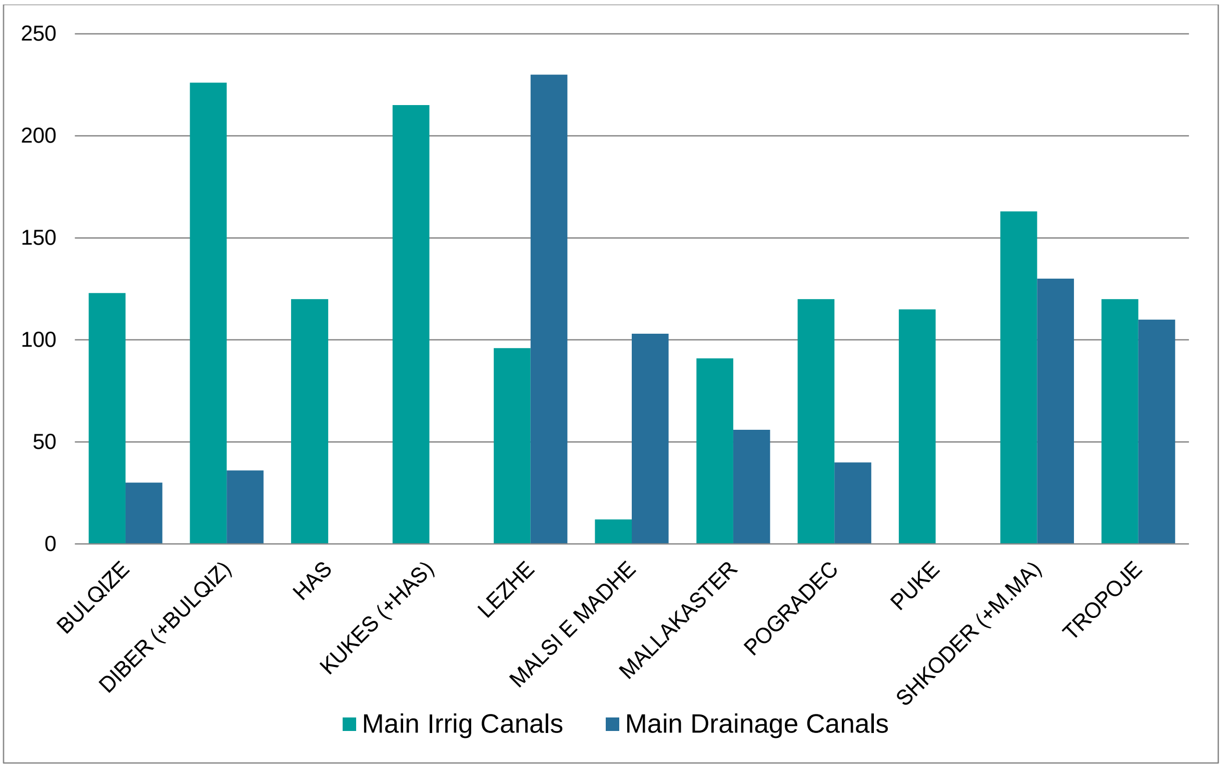
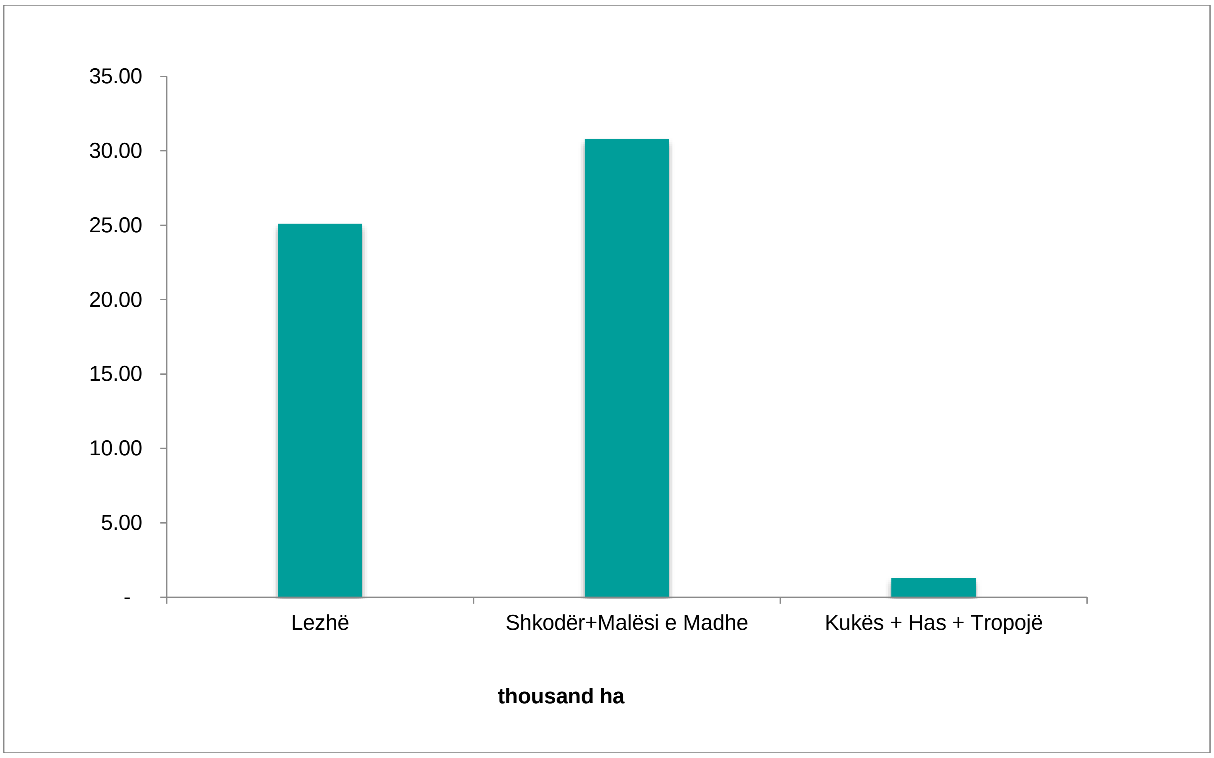


Figure 8.17: Area of drainage network in the main cities of the Drini-Buna River Basin[164]



[163] Ministry of Agriculture and Rural Development
[164] Source: MARD

Based on the water resources and water balance calculated for the Drini-Buna River Basin (see above Section 3.5.4, Table 3.4), it is estimated that water availability in the Drini-Buna River Basin will be more than adequate to meet the agriculture water demand through to 2027.

Although water availability for food production is expected to remain sufficient, measures have to be taken in the Drini-Buna River Basin to decrease vulnerability and increase flexibility of agriculture. These measures are mainly related to modernisation of agriculture (adopting Best Practices), improvement of irrigation and drainage infrastructure and introducing the new method of irrigation (spring and drip irrigation).

Table 8.3 below shows the location and main parameters of drainage pumping station in Drini-Buna River Basin. In total, there are 8 drainage-pumping stations, seven of which are in coastal area. Being in lower part of basin and behind the Vau Dejes HPP, the drainage pumping station of Lezha and Shkoder have important role in removal of surface water, especially during the intensive rain or after discharges of Vau Dejes HPP.

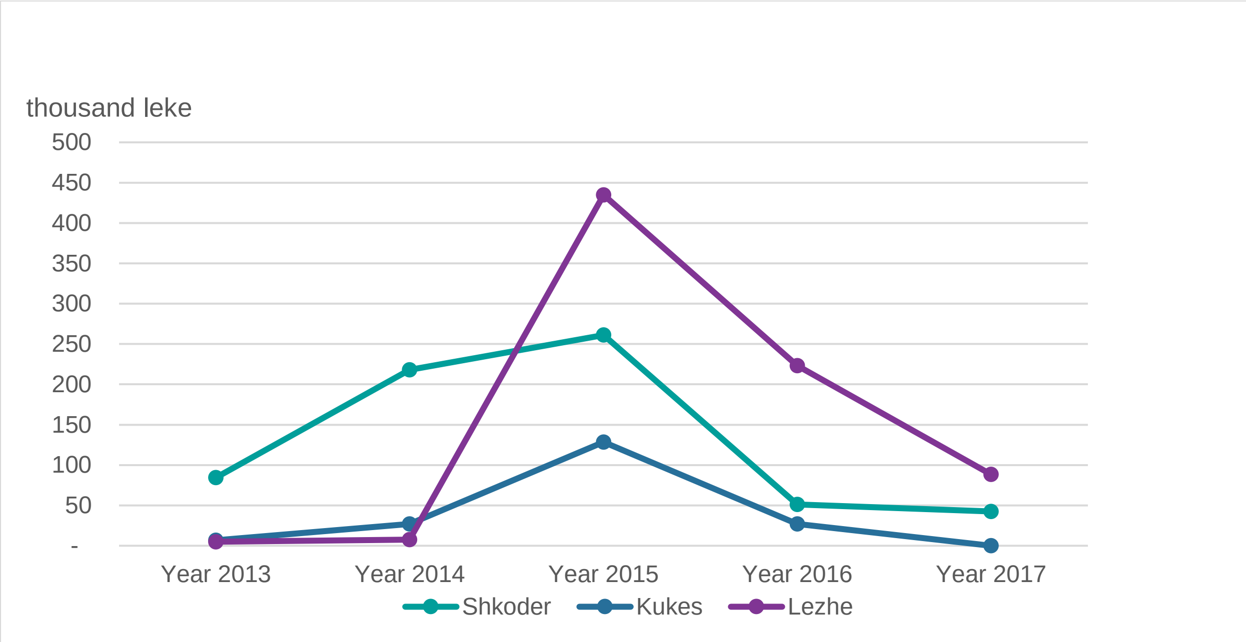
Table 8.3: Summary of drainage pumping stations (PS) in the Drini-Buna River Basin[165]

Irrigation and Drainage Board	Drainage Pumping Station Location	Drainage Area (ha)	Number of Pumps	Total Design Capacity of Drainage PS (m^3/sec)	Installed Electrical Power (kW)
Shkodër	Velipoj	1,800	5	14.05	860
	Ças	1,600	5	14.05	860
Subtotal		3,400	10	28.10	1,720
Lezhë	Balldren	2,680	5	25.50	1,480
	Tale	4,777	7	22.35	1,555
	Ishull Shengjin	640	4	3.60	320
	Gryke Zeze	550	4	3.90	420
	Gocaj	220	2	1.30	110
Subtotal		8,867	22	56.65	3,885
Korçë (Pogradec)	Tushemisht	300	4	2.40	350
Total		12,567	26	87.15	5,955

As is mentioned above, the local authorities will administrate secondary and tertiary network of irrigation and drainage system and Regional Boards remain responsible for irrigation dams and main irrigation and drainage network. Figure 8.18 below shows the investments in irrigation and drainage network in the Drini-Buna River Basin during the last 4 years.

[165] Ministry of Agriculture and Rural Development

Figure 8.18: Recent investment in irrigation and drainage network in the Drini-Buna River Basin[166]



As been said above, the lower area of Drini-Buna River is under the risk of flooding. Table 8.4 below show the current status of embankments in Shkoder and Lezha regions and the length of the embankment in each that requires rehabilitation for protection of municipalities and agriculture land especially during the heavy rain situation.

Table 8.4: Embankments for flood protection in the Drini-Buna River Basin[167]

Embankment	Length of Embankment (Km)	Length of Embankment in need for rehabilitation (Km)
Shkodër	48	4.3
Lezhë	112	50
Total	160	54.3

8.4 Hydropower Plants

Hydropower is the main source of electricity production in Albania, occurring in all river basins and accounting for 97% of Albania's current domestic electricity generation. Public hydropower plant production represents 72.1% of total domestic production, while production of electricity from independent power producers was 27.9% in 2014. KESH Sh.a., a state-owned company, controls public hydropower production. Currently, production varies between approximately 2,900 GWh in very dry years to almost 6,000 GWh in very wet years[168].

[166] Source: MARD
[167] Source: MARD
[168] World Bank, 2009. Water Sector Board Discussion Paper No. 12: "Strategic Environmental Assessment: Improving Water Resources Governance and Decision Making, Washington

As part of an effort to reform the Albanian energy sector, the former Ministry of Economy, Trade and Energy privatized four hydropower plants and has unbundled its transmission and distribution systems, introduced a new market model and granted concessions for the development of new hydropower plants[169].

On Drini River there are three large operational hydropower plants with a total installed capacity of 1350 MW, i.e. “Vau i Dejës” HPP, “Fierza” HPP and “Koman” HPP. Furthermore, a concessionary contract has been concluded for “Ashta” hydropower plant on Drin river between the Ministry of Economy, Trade and Energy and Austrian Company “Österreichische Elektrizitätsëirtschafts - Aktiengesellschaft”, with an installed capacity of 48.2 MW (Table 8.5).

Table 8.5: Major hydropower plants in the Drini-Buna River Basin[170]

HPP	Capacity (MW)	Annual Production (MWh)
“KESH” sha Hec "Fierze"	500	1,636,522
“KESH” sha Hec "Koman"	600	1,882,721
“KESH” sha Hec "V. Dejës"	250	932,732
"Energji Ashta" sh.p.k Hec "Ashta"	48.2	235,604
Total	1,398.2	4,687,579

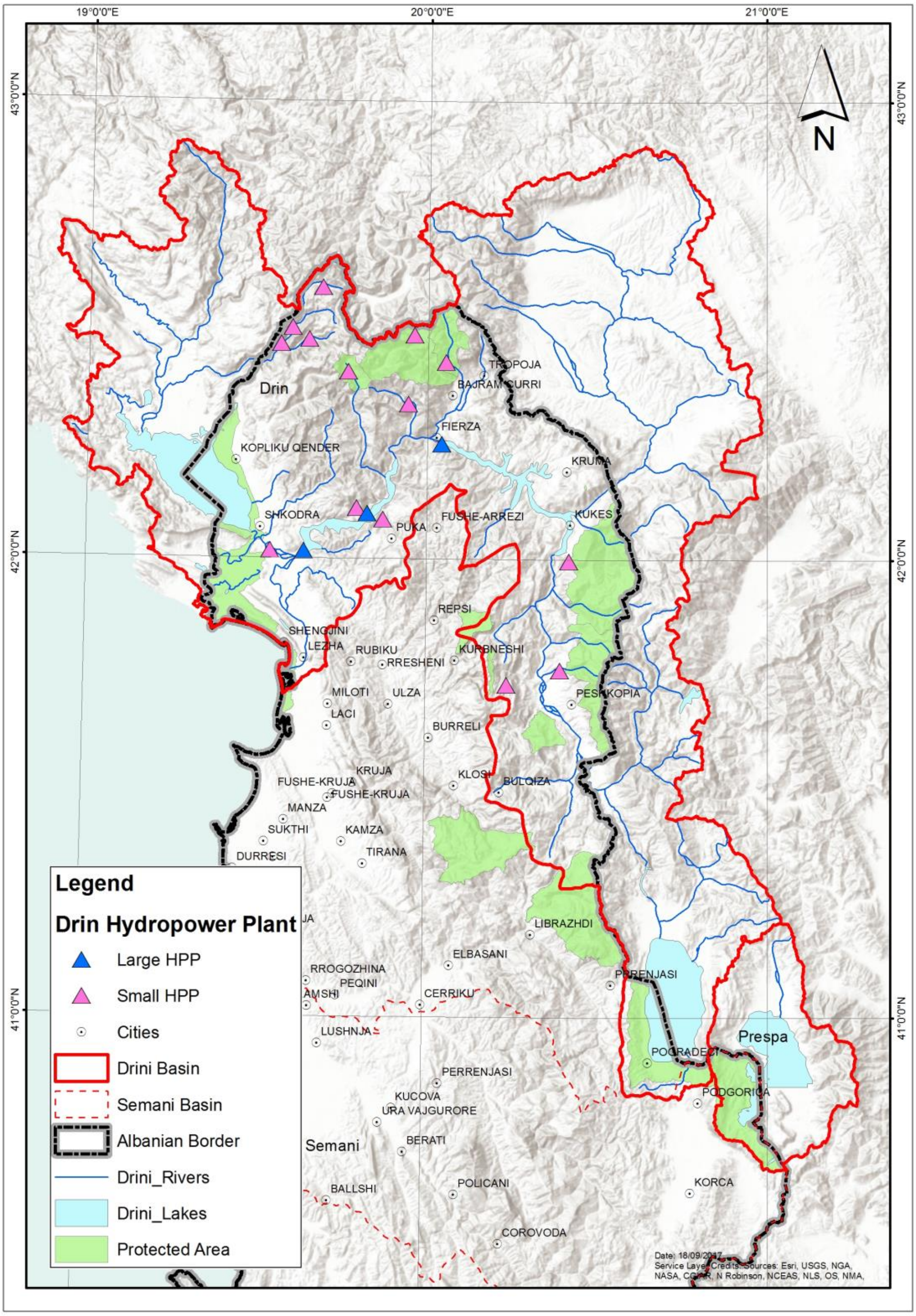
According to NARN at the end of 1st trimester 2018, there are currently 47 concession contracts in place for the construction of 121 Small Hydropower Plants (SHPP) in the Drini-Buna River Basin with an estimated installed capacity of approximately 650 MW. 29 SHPPs are in operation.

A map of the current operational small (>1MW) and large hydropower plants (>250MW) in the Drini-Buna River Basin is provided in Figure 8.19.

[169] IFC, 2013. Public-Private Partnership Stories Albania: Hydropower Privatization

[170] National Agency of Natural Resources

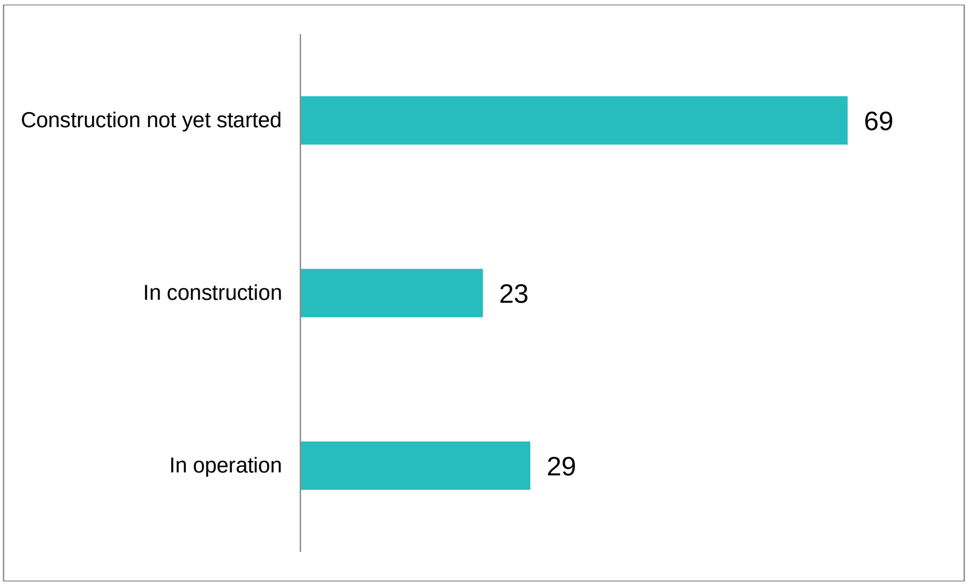
Figure 8.19: Location of the most important small HPPS (>1MW) and large hydropower plants (>250MW) in the Drini-Buna River Basin



The almost exclusive reliance on hydropower for its electricity supply makes Albania's current annual generation highly dependent on the yearly hydrological variability. During dry season the hydroelectricity can decline by 40% below the long-term generation average (as experienced in 2007) or rise 60% above average in a particularly wet period (e.g. 2010). Dry periods require high cost electricity imports from neighbouring countries to meet the domestic demand load. However, due to power distribution capacity limitations, electricity imports cannot fully supplement domestic generation and the system operator is forced to resort to load shedding during periods of peak demand. In contrast, the exceptionally wet year of 2010 turned Albania into a net electricity exporter for the first time since 1997. Interconnections to the neighbouring electricity systems are of critical importance for Albania's electricity supply security for daily and seasonal load balancing.

The status of SHPPs in operation, in construction or where construction has not yet started is shown in Figure 8.20.

Figure 8.20: Status of small hydropower plants with concesion in the Drini-Buna River Basin and of 1st trimester 2018[171]



According to NANR, in the end of 1st trimester 2018, the 26 SHPPs that are not subject to concession were not yet operational.

[171] National Agency of Natural Resources

9 Flood Management

9.1 Introduction

Flooding of land is a regular occurrence in Albania. There are two main factors, which define the type of flooding which occurs. The first is the seasonal nature of the precipitation. The winters have heavy precipitation, which in the mountains falls mainly as snow, and the summers are very dry. Around 80 to 85% of the precipitation falls in the winter months. Floods sometimes occur which are a combination of snowmelt and heavy rain. The second feature is the topography of the country. The mountains to the east lead to high rainfall in this part of the country, the rivers are mainly short, and to the west near the coast the land is flat. In the upper parts of the river basins flooding is very flashy and occurs with very little warning. By contrast, in the flat areas near the coast flooding can last for several weeks. Around half of the population of Albania is believed to live in areas, which are liable to flooding.

In the Drini-Buna River Basin, there are three large dams built mainly for hydropower, which have some influence on flooding. There are also 115 smaller dams in the River basin, built for irrigation and flood control, however many of these have had little maintenance in recent years and their available capacity is reduced from the originally designed values.

In the Drini-Buna River Basin it has been estimated that in a 1-in-100 year-flood around 20,000 buildings would be affected and to 170,000 people.

Some human activity has increased the risk of flooding. This includes gravel abstraction from the rivers and deforestation in the upland areas. Though both of these activities have reduced recent years they still have an impact on flooding.

9.1.1 Project Inception Report

The first part of the section of the Inception Report dealing with floods is basically a summary of the contents of the European Union’s Floods Directive. A more extensive summary of this Directive is given in a later section of this report. The relationship between the Floods Directive and the River Basin Drini-Buna river basins is given in the table reproduced below.

Table 9.1 Expected delivery contents as provided in the Project Inception Report

Component of Flood Risks Management Plan	RBMP for Drini-Buna	Consultant’s Instruments
(1) Preliminary Flood Risk Assessment		
RBMP will contain a description of historical floods: locations and frequency. Relation between river discharges based on the modelling of both rivers with the historical floods.	✓	Mike Hydro Basin modelling, historical data, expert judgement
RBMP (expected developments related to climate change). General prediction of (increase of) flooding frequency, based on modelling of river discharges taking climate change into account.	✓	Climate change modelling, expert judgement
(2) Flood hazard maps and Flood Risks Maps		
These are not required to be included in either of the RBMPs. For hazard maps another type of	X	Outputs of previous or on-going projects

Component of Flood Risks Management Plan	RBMP for Drini-Buna	Consultant's Instruments
modelling is needed (calculating the water level in relation to river discharge), and data like an altitude map is needed. For Flood Risk maps information like land use maps, occupation maps are needed. Actions needed, estimated costs and timelines for developing accurate Flood Risk Maps will be included in the Programme of Measures		
Objectives of Flood Risk Management		
To be included	✓	Gap analysis for Flood risk management, existing strategies, expert judgement
Measures		
The RBMP will include measures based on Preliminary Flood Risk assessments including recommendation from other projects	✓	Preliminary flood risk assessment and modelling outputs, PoMs or Action Plans from other projects, expert judgement
Methodology of Cost-Benefit Analysis for Measures with Transnational Effects		
Economic analysis will be included in the RBMP	✓	Internationally recognised practices for CBA, Governmental Budget Projections, Donor investment projections, expert judgement

The instruments to be used as summarised in the above table are as follows:

- *Mike Hydro Basin modelling, historical data, expert judgment*. The Mike-Hydro basin model is a well-known and well regarded mathematical which simulates the hydrology and hydraulics of a river basin. The Mike Hydro model has been calibrated for the Drini-Buna River Basin. The model will use daily rainfall data and this will enable it to simulate floods. Unfortunately, it has not been possible to locate any daily flow data, so the calibration was based on monthly flow data. Whilst at this stage the calibration has not been completed it is to be expected that the model would give a reasonable representation of flood flows. There is very little quantitative data on flood flows and their frequency. What there is, is summarised below. Given that there is very little quantitative data available many of the conclusions will depend on expert judgment.
- *Climate change modelling, expert judgment*. The hydrological model of the river basin will use observed meteorological data (rainfall and potential evapotranspiration) as input. To study the possible impact of climate change, the input data will be modified to use values that are expected in the future. This will enable the change in river flow to be examined. Another related aspect is the impact of human activity in other ways. One of the effects of deforestation is to increase flood flows; with less leaf cover, more of the rain falls on the soils and without the deep-rooted trees the soil becomes more quickly saturated.
- *Outputs of previous or ongoing projects. Gap analysis for Flood risk management, existing strategies, expert judgment*. We summarise below the outputs of other projects, which have examined flooding in Albania. One important aspect of the gap analysis the comparison between what is currently known and what needs to be known to develop rational flood management plans. This in turn will lead on to recommendations for improvements in monitoring the flow, levels, flooded areas and response times of floods.
- *Preliminary flood risk assessment and modelling outputs, Programmes of Measures or Action Plans from other projects, expert judgment*. The appraisal of the current level of flood risk will be based on reports from the Directorate of Civil Emergency, reports of other projects on flooding and media reports on the extent of flooding and damage caused. One important outcome of the hydrological modelling would be to identify more completely the nature of floods, which occur. Do they mainly occur in winter or do major floods occur as a result of intense storm rainfall in the summer? Is snowmelt a factor in major floods? The programme of measures will be based, in part, on the recommendations in previous reports but also from

the project team's assessment of the current level of risk and measures, which could be taken to minimise it. It will also take account of previous flood protection works and their current level of maintenance.

- *Internationally recognised practices for Cost Benefit Analysis, Governmental Budget Projections, Donors investment projections, expert judgment*. Classical cost benefit analysis of flood protection would typically examine the costs associated with floods which are statistically likely to occur within an extended period, for example 100 years. One might, as a first approximation, as assume one flood of 1-in-100 years return period, one of 1-in-50, thee of 1-in-20 and five of 1-in-10 and ten of 1-in-5. In total this would give 20 floods with a return period of 1-in-5 or higher. It would then examine the costs to provide protection to different levels of flooding. So, it might conclude, for example, that it was economically justifiable to protect against one in 50 years flood, but that the cost of protecting against a 1-in-100 years flood was not justified. Such an analysis, of course, depends on the availability of detailed flood maps for floods of a range of return periods. If such maps were not available, recommendations would be based on the expert judgment of the team members.

9.2 Historical and Current Situation

Tables 9.2 and 9.3 below summarise the history of flooding in Albania. Table 9.3 summarises damage by county (qark) since 1852 where at least part of their area is in the Drin river basin. Both tables are based on data from the web site www.desinventar.net/DesInventar/profiletab.jsp. Table 9.2 only includes years when damage in one of the named columns occurred. In some years, there were other, lesser, types of damage. It shows that flooding is a regular occurrence in Albania and that flooding often leads to deaths. It is also evident that more information is available on more recent floods. The flood of 1905 caused the largest number of deaths and of houses destroyed but there is little information on other types of damage. It was reported that the flooding occurred in the region of Lake Shkoder[172]. The same year there was a 6.6 magnitude, one of the largest in South-East Europe in the last 100 years, also in the Shkoder region. This resulted in 120 deaths[173]. It is not clear whether or not the two events were related.

Table 9.2: Historical damage caused by flooding in Albania

Year	Deaths	Houses Destroyed	Victims	Damage to crops (ha)	Lost Cattle	Damage to roads (m)
1865	14	0	0	0	0	0
1905	200	1,500	0	0	0	0
1946	14	124	0	12,861	2,873	205
1947	0	5	0	0	0	0
1949	0	0	0	2,642	0	0
1953	5	3	0	3,778	87	0
1955	0	0	0	2,994	0	0
1956	0	0	0	0	10	0
1960	4	177	557	569	27	0
1961	0	0	0	5	0	0
1962	7	351	3,483	24,900	7,572	610
1963	0	79	56	1,407	34	0
1968	0	0	0	1,500	0	0
1970	0	0	0	21,914	155	200

[172] Historical Collection of Disaster Loss Data in Albania. E. Toto & M Massabò, CIMA Research Foundation.

[173] Ghosh at al, Building awareness of catastrophe risks in southeast Europe: Interactive consumer information portal CatMonitor from Europa Re. Tenth U.S. National Conference on Earthquake Engineering Frontiers of Earthquake Engineering. July 21-25, 2014. Anchorage, Alaska

Year	Deaths	Houses Destroyed	Victims	Damage to crops (ha)	Lost Cattle	Damage to roads (m)
1971	0	0	0	26,057	0	0
1972	2	0	0	0	0	0
1973	0	2	0	835	7	4,800
1975	0	0	0	919	0	0
1976	3	0	0	13,862	0	0
1978	0	0	0	8,342	0	0
1979	4	13	0	33,206	24	0
1980	0	0	0	2,163	0	0
1981	9	709	0	24,321	546	0
1985	0	0	900	21,434	573	0
1989	0	1	7	0	0	0
1994	0	0	40	800	0	0
1995	1	466	2,000	10,987	0	2,000
1996	2	31	2,600	5,544	80	0
1997	0	0	68	6,000	0	0
1998	0	28	29	7,440	0	0
1999	0	6	26	7,000	126	15,000
2000	0	5	0	3	0	0
2001	1	1	589	3,000	0	0
2002	0	4	16	0	0	0
2003	0	2	4	1,063	26	40
2004	0	2	155	3,050	0	0
2005	0	6	368	7,620.2	25	800
2006	0	0	0	450	0	0
2008	0	0	17	410	0	0
2009	0	1	5	0	0	0
2010	0	3	68,649	19,049	31,622	410
2011	0	3	6,793	1,092	75	0
2012	0	0	66	2,001	0	0
2013	0	3	1,155	9,824	11	300
2015	1	0	1	7	0	0

Table 9.3: Historical damage caused by flooding in Quarks in the Drini-Buna River Basin

County	Deaths	Houses Destroyed	Houses Damaged	Victims	Damage to crops (ha)	Lost Cattle	Damage to roads (m)
Dibër	0	9	112	79	980	0	200
Elbasan	3	13	56	96	6,040	216	15,200
Kukës	4	8	6	0	31	0	0
Shkodër	206	1,972	6,627	77,528	51,937	31,721	4,850

The following list gives more details of major floods in reverse chronological order. In the text below we have used the English word ‘county’ as the translation for Albanian word ‘qark’.

9 November 2016

Widespread flooding occurred in Montenegro and Albania. Unless otherwise stated this and the remaining reports of flooding are taken from the web site: floodlist.com. Two fatalities are thought to have occurred within Albania. The first was in Diber County in the Drin basin where the victim attempted to cross a road by car; in fact, many flood fatalities result from people taking risks. Also, in Diber county 30 families were evacuated including one family by helicopter. The second fatality was in Tirana. The emergency services in Albania received up to 7,000 calls and around 3,500 police, military, civil protection and fire service personnel have been drafted in to carry out flood rescues and evacuations. In Kukës district in the Drini basin, landslides blocked roads in several places and a bridge collapsed[174].

12 October 2016

Widespread flooding occurred in Albania, Greece and Romania. There was one fatality in Lezhes County, which borders the Drini river basin. Heavy rain was reported in Diber County in the Drini basin.

7 January 2016

Two days of heavy rain led to flooding and landslides in Shkoder and Diber County within the Drin basin and elsewhere. In total 700 people were evacuated but no deaths or serious injuries were reported.

23 November 2015

There was widespread flooding in Albania. One man was killed in Diber County. Flooding occurred in the Diber and Shkoder counties within the Drin river basin and elsewhere. Flooding blocked roads, and caused damage to property and to several bridges in several counties. Many residents were left without power and some without drinking water.

2 February 2015

Widespread flooding was reported in Albania, Greece and Bulgaria. In Albania, most of the flooding was in the south of the country and hundreds of families were evacuated. These floods created damage amounting to over €122 million. The situation led on February 4th to the declaration of national emergency and to a formal request to Director General ECHO for European Civil Protection Mechanism[175].

19 November 2014

Three people died during floods in Albania. Two of them were killed in Lezhe County, adjoining the Drin Basin, when their car was swept away.   The third died when a bridge collapsed in the same county.

December 2009 and January 2010

Heavy rainfall caused severe flooding in many parts of Albania. The counties of Shkoder and Lezhe, in the Drin basin, were the most severely affected. The district of Durres, further south also suffered. In total, almost 10,000 ha of land were flooded. Over 5,000 people were evacuated from their homes; the number would have been higher but many people refused to leave their homes. 2,200 houses were damaged by flooding.

20 November 1992

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[174] www.floodlist.com

[175] DRR-Team Mission Albania Scoping Mission Report September 2015

Heavy rain during three days resulted in serious flooding in Northern Albania. The Mat and Drini rivers overflowed their banks and inundated large areas with up to one metre of water. Most damage occurred to housing, livestock, and crops. Damage to the Fierza hydroelectric facility was reported, and electricity to some of the affected areas was cut. Practically all belongings of many families were lost and food stored for the coming winter was destroyed. The floods also caused damage to roads, bridges, riverbanks and irrigation networks. 17,000 ha of agricultural land were inundated. There was major disruption to electrical power[176].

1970-1971

These floods are reported mainly in the context of the limited damage caused thanks to the flood protection measures introduced after the floods of 1962-63[177]. Though a 2014 paper[178] stated "The biggest floods in Albania happened in the period 1970-1971 flooding the pumping stations and reservoirs." This same paper also states: "Because of the topographic features, these floods occur very fast (8 – 10 hours)."

November 1962 to February 1963

The most serious flooding observed up to now in the rivers of Albania occurred during the winter of 1962-63 in terms of flooded area, duration and damages caused by them[179]. These events occurred not only in Albania but also in many other parts of the Mediterranean Basin and other parts of Western Europe. Very high water levels were observed in Lakes Ohrid, Prespa and Shkoder. In some parts to the west of the country groundwater levels rose and contributed to surface flooding.

Table 9.4: Flood depths on Drini (November 1962 to February 1963)

River	Station	Surface of watershed A (km^2)	River stage over "0" H (cm)	Discharge (m^3/s)
Buna	Shkodër	4,134	560	2,000
Drini	Vau i Dejës	11,500	673	5,180
Drini	Bahcellek	14,173	564	*
Drini i Zi	Kukës	4,413	531	1,080
Drini i Bardhë	Kukës	4,314	553	1,450

*Flow not computed as water overflowed the riverbank

Table 9.5: Flooded areas in the Drini-Buna River Basin (November 1962 to February 1963)

Zone	Inundated surface area (ha)	Duration (days)
Zadrima of Shkodra and Lezha, Bregu Bunës	18,575	22
Fields between Drini of Lezha and Mati	3,122	10

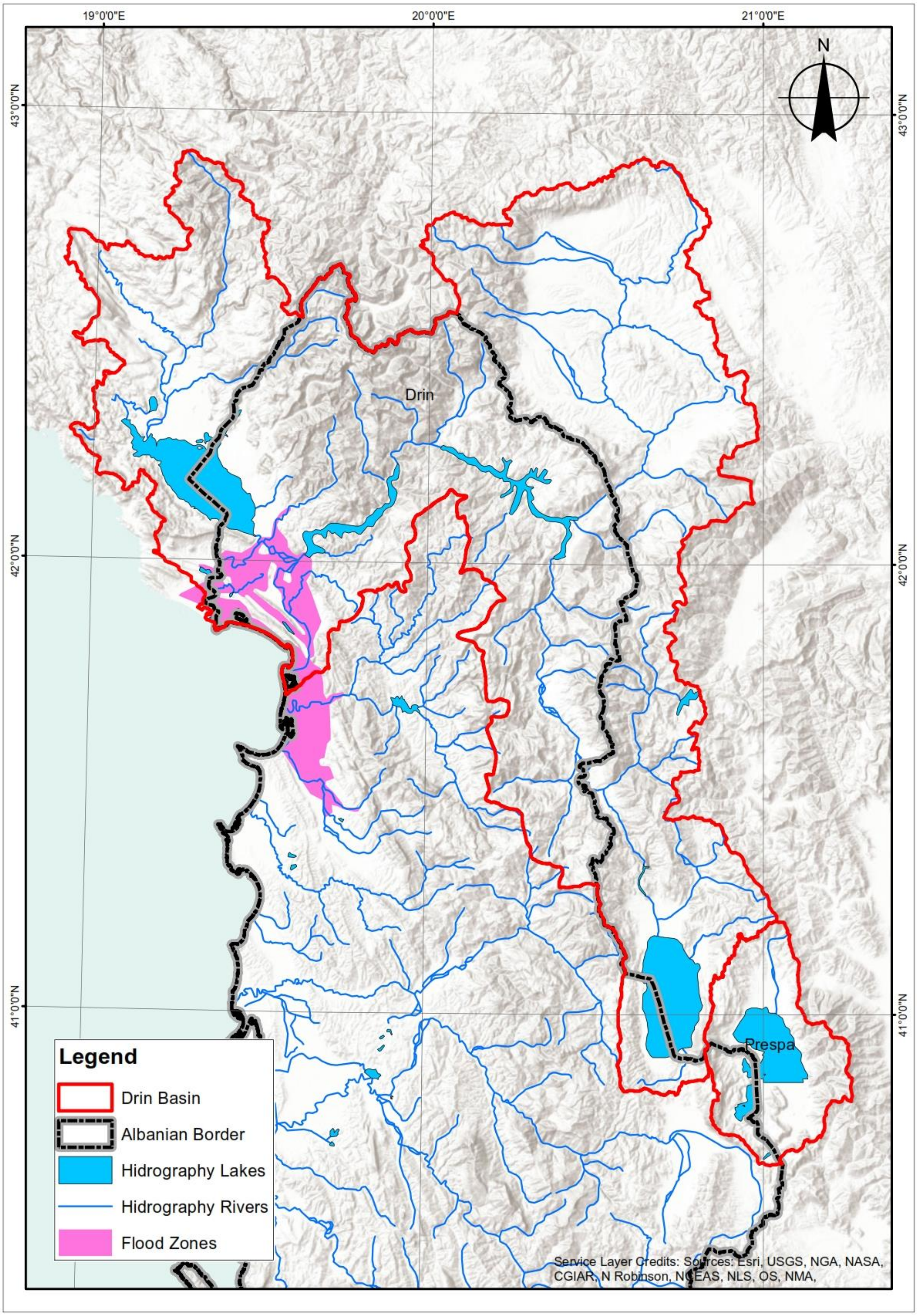
[176] http://reliefweb.int/report/albania/albania-floods-nov-1992-un-dha-situation-reports-1-4 (UN Department of Humanitarian Affairs)

[177] *Catastrophic floods and their "risk" in the rivers of Albania*. M. Bogdani & A. Selenica, Destructive Water: Water-Caused Natural Disasters, their Abatement and Control (Proceedings of the Conference held at Anaheim, California, June 1996). IAHS Publ. no. 239, 1997.

[178] Hoxna et al, *GIS Technology on Natural Disasters Management in Albania,* International Journal of Science and Research. Volume 3 Issue 11, November 2014

[179] *Risk assessment from flooding in the rivers of Albania*: Agim Selenica, Mehmet Ardicioglu ,Alban Kuriqi: International Balkans Conference on Challenges of Civil Engineering, BCCCE, 19-21 May 2011

Figure 9.1: Major flood zones in the Drini-Buna River Basin



M. Bogdani and A. Selenica [177] also give some details of the flooding of 1962-63. For the Drini they quote a flooded area of 20,000 ha, a flood duration of 22 days and maximum discharge of 9,500 m^3/s.

It is also reported that the flooding affected urban areas including the cities of Shkoder, Berat and Lezhe. The national network of roads was interrupted at many locations. The system of protective dikes was seriously damaged and, in many places, even destroyed[180].

After the major flooding outlined above, the Albanian government decided to reconstruct the flood embankments, which had been destroyed. Major investments were carried out for the construction of embankments of the parts of the rivers Drini, Buna, Mati, Ishmi, Erzeni, Shkumbini and Vjosa. These new embankments played a major role in reducing the impact of flooding in the winter of 1970-71. It has been calculated, that by these measures floods with return period of less than 50 years do not cause flooding in the low lands in the Western plane of Albania, on condition that the embankments remain undamaged and that the pumping stations operate normally.

9.2.1 Earlier flooding

The same paper quoted above[179] also reports on earlier floods.

Archival sources and the data collected from the Institute of Hydrometeorology of the Academy of Sciences show that big flooding are observed even in the past. From the first centuries before new era Roman historians had given evidences on the flooding of the Buna and Drini Rivers and the movement of their flow direction one time toward the Shkoder and the other time toward Lezha town.

Interesting evidences are given by Turkish chronist M. Sirri on the inundations of Shkoder from the floods of Drini, Buna, Lake Shkoder and Kiri River during the period 1854 - 1871 (see State Archives, document Nr.1/5605).

In the watershed of the rivers Buna and Drini other flooding's have been observed during the years 1937, 1952, 1960 but always with lower river stages than the floods of the winter 1962-63.

A hydrological study of the White Drin in Kosovo[181] dealt mainly with hydrology and climate. The study was based mainly on data for the period 1952 to 1986.

9.2.2 Observed floods overview

The observed floods show three main characteristics; The first is that there have been many deaths due to flooding, though less frequently in recent years than in the past. This is reflection of the efforts of Albania authorities. Secondly, floods often cause disruption to transport with landslides exacerbating the problems of flooded roads. The third, and from the economic point of view perhaps the most serious, is the flooding of low-lying irrigation areas near the coast. This type of flooding can last for several weeks and the floodwater can only be evacuated by pumping.

9.3 Water Storage

On the Drin River, there are three major dams built primarily for hydropower but which are also operated to minimise the effect in flooding. At present the operating rules are those developed in 1988[182]. The main features of the dams are given in the Table 9.6.

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[180] Disaster Risk Assessment in Albania, UNDP, 2003

[181] Technical Report on the Hydrology of the Drini River Basin. GFA Consulting Group. November 2008.

[182] Regulation on Discharge of Overflows of the Drini River Cascade, Tirana, 1988

Table 9.6: Main features of the three large hydropower dams in the Drini-Buna River Basin

Name	Total capacity (10^9 m^3)	Operating capacity (10^9 m^3)	Maximum level (m)	Winter level (m)	Flood storage (10^9 m^3)
Fierza	2.70	2.30	295	289	0.400
Komani	0.50	0.063	170	175	0.150
Vau i Dejës	0.580	0.044	76	74	0.075

As can be seen, Fierza reservoir has by far the biggest storage of the three dams. The level given above as "Winter" is the level, which as far as possible, is not exceeded during the period October to March, April is a transitional month and the during this period the level is allowed to increase to its maximum operating level. This rule has been developed to provide the maximum of flood protection in winter, when most floods occur, but to capture in the reservoir storage the runoff from the last month of snow melt runoff in spring to maximise storage available for summer.

The estimated flood inflows for Fierza reservoirs are: 1-in-100-year – 4570 m^3/s, 1-in-1,000-year – 6,100 m^3/s, 1-in-10,000-year – 9,600 m^3/s.

The column shown as flood storage is the volume between the 'winter' and the 'maximum' level. This flood storage for Fierza is equivalent to a flow of 4,629 m^3/s over a 24-hour period. However, the outlet tunnels at the dam can discharge 2,600 m^3/s and also, for the highest flood, levels can increase to 306.5 m giving a total flood storage of 1.345 10^9 m^3.

To allow for the smaller storage in Komani reservoir, relative to Fierza, a number of scenarios have been considered with different levels in Fierza reservoir at the start of the flood. The basic method of operation of Komani reservoir is to reduce its reservoir level below that shown above when Fierza is close to overflowing.

In the case of Vau i Dejes, the reservoir outlet structures are capable of discharging the 1-in-10,000-year flow, after allowing for the operation of Fierza.

Figure 9.2: Vau i Dejës dam showing turbine house and electrical sub-station

The conclusion is that for the three dams on the Drini, even for a return period of 1-in-10000-years, there is capacity to handle the flood.

During the construction of the dams, the possibility of landslides leading to flooding by overtopping of, or damage to, the dams was considered. In the case of Fierza two possible slip planes were examined; one of these could lead to a large volume of earth sliding into, filling up and overtopping the dam and the other was in the vicinity of the turbine hall. There was a third possibility of a landslip immediately downstream of Komani dam. In each case the potential slip planes and land levels are regularly monitored and at present there are no grounds for concern.

In addition to the dams mentioned above there are also 115 irrigation dams in Drini-Buna River Basin. They were constructed for flood protection, irrigation and hydropower generation. Many of these have a reduced capacity due to the deposition of silt. Some of them were badly designed and are now, for safety reasons, operating at less than full capacity. This reduces their effectiveness for flood control and the state of some them is such that the pose a flood themselves[183]. It has also been reported that some of the reservoirs are in a dangerous state and a few of them constitute a flood hazard.

9.4 Legal Requirements

The legal and policy framework of Albania for water and flood management has been modified in recent years to correspond to European legislation[184]. (The following summary of the legal situation regarding flooding in Albania is based largely on the document referenced, which was published in 2016.) The law on integrated management of water resources transposes the European Water Framework Directive into the national legislation. Chapter 10 of that law introduces the obligation for the preparation flood risk management plans, but it does not regulate systematic assessment of flood risk as a basis for the development of flood risk management plans. In 2015 the National Water Council adopted decision Number 4 of 17 February 2015 on a proposal for approval, by the Council of Ministers, of the draft decision for contents, development and implementation of the national strategy of water resources management, river basins management plans and flood risk management plans. These decisions incorporate the provisions of the EU Framework Directive specifically annexing three on procedures and contents for the development and implementation of flood risk management plans. Full implementation of the EU framework directive is expected to be achieved in Albania by 2020.

Several ministries and national organisations are involved in flood management; the Ministry of Agriculture and Rural Development, the Ministry of Tourism and Environment, the Ministry of Education, the Ministry of Interior, Ministry of Defence, prefectures, and local government. The role defines the mandate and responsibilities of the National Water Council, the Water Resource Management Agency, the River Basin Council's and the Administration Offices of Basin Water. The council is composed by the nine ministries. The integrated policy management group established for thematic groups, which are: water for people, water for food, water for industry and water for environment. The Water Resource Management Agency is preparing the national sector programme, which will address water issues. One of these issues is related to floods. The group "water for food" among others will deal floods and will be responsible for the preparation of the National Flood Program.

In decision number 5 of the National Water Council and by the Water Law, Albania is divided into six River Basin Management Authorities: Drini-Buna, Mati, Ishem-Erzen, Shkumbini, Seman and Vjosa. The first of these is an international river basin. Albania has signed agreements with neighbouring countries based on the United Nations ECE Water Convention. These include;

- The convention on the protection and use of international waters and international lakes, which was ratified by Albania in 1994 and by Greece 1996.
- The agreement for the permanent committee of Albania-Greece, regarding the management of freshwater issues transboundary basins, April 2003.

[183] Albania Second Environmental Review, United Nations, 2012.

[184] http://ipafloods.ipacivilprotection.eu/wp-ontent/uploads/2016/11/Findings_Recommendations_Albania.pdf

- Albania is also a signatory of the Memorandum of Understanding for the management of the extended transboundary Drin basin, which was signed in Tirana in November 2011 by ministers from Albania, the former Yugoslav Republic of Macedonia, Greece, Kosovo and Montenegro. This agreement aims at improving water resources management at a transboundary level.
- To improve flood preparedness and response in the Drin basin, Albania signed the Joint "Conclusions for the Development and Deepening Regional Cooperation in the Field of Crisis Management" between the republics of Albania, Kosovo and Macedonia, which was signed in Skopje in May 2011.

Preliminary flood risk assessment is currently under development in Albania. In particular, data on floods and their associated losses were systematically collected by the General Directorate of Civil Emergency of the Ministry of Defense. Moreover, in 2012 flood prone areas were mapped for the lower part of the Buna and Drini River as part of the post-disaster comprehensive flood risk assessment and management study, supported by the General Directorate of Civil Emergency, Ministry of Interior and the World Bank.

The law "On Organization and Functioning of Local Governments," No. 8265, dated July 31, 2000, Article, par.1, stipulates that "The commune and municipality have full administrative, service, investment and regulatory competencies for their exclusive functions set forth in this article;" and paragraph3 stipulates that "The communes and municipalities shall assume responsibilities, among others, for the following exclusive functions: Infrastructure and public services: (a) water supply; (b) sewerage and drainage system and (flood) protection canals in the residential areas."

9.4.1 Floods Directive

The European Water Framework Directive deals mainly with river basin management. In the preamble to the water directive it mentions that achieving good ecological status will contribute to mitigating the effects of floods. It also says that reducing the risk of floods is not one of the principal objectives of that Directive.

The Floods Directive (officially "Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks) is the primary document of the European Union relating to flooding.

The first three points in the preamble are as follows:

- Floods have the potential to cause fatalities, displacement of people and damage to the environment, to severely compromise economic development and to undermine the economic activities of the Community.
- Floods are natural phenomena, which cannot be prevented. However, some human activities (such as increasing human settlements and economic assets in floodplains and reduction of the natural water retention by land-use) and climate change contribute to an increase in the likelihood and adverse impact of flood events.
- It is feasible and desirable to reduce the risk of adverse consequences, especially on human health and life, the environment, cultural heritage, economic activity and infrastructure associated with floods. However, measures to reduce these risks should, as far as possible, be coordinated throughout a river basin if they are to be effective.

Article 2 of the directive gives two very important definitions. The first for 'flood' means "the temporary covering by water of land not normally covered by water". The second is for 'flood risk', which means "the combination of the probability of a flood event and of the potential adverse consequences for human health, the environment, cultural heritage and economic activity associated with the flood event".

Just as for the Water Framework Directive an important first stage is producing a River Basin Management plan, so for the Floods Directive the first stage is a preliminary flood risk assessment. The requirement is that the preliminary flood risk assessment should be based on a river basin district. The assessment should include the following:

- Maps of the River Basin district at the appropriate scale including the borders of the river basins, sub-basins and, where existing, coastal areas showing topography and land use;
- A description of the floods which have occurred in the past and which have significant adverse impacts on human health, the environment, cultural heritage and economic activity and for which the likelihood of similar future events are still relevant, including the flood extent and conveyance routes and an assessment of the adverse impacts they have entailed;
- A description of the significant floods, which have occurred in the past, where significant adverse consequences of similar future events might be envisaged.

The next step is to produce Flood Hazard Maps and Flood Risk Maps. The maps should define the geographical areas, which can be flooded according to 3 different scenarios: floods with a low probability, floods with a medium probability, and floods with a high probability. For each of the three scenarios the maps should show the flood extent, the water depths or water level, and the flow velocity or other relevant factors.

The next step is to produce flood risk management plans which have to take into account aspects such as costs and benefits, flood extent and flood conveyance routes and areas which have the potential to retain flood water such as natural floodplains. The management plan shall address all aspects of flood risk management focusing on prevention protection preparedness including flood forecast and early warning systems and taking into account the characteristics of the particular river basin and sub basin. The flood risk management plans may also include the promotion of sustainable land-use practices, improvement of water retention as well as the controlled flooding of certain areas in the case of a flood event.

The Floods Directive ends by setting out a timetable for producing the flood risk assessments and the flood risk maps.

9.4.2 Guidance for reporting under the Floods Directive

In addition to the Floods Directive itself. Guidance Note 29 gives further advice and clarification[185].

The stated purpose of this guidance document is to provide coherent guidance on reporting requirements from member states related to the implementation of directive 2007/60/EC on the assessment and management of flood risks. This guidance document can be considered as complementary to guidance document number 21 reporting under the Water Framework Directive.

Article 16 of the floods directive contains the provision for the European commission to submit to the European Parliament and the Council of Ministers a report on the implementation of the floods directive by the year 2018, and every six years after that. The impact of climate change shall be taken into account in drawing up this report. It is envisaged that reporting will be carried out electronically via WISE (Water Information System for Europe).

The document also sets out detailed reporting scheme:

- User manual
- User guide to the reporting scheme
- User guide to reporting spatial data
- Guidance on reporting Flood Hazard and Risk Maps.

[185] Guidance for Reporting under the Floods Directive (2007/60/EC) Guidance Document No. 29. A compilation of reporting sheets adopted by Water Directors Common Implementation Strategy for the Water Framework Directive (2000/60/EC)

There is also a requirement for coordination between the development of river basin management plans under the Water Framework Directive and flood risk management plans under the Floods Directive. They are considered to be elements of integrated river basin management. The coordination in particular requires:

- The development of flood hazard maps and flood risk maps and the subsequent reviews.
- The development of flood risk management plans and subsequent reviews.
- The active involvement of all interested parties to be coordinated, as appropriate, with the active involvement of interested parties under the Water Framework Directive.

Reporting is also required to take account of the Inspire Directive 2007/2/EC (infrastructure the spatial information in the European community). Inspire is based on a number of common principles:

- Data should be collected only once and stored where it can be maintained most effectively.
- It should be possible to combine spatial information from different sources across Europe and share it with many users and applications.
- It should be possible for information to be interchanged different levels and scales.
- Geographic information at all levels should be readily and transparently available.
- Easy to find geographic information was available and how it can be used.

The provision of this data and information will allow the European Commission to ensure that all administrative roles required by the floods directive were being fulfilled within the river basin district or other unit of management. The data may be used for presentation to the European commission will be provided to the public through wise.

9.5 Floods Working Group Resource Document on Flood Risk Management

Further guidance on economic aspect of implementing the Floods Directive is given in a report by Working Group F of the Common Implementation Strategy for the Water Framework Directive.[186] This report points out that both the Floods Directive and the Water Framework Directive make explicit and implicit references to economic assessments. It develops the concept of risk as being the combination of flood hazard and flood consequences.

The document underlines the need for member states to take an integrated approach to flood management. Special attention should be paid the use of flood forecasting and warning systems, to cooperation and information sharing between disaster management water management, also in an international context, to the increasing use of disaster insurance policies with risk-based premiums. An important conclusion of the report was that economic assessments could deliver mechanisms for compensation transboundary effects related to the solidarity principal, and cross-border cooperation should be supported by appropriate funding. The impact of climate change on these issues should also be assessed.

Recital 18 of the Preamble of the Floods Directive points out that ‘A significant challenge exists in striking the balance between devising methodologies that allow for a robust assessment of alternative measures, while at the same time not being excessively costly, technical, or prohibitively complex for interested parties to understand.’ This implies that the decision framework for evaluating and prioritising flood risk management measures and drawing up flood risk management plans should be kept relatively simple although still allowing for a consistent assessment.

The report identifies the main stages in economic evaluation of flood alleviation measures.

- Build an appropriate baseline. This is the actual current situation against which future flood greatest reduction measures management plans can be compared.

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[186] A Floods Working Group (CIS) Resource document Flood Risk Management, Economics and Decision-Making Support. October 2012. Working Group F of the Common Implementation Strategy for the Water Framework Directive

- Counting economic losses. There's should make a financial evaluation of the impacts of flood risk reduction measures which should also take account of intangible impacts.
- Sensitivity and uncertainty analysis. This should be used to identify critical parameters. That is a parameter for which a small variation in its value as a relatively impact on the performance of a flood management measure or plan.
- Flood consequences in the classification. The floods directive requires the assessment for different types of impact: economic, social, environmental and cultural.
- Flood hazard data. The flood hazard data can either be modelled by means of hydrologic and hydraulic modelling or can be based on observations. Cost benefit analysis it is necessary to consider the consequences of a number of flood events with different frequencies of occurrence.

Flood risk reduction measures can be considered under the following headings:

- No action
- Prevention: Avoidance, removal or relocation, reduction, other prevention.
- Protection: Natural flood management /runoff and catchment management, Water flow regulation, Channel, Coastal and Floodplain Works, Surface Water Management, Other protection.
- Preparedness: Flood Forecasting and Warning, Emergency Event Response Planning, Contingency planning, Public Awareness and Preparedness, Other preparedness.
- Recovery and Review: Individual and societal recovery, Environmental recovery, other recovery and review.

All of the above should lead to cost benefit analysis. The report argues that cost benefit/analysis as used in welfare economics it is perfectly suited to compare totally different alternatives; costs and benefits expressed in the same unit: money. That said, there is often opposition to the use of cost benefit analysis as it is difficult to express certain effects in monetary terms. It may be necessary to consider alternative approaches such as cost-effective analysis, multi-criteria analysis and extended cost benefit analysis.

9.6 Emergency Response

A good overall summary of the emergency response situation in Albania is given by 'Vademecum – Civil Protection' which part of the Directorate for "Humanitarian Aid & Civil Protection Directorate" of the European Commission[187].

The General Directorate of Civil Emergency is part of the Ministry of the Interior. It was established under Albanian Law 8756 of 26th March 2001 and governed by the Albanian National Civil Emergency Plan of 3 December 2004. In summary, the aims of that law are:

- To prevent, mitigate and remedy any damage inflicted on people, animals, property, cultural heritage and environment by emergencies;
- To provide conditions for public institutions, economic entities and the population for the transfer from ordinary living and working conditions to an emergency situation with the smallest possible losses, for the keeping of order, preservation of human lives, animals, property, cultural heritage and the environment against the effects of an emergency;
- To guarantee the use of available state resources in order to ensure public security, maintain the continuation of the national economy, localise the emergency areas and alleviate the effects thereof.

[187] http://ipacivilprotection.eu/albania.html

“At the highest level The Council of Ministers leads and governs the national system of civil emergency management in Albania. It approves and endorses appropriate strategies, policies and programs that aim to prevent, mitigate, prepare and respond to civil emergency situations. In compliance with the Constitution of the Republic of Albania, other legal instruments, international agreements and covenants, it endorses appropriate policies and funds for the strengthening of the system of defence against events that threaten human life, property, cultural heritage, and the environment.”

From this description, it is clear that the response to flooding in but one of the types of civil emergencies to be responded to by the General Directorate of Civil Emergency. Albania is exposed to a considerable number of natural and man-made disasters. The biggest risk of natural disasters comes from earthquakes, but in recent times, floods, landslides (often caused by heavy rain which also causes flooding) and winter emergencies, even though at lower impact, were more evident. Also, it is important to consider the protection of water resources (surface and underground) as a result of flooding in order to guarantee the quality of drinking water, and thus the protection of the health of vulnerable populations from diseases as a consequence of water pollution. Factors such as the economic situation, damaged infrastructure and communication means, mass migration, building boom and other factors related to misuse of forests, natural sources of water and environmental pollution, increases vulnerability of the population and the economy in general.

The General Directorate of Civil Emergency is the highest-level body working with civil emergencies. Responsibilities start at the Municipal or Commune level. The Mayor is responsible for planning and facing civil emergencies in the relevant municipality. The next higher level is that of the District (Qark) (Region); at this level, the Prefect is responsible for planning and facing the civil emergencies in the relevant district. Also the Line Ministries are responsible forplanning and facing the civil emergencies in their field of responsibility and have a role in developing their specific responsibilities. The General Directorate of Civil Emergency has the overall coordinating role. The General Directorate of Civil Emergencythrought the National Operational Centre of Civil Emergency has direct links with operational forces and other stakeholders including those set up at District (Qark) level.

If it is determined that that national resources and capabilities are not able to fully respond to an emergency there are established procedures for requesting international assistance. The assistance can take the form of financial contributions, donations (food, tents, blankets, medical supplies etc.) or specialist services (search and rescue teams). Assistance in coordinating international aid can be requested from the United Nations, EU structures, NATO or other countries. In the case of international emergency aid, the Directorate of Emergency Situations works closely with Customs, Immigration, Quarantine and border services to facilitate the entry of personnel, equipment and supplies.

Albania is party to international agreements to disaster preparedness and response.

In addition to the Directorate of Civil Emergencies other organisation with a defined role include IGJEUM (Institute of GeoSciences, Energy, Water and Environment), particularly in relation to earthquakes and floods, and the Red Cross.

The principal operational forces, which can respond to a flood (or other type of emergency) include:

- Armed Forces
- Directorate of Fire Protection and Rescue (PMNZZH)
- The Ambulance Service
- The State Police and other Police units
- General Directorate of State Reserves

A recent example of implementing the government’s response to flooding came after the floods of November 2016, which were caused by a combination of heavy rain and snow melt. A flood alert was issued by IGJEUM. Reacting to the flood alert the Ministry of the Interior ordered the establishment of several “emergency headquarters” across the country, the police, Red Cross and other emergency teams were put on standby and Mayors and commune heads were ordered to avoid risks including the closure of schools. The flooding affected 4,500 people, 1,000 hectares of land and 1,500 buildings. A consequence of the flooding was that stores of food were often destroyed.

9.7 Gap Analysis

A study published in 2014[188] managed by the European Investment Bank reported "The implementation of FD remains at an early stage." stated that full implementation was planned for 2020. The report set out the main steps of the flood management cycle:

- Mitigation. Preventing future emergencies or minimising their effects.
- Preparedness. Preparing to handle potential floods.
- Response. Responding safely to flood catastrophes.
- Recovery. Recovering from an emergency.

The status in Albania at that time was summarised in Table 9.7 below.

Table 9.7: Implementation status of the Floods Directive in Albania

Level of Implementation	Foreseen Date
Preparation of flood hazard maps (FHM) and flood risk maps (FRM) (Art. 5)	2018
Establishment of appropriate objectives for the management of flood risks (Art. 7)	2018
Establishment of measures for achieving appropriate objectives for the management of flood risks (Art. 7)	2015
Establishment of appropriate steps for coordinating application of Directive 2007/60/EC and Directive 2000/60/EG (Art. 9)	2014
Publication of PRA, FHMs and FRMs, FRM plans making them available to the (Art. 10)	2019
Full implementation	2020

A Gap Analysis for countries in the Western Balkans, also within the Western Balkan Investment Framework, was published in 2015.[189] The report recognises the specific topography of the region, which is:

"*often characterised by steep slopes with low vegetation, occasionally with narrow riverbeds and relatively large basins. The southern strip of shore of the Adriatic (typically in Albania) consists of fluvial lowlands. The large flatlands, and the extreme variations in the terrain and the river network, mean that large areas in the region are prone to flooding, to a varying degree*."

Referring to the Organisational Background they state:

"*The organisational background of flood management in Albania is established and the structure reflects the requirements of the WFD and the FD. The functioning of the organisation is, however, problematic due to some overlaps in responsibilities. For example, land use planning is the concern of following ministries: the Ministry of Agriculture, Rural Development and Water Administration (MoARDWA), the Ministry of Environment (MoE), Ministry of Urban Development and the National Territorial Planning Agency and the Ministry of Interior (MoI) as well as the prefectures and municipalities (under the MoI). The Hydro-meteorological Institute is affiliated to the Ministry of Education and the operation of the dams is under the*

[188] Present Situation of Flood Management in the Western Balkans, December 2014, Western Balkans Investment Framework (WBIF), Infrastructure Projects Facility Technical Assistance 4 (IPF 4).

[189] Flood prevention and management gap analysis and needs assessment in the context of implementing EU Floods Directive. September 2015. Western Balkans Investment Framework (WBIF), Infrastructure Projects Facility Technical Assistance 4 (IPF 4).

responsibility of the Ministry of Economy, Trade and Energy. The fragmentation of the responsibilities leads to inefficient use of resources and the decrease of the overall efficiency of the flood management system."

The report set out a road map for implementing the WFD for the countries of the Western Balkans, including Albania. Its five steps are:

- The countries should develop and adopt their FD implementation plan and programme.
- The countries should accelerate the transposition of EU legislation. Besides the full transposition of the FD and the WFD, detailed bylaws and decrees, annexed with renewed planning, design and construction standards are to be developed. These should be in line with the country-specific institutional settings and the overall framework of disaster risk management and should consider the foreseeable impacts of climate change.
- The countries should take steps to incorporate flood management issues into all other sectoral procedures, such as urbanisation, urban and rural housing, agriculture or dam management. Special emphasis is to be given to land use in flood areas, sewage and waste management, as well as climate change. Strengthening legislative enforcement is a key issue, in general, but also in light of land use and property issues.
- The Floods Directive is a soft directive and, therefore, it is necessary that the institutional and planning activities be in place prior to its implementation. The implementation of the Directive has to be accelerated and organisational structures have to be rehabilitated and refined, and existing management organisations need to prepare for the Directive's implementation. Strengthening organisational structures must be carried out as soon as possible.
- The preparation of flood hazard and flood risk assessments and flood management plans are the major points of the FD.

The report itemises a number of flood related projects for Albania. These include Flood Protection in the Lower Drin & Buna River Basin in Shkoder area, estimated to cost €63,000,000. Other than a single line in a table no further details are given.

With regard to Strategy and Institutions related to flood management, their overall assessment is that the basic requirements are met but further detailing of tasks in needed. They comment that the Institutional background has been set up set up, with a strong central co-ordination under the Prime Minister's Office. A National strategy on water management exists with chapters on flood management.

At the time of writing the report they assessed that transition to the legal framework in line with the Floods Directive is in place or under preparation. The Law on Waters has chapters on Flood Management but other flood related legislation was less developed. The following table summarised the implementation status.

Table 9.8: Implementation status of institutional background related to FD in Albania

Major steps in the implementation process	In Progress	To be Developed
Legal framework	+	
Efficient organisational framework	+	
Sufficient early warning system		+
Sufficient monitoring system		+
Preliminary Flood Risk Assessment		+
Flood Hazard Maps		+
Flood Risk Maps		+
Flood Management Plans		+

The most recent published study of the Floods Directive status was the one referenced above[184]. Whilst not specifically a gap analysis it showed that the situation as described in the earlier reports has not advanced markedly.

9.8 Climate Change

There are two main international bodies associated with climate change. The United Nations Framework Convention on Climate Change (UNFCCC); the body was set up in 1992 within the framework of the United Nations. The second body is the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by two United Nations Organizations, the World Meteorological Organization and the United Nations Environment Programme. Its function is to assess "the scientific, technical and socioeconomic information relevant for the understanding of the risk of human-induced climate change."

In brief, the UNFCC is the body that coordinates governmental level actions to combat the impact of climate change. The IPCC's role is to assess the scientific, technical and socioeconomic information relevant for the understanding of the risk of human-induced climate change and the effectiveness of measures to combat the risk.

Within the context of the UNFCCC countries are required to submit National Communications. These outline the contribution of the country to climate change and their response the challenges it poses.

A UNDP project document related to the Third National Communication summarises the progress in climate change reporting[190]. Albania submitted its Initial National Communication in 2002. This included a greenhouse gas inventory and a review of the seven main GHG-emitting sectors: energy, industrial processes, agriculture and livestock, land use change and forestry, waste, solvents and international use by ships and aircraft. The second National Communication was submitted in 2009. The third, and latest, National Communication was submitted in 2016.

The third National Communication (TNC)[191] presents an updated inventory for greenhouse gases, both direct and indirect, and key sources. The climate of Albania is divided into four zones: Mediterranean field zone, Mediterranean hilly zone, Mediterranean pre-mountain zone and Mediterranean mountain zone. The study for the TNC concentrated on the Mediterranean field zone, which includes the capital, Tirana, and the coastal zone. The report justified the choice of coastal zone as an earlier UNDP-GEF study of the Drini-Buna[192] identified the delta of this river system as 'critically vulnerable'.

The analysis of observed temperatures suggested that average temperatures had fallen in the period 1971 to 2000 and after that had risen. In the latter period the number of days with temperature greater than 35°C had also risen. With precipitation, both annual and daily, there is some evidence of increases in recent years but the trend is reported as being less clear than for temperature. The report states that flooding is a major form of natural disaster experienced in Albania.

The climate change scenarios presented are based on the Special Report on Emission Scenarios (SRES) as presented in the IPCC Fourth Assessment Report of 2007.

Table 9.9 shows the projected increase in temperature.

Table 9.9: Temperature change projections (°C) for different time horizons related to 1990 (average model)

Years	2030	2050	2080	2100
Annual	1.0 (0.7 to 1.2)	1.7 (13 to 2.2)	2.8 (2.0 to 3.5)	3.2 (2.4 to 4.1)

[190] UNDP, Country: Albania, Third National Contribution to the UNFCCC. Project Document. albania_tnc_prodoc_signed_and_dated-2.pdf

[191] Third National Communication of the Republic of Albania under the United Nations Framework Convention on Climate Change, 2016.

[192] Climate Change Adaptation in the Drini Mati River Delta and Beyond. Policy Paper. MARD, 2013.

Years	2030	2050	2080	2100
Winter	0.8 (0.7 to 0.9)	1.2 (1.0 to 1.4)	2.8 (1.7 to 2.3)	2.4 (1.9 to 2.7)
Spring	1.0 (0.8 to 1.12)	1.5 (1.3 to 1.8)	2.6 (2.2 to 3.0)	3.1 (2.6 to 3.6)
Summer	1.6 (0.5 to 1.8)	2.5 (2.1 to 2.8)	4.3 (3.8 to 4.9)	5.3 (4.6 to 6.0)
Autumn	1.0 (1.0 to 1.1)	1.6 (1.5 to 1.8)	2.8 (2.7 to 3.0)	3.5 (3.2 to 3.7)

What is significant is that the largest increases are expected in the summer. One consequence of this will be on the demand for irrigation water. A second consequence will be an increase in the frequency and intensity of summer thunderstorms. The temperate increases in spring will have an impact on flooding, as many floods are combination of rainfall and snowmelt.

Table 9.10 shows the projected change in precipitation, which shows that in general precipitation is expected to decrease in all seasons over the coming century.

Table 9.10: Precipitation change projections (%) for different time horizons related to 1990

Years	2030	2050	2080	2100
Annual	3.84 (-35.4 to 27.7)	-8.46 (-56.0 to 47.4)	-14.37 (-78.6 to 81.1)	-18.13 (-89.7 to 94.9)
Winter	-5.96 (-15.9 to 4.0)	-10 (-27.9 to 7.7)	-14.3 (-44.6 to 16.1)	-18.1 (-55.8 to 19.6)
Spring	-2.45 (-11.9 to 7.0)	-7.26 (-25.3 to 10.75)	-14.26 (-45.1 to 16.6	-17.7 (-55.3 to 19.8)
Summer	-10.4 (-12.8 to -7.9)	-19.7 (-24.1 to -15.3)	-41.9 (-49.2 to -34.5)	-50.4 (-59.4 to -41.3)
Autumn	0.5 (-10.1 to 11.1)	-2.5 (-21.3 to 16.3)	-6.9 (-38.1 to 25.2)	-9.5 (-48.1 to 29.1)

The National Contribution also tabulates 24-hour precipitation for different return periods but does not present this as a change relative to present conditions. It does however state “Although the number of extreme precipitation events can be expected to increase in terms of magnitude and frequency, overall the reduced levels of precipitation will also lead to an increase in the number of consecutive days without precipitation (drought).”.

One limitation of the National Contribution is that is based mainly on the projections presented in the IPCC Assessment Report of 2007. The latest assessment report of the IPCC was published in 2013 and replaced the SRES scenarios with Representative Concentration Pathways (RCP). These are briefly mentioned in an annex to the Third National Contribution. Representative Concentration Pathways quantify the changes in climate in terms of the energy imbalance introduced by greenhouse gases and other anthropogenic factors. There are four of these 2.6 w/m^2, 4.5 W/m^2, 6.0 W/m^2 and 8.5 W/m^2. The last of these represents the most severe change and can be taken as representing an envelope of the maximum likely impact.

An analysis carried out in the context of this project identified four climate models as being representative of the Balkan region. These were:

- CNRM-CM5. National Centre for Meteorological Research, France
- EC-EARTH. European Centre for Medium-range Weather Forecast
- HadGEM2-ES, Meteorological Office, United Kingdom.
- MPI-ESM-MR, Max-Planck-Institut für Meteorologie, Germany.

Precipitation projections were downloaded for all four models. Further analysis of the modelled output concentrated on precipitation and concluded that the CNRM model was most representative, though not markedly more accurate than other models.

As part of the overall exercise using climate models coordinated by the IPCC a separate study was set up under the Expert Team on Climate Change Detection and Indices (ETCCDI). This team extracted projections on extreme weather events from the climate models whose output was used to inform the IPCC assessment report of 2013. Among the parameters they analysed was the maximum rainfall in each year up to 2100. Of the four models mentioned above one of them, EC-EARTH, did not contribute to this supplementary study. Data for this parameter for the three remaining models were downloaded from the Climate Explorer web site of the Netherland Meteorological Service.

The following chart is based on the model cells, which approximate to the area of the Drini-Buna River Basins. However, given that the model cells typically cover an area of 100 by 50 then they represent an area that often extends beyond the basin.

The first of each pair of columns shows the percentage change in average annual maximum daily rainfall 2020 to 2100 relative to the period 1990 to 2020. The second column of the pair shows the increase in the 1-in-25-year rainfall for the period. This took account of the mean and the standard deviation.

Table 9.11: Rainfall modelling in the Drini-Buna River Basin

Model	Drini-Buna River Basin	
	Change in average maximum daily rainfall (%)	Change in 1-in-25-year rainfall (%)
CNRM	3.9	21.3
HadGem	1.2	-7.0
MPI	6.6	9.2

The first conclusion is that on average flooding will increase slightly. However, storm rainfall will become more variable and as a consequence some years will have smaller floods in the past but others will have higher floods.

It should be noted that these projections only take account of the influence of climate change. Other factors, such as deforestation or increased urbanisation will also have an impact.

9.9 Measures Recommended in Previous Projects

9.9.1 Legislative and institutional measures

The gap analysis comparing the legislative situation relating to flooding[188] in Albania with the requirements of the EU Floods Directive shows that good progress has been made. There are however gaps related to the institutional framework required under the Floods Directive.

9.9.2 Efficient organisational framework

The organisational structure has been established and this corresponds to the requirements of the FD. However, there is still a need to strengthen the organisations that have been created to enable them to fulfil their obligations. This situation is not one that specifically, or only, relates to flooding but applies to Water Framework Directive and other directive associated with water management. Whilst the proposed structure complies with the requirements of the Water Framework Directive it could be considered to have ignored some specific aspects of the hydrogeology and hydrogeology of Albania. For example, a comparison of the six proposed river basin districts in Albania shows that they would be comparable to the smallest basin districts in the European Union and a better use of scarce resources might envisage many tasks being performed at a national level.

9.9.3 Sufficient Monitoring System

In the reports analysed for this section of flooding there is virtually no quantitative information on water levels or on river flows for recent floods. (Though such information is available for the floods of 1962-1963.) Without such measurements, it is difficult to relate the narrative descriptions of floods in press reports to a quantitative analysis of the frequency of flooding. This in turn means that an economic analysis of measures to reduce the impact of floods cannot be completed to an acceptable level of accuracy. As a priority, water level measurement stations should be installed at critical points on the system of major rivers within Albania. Suitable location would include: upstream of lowland areas or areas of irrigation, on major tributaries and selected tributaries on the headwaters of some rivers. Such a network operated in the past and the sites of new stations should correspond, where possible, with the sites of previous stations; this would enable an analysis of the impact of climate change or of human activities in the river basins.

The water level stations should be calibrated so that they also provide measurements of river flow.

At present the meteorological network comes under the Ministry of Education. Regardless of which Ministry become responsible for flow measurement it should work closely with those who operate the meteorological network.

Until a suitable flow measuring network is established then other activities such as flood forecasting, water resources planning and establishing criteria for water quality cannot proceed.

9.9.4 Sufficient early warning system

At present flood warning is based largely on weather forecasts.

With the exception of the Drini-Buna system, the rivers in Albania are around 100 km from the headwater to the sea and for most of their length are steep. This means that the time of concentration (the time between the start of storm to the peak of a flood) is of the order of 5 to 10 hours. As a consequence, a flood early warning system would require a network of climate and rainfall stations, for a preliminary calculation of the potential flood risk at the start of a storm, and a network of water level monitoring stations, to increase the accuracy of the forecast as the storm and flooding progressed. The network would require rapid, real-time, transmission of data and a mathematical model to produce forecasts of levels. All of this would feed into an organization, which had the means and authority to evacuate people at risk or close roads made dangerous by flooding.

9.9.5 Preliminary flood risk assessment

The reports of past flooding in Albania are taken largely from media sources and give little detail of the meteorological conditions leading up to the flood, the rate of rise of rivers and how the flooding moved out of the river banks to the area damaged. That said, the existing information coupled with field surveys of areas known to have been affected would provide a valuable basis for an initial assessment of flood risk. When people have been flooded, they are often able to identify specific points that the flood reached.

9.9.6 Flood hazard maps

Flood hazard maps are defined as ‘maps to show the geographical area which could be flooded under different scenarios’ (WD, Article 6.3). The preliminary flood risk assessment would identify areas that had been flooded in the past. This information coupled with topographic surveys could enable maps of past flooding to be prepared.

The mapping should take account of features specific to each catchment. For example, major dams and their pattern of filling and release of water can alter the frequency and severity of flooding. Some of the irrigation dams are known to be in a poor condition; the risk of dam failure should be assessed and consequences of a dam-break flood on downstream populations assessed.

Many residential and industrial areas have flood protection embankments. The current state of these structures must be surveyed.

An assessment covering the points mentioned above would still be very preliminary. According to the Floods Directive the mapping should relate the degree of flooding to known frequencies of occurrence; without a long record of water levels this is not possible.

9.9.7 Flood risk maps

Flood risk maps must show 'the potential adverse consequences of these flood scenarios identified in the flood hazard maps' (WD, Article 6.5). As with the flood hazard mapping an initial assessment could be developed based on descriptions of past floods. This mapping should identify especially vulnerable locations such as hospitals, schools, major roads, industrial complexes, etc. For a more complete mapping then additional hydrological and meteorological data would be needed.

Another potential limitation in using only records of floods over recent decades as a guide is that it cannot take account of changes to the river basin. For example, newly built up areas, could lead to higher runoff, or new road building could change flow paths in the flood plain. When flow data have been available for a few years then, in the future, it will be necessary to calibrate a detailed hydraulic model of the river and the surrounding areas which are, or which could be, flooded. Such a model could use as a starting point the hydrological model of the Drini-Buna River Basin developed as a component of this project.

9.10 Specific Recommendations for the Drini-Buna River Basin

A major study of flooding in the Lower Drini and Buna River Basin was completed in 2012[193]. To date, this is the most comprehensive study, 224 pages, of flooding in that basin. The study considers the area downstream of Shkoder Lake on the Buna and downstream of Vau I Dejes reservoir to the sea. It includes areas with intense irrigation and inter-connected canals.

The study was initiated after the severe floods of 2010. The main tool used was a hydraulic model of the river system calibrated to represent the areas flooded in 2010. A digital terrain model was developed using data from river bathymetry, 1:10,000 contour data scanned from hardcopy maps, shuttle radar topography mission data and additional surveys of embankments, roads and bridges. Flow records on the Drini were based on outflow from Vau I Dejes reservoir. Outflow from Shkoder lake was based on levels at two gauges: Buna Shkoder and Buna Fabrika Cimentos.

The proposed measures for flood reduction were grouped as Medium-term measures, Longer-term measure and Non-structural measures. The eight medium-term measures were:

- Improvements in existing dikes along the Buna River in accordance with the corresponding existing dikes on the Montenegro side of the river.
- Increase the capacity of drainage channels. This is to be achieved by a combination of clearance of excessive vegetation and excavation of a wider drainage channel.
- Bunding along the west side of the road to prevent overflow water reaching land of villages to the east of the road.
- Formalising the use of the canal embankment to function as a flood containment structure.

[193] A Post-Disaster Comprehensive Flood: Risk Assessment & Management Study. Final Report - The Flood Risk Management Plan for the Lower Drini & Buna River Basin, July 2012. Mott MacDonald, General Directorate of Civil Emergencies

- Using an area as a free flood-way by the construction of a long bridge. This would also include improvements to other Drini River dikes.
- Widening part of the Buna river channel. This option might also include river dredging.
- Increase the capacity of a road bridge, widen and increase the span. Remove an old bridge upstream.

These individual components are part of four alternative flood mitigation solutions. All of which involve dredging and which are intended to increase the flow capacity of the river from 1500 m^3/s to 2200 m^3/s. [194] Two of the four options were assessed to have a benefit/cost ration in excess of 1.0.

The report also presented two longer-term measures.

- Transboundary decisions need to be made between Albania and Montenegro regarding water levels in Shkoder Lake. This would require a gated control structure, which allows the regulation of the Lake levels during the dry season and controlled discharge and storage flows during the wet season.
- Management of the Drini cascade is currently based on concerns about stability of the dams in energy production but does not consider flood protection. Management of the discharges of the dams and Shkoder Lake could have a positive impact on floods downstream.[195]

A further long-term measure is proposed by NAPA - The biological measure for the installation of the forest vegetation in the deforested sides of the catchment must be a priority, as an intervention to eliminate the causes, not the consequences

Two non-structural measures were also presented.

- Providing a flood forecasting and warning service to minimise the impact of flood events by allowing authorities and the general population to take mitigating actions.
- Planning controls to prevent further development in areas such as the low-lying land between the Drini and Buna at their confluence.

[194] Normally, solutions involving dredging also include an allowance for further dredging in the future. This is due to the fact that when a river's capacity has been increased velocities are lower and therefore more of the material in suspension drops out and the river over time will return to its original profile. The economic analysis includes 'maintenance' but does not appear to make allowance for repeated dredging in the future.

[195] This appears to contradict information provided to the project by the dam operator (KESH) who presented details of operating procedures designed to minimise floods.

10 Environmental Objectives

The WFD requires that Member States implement the necessary measures to prevent the deterioration of the status of all bodies of surface water and that the following environmental objectives are achieved:

- Good ecological/chemical status of surface water bodies;
- Good ecological potential and chemical status of HMWBs and AWBs;
- Good chemical/quantitative status of groundwater bodies.

Based on previous national monitoring, the Drini-Buna RBMP provides an overview of the surface water and groundwater status (Section 7). The previous monitoring is not however in line with the requirements of the WFD. In the absence of WFD compliant methodologies, a rapid procedure for ecological assessment has been applied in order to provide information, albeit limited, on the ecological quality of surface waters.

Despite the lack of capacity (human resource and technical ability) in the Drini-Buna River Basin (and nationally) to undertake the monitoring requirements of the WFD, a complementary approach at the basin-wide level, which is of use for national planning and implementation, visions and specific management objectives can be defined for the River Basin based on the Nation Plan for the water sector (NPWS). This approach will provide guidance for management with regard to attaining agreed goals of basin-wide importance and also assist with the achievement of the overall WFD environmental objectives. The visions are based on common values and describe the principle objectives for the Drini-Buna River Basin. The respective management objectives describe the first steps towards the environmental objectives in the Drini-Buna River Basin in an explicit way.

NPWS sets perspective on the vision, goals and objectives of the sector in the year 2030, in line with the UN Sustainable Development Goals (2030 Agenda) and the cycle of drafting water basin management plans, referred to in the Water Framework Directive.

From the hierarchical division point of view there are four main levels of the division of roles and responsibilities in the public sector, which are; Leading, Managing, Managing and operational. The leading institutions are the Council of Ministers, the National Water Council, the Strategic Planning Committee; At government level are line ministries related to water issues; At the management level are the National Agencies, the Regional Drainage Boards, the latter also perform operational tasks; Depending on line ministries and at the operational level, local authorities are responsible for various sectorial problems (construction, maintenance, rehabilitation, etc.).

The approach, based on the NPWS is set up in river basin an integrated system in order to ensure inter-institutional interaction to successfully achieve the foreseen environmental objectives while also ensuring the sustainability of the system. The environmental objectives, proposed actions and the indicators for success are presented in Table 10.1.

To achieve the objectives for the water sector, for the period 2017-2027 and beyond, a number of necessary measures have been proposed in Section 12.

Table 10.1: Environmental Objectives, actions and indicators for the Drini-Buna River Basin[196]

Environmental Objective/Actions	Measurable Units	Target		
		2019[197]	**2021**	**2029**
1. *To promote the sustainable use of water resources, their fair distribution among users, maximizing economic benefits in respect of environmental conditions and sustainable management principles*				
Continuous improvement in the water supply	*% of population served in urban areas*	84	89	94
	% of population served in rural areas	35	40	58
	Average water supply (hours/ days)	9	12	17
Improved collection of waste water	*% of population served in urban areas*	64	65	70
	% of population served in rural areas	18	24	30
Water for irrigation for agriculture land	*Irrigated agriculture land (ha)*	28,000	35,000	45,000
Improvement of drainage network for irrigated agricultural land	*Area with drainage network (ha)*	40,000	50,000	60,000
Sustainable development aquaculture in specified zones	*% of active economy in specified zone*	10	30	60
Maximising the use of hydro energy potential	*% compared with country max capacity*	70	80	95
Fulfilling of industrial water requirements	*% compared with demand*	90	100	100
2. Preservation and achievement of minimal "good" ecological and chemical status for surface water bodies that have "less than good", "poor" or "very poor" status. (rivers, lakes, transitional / transitional waters, coastal, artificial and highly modified water bodies)				
Improvement of monitoring for all water bodies	*% of monitoring stations at agreed locations providing relevant data*	20	50	100
Improvement of ecological status and chemical quality for all surface water body types	*% reduction of discharges of untreated wastewater from towns with >2,000 population equivalents (point sources)*	10	50	95
	% of population connected to the waste water treatment plant	22	40	70
	Construction of septic tanks for % of population not in wastewater collection network	15	25	50
	% reduction of discharges of untreated wastewater from industrial and agricultural	10	50	95

[196] The Environmental Objectives are in line with the NPWS

[197] 2017 is regarded as the 'base year'.

Environmental Objective/Actions	Measurable Units	Target		
		2019[197]	2021	2029
	installations (point sources)			
Introduction of good agricultural practices – assessment, monitoring and management	*% of compliance cases of water quality indicators for nutrients (diffuse sources)*	30	50	95
Reduction of contamination from use of pesticides in agriculture	*% of contamination reduction*	-	50	80
Reduction of illegal use of inert and river gravels	*% reduction of companies carrying out illegal activities on river beds*	5	50	100
3. Prevention of pollution in order to avoid a deterioration of groundwater quality and to attain a good chemical status in GWBs				
Elimination/reduction of the amount of hazardous substances and nitrates entering groundwater bodies	*% of contamination reduction*	-	50	80
Increase of wastewater treatment efficiency in order to avoid GW pollution from urban and industrial pollutions sources	*% reduction of discharges of untreated wastewater from towns with >2,000 population equivalents (point sources)*	10	50	95
4. Preservation and achievement of minimal "good" quality for bathing water (internal, coastal and transitional)				
Increasing the number of coastal monitoring stations for microbiological elements	*Number of monitoring stations*	20	30	40
Increase the number of monitoring parameters according to the requirements of the European directives	*% of parameters regularly monitored according the EU Bathing Water Directive*	50	75	100
5. Reduction of flood risk and losses for life, livelihoods, health, economy, cultural and environmental assets of persons, businesses and communities				
Reducing the number of residents affected by flooding	*% of population affected*	>10	>5	>1
Reducing the agriculture land affected by floods	*Agriculture land surface affected (ha)*	3,000	1,700	1,000
6. Improvement of the safety of irrigation dams				
Assessment and the provision of measures to improve the safety of dams	Number of dams	25	50	100
7. Preservation and/or reduction of the rate of erosion in rivers				
Less vulnerable areas (20% of the territory)	*tons/ha/year*	5	4.5	3
Highly endangered areas (70% of the territory	*tons/ha/year*	15	13	10

11 Economic Analysis of Water Use

11.1 Purpose of the Initial Economic Characterisation

The purpose of the economic study is to make use of existing data to provide an initial overview of the economic benefits and costs associated with the utilization of water resources in the Drini-Buna River Basin District and to estimate the future trends of the water demand. Economic issues are generally tied to social conditions and suggest, often by proxy, the current and future social behaviours (see Section 4.7 below).

The initial economic characterization for the Drini-Buna River Basin includes:

- Analysis of economic importance of water uses
- Trends in water demand
- Assessment of current level of cost recovery for water services.

Emphasis is placed on characterizing a broad range of water uses, including domestic, agricultural and industrial ones. In addition to and in the context of this initial overview, this study also provides a planning framework for implementation of the WFD, one that integrates the remaining economic analysis requirements that are not met in this initial characterization.

Economic analysis is a key part of the implementation of the Water Framework Directive (WFD, Directive 2000/60/EC). The Directive itself only provides a broad overview of the required economic analysis. This is a requirement of Article 5 of the WFD, "Characteristics of the river basin district, review of the environmental impact of human activity and economic analysis of water use of the WFD", which states that each Member State shall ensure that for each river basin district or for the portion of an international river basin district falling within its territory:

- An analysis of its characteristics,
- A review of the impact of human activity on the status of surface waters and on groundwater, and,
- An economic analysis of water use is undertaken according to the technical specifications set out in Annexes II and III and that it is completed at the latest four years after the date of entry into force of this Directive."

Article 9 of the WFD relates to the recovery of costs for water services, whereby Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, having regard to the economic analysis conducted according to Annex III, and in accordance in particular with the polluter pays principle.

It is required that Member States shall ensure that:

- Water-pricing policies provide adequate incentives for users to use water resources efficiently, and thereby contribute to the environmental objectives of this Directive,
- An adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of the costs of water services, based on the economic analysis conducted according to Annex III and taking account of the polluter pays principle."

In order to implement the above requirements of the WFD, two Guidance documents were issued by EU and were taken into account in this report:

- Guidance Document No 1: Economics and the Environment – The Implementation Challenge of the Water Framework Directive, Produced by Working Group 2.6 – WATECO
- Assessment of Environmental and Resource Costs in the Water Framework Directive, Information sheet prepared by Drafting Group ECO2, Common Implementation Strategy, Working Group 2B

In keeping with the objectives set in the WFD and more specifically in the guidance documents mentioned above this report provides:

- Estimates of the economic impacts and values associated with the major uses of water resources at the River Basin District levels, where "uses" include the abstractive uses associated with the agricultural, industrial, and domestic sectors;
- Projections of water demand, estimates that will serve in part as the baseline for future assessments of potential programmes of measures under various impacts and pressures scenarios; and
- An identification of the current levels of water services costs and costs recovery in the River Basin District, where "costs" include the expenditures for the provision of water services as defined in the WFD:
  - "Water services' means all services which provide, for households, public institutions or any economic activity:
    - (a) Abstraction, impoundment, storage, treatment and distribution of surface water or groundwater,
    - (b) Waste-water collection and treatment facilities which subsequently discharge into surface water."

The economic analysis examined the economic impacts of water use of domestic sector and selected key water using subsectors of the agricultural and industrial sectors and other water-using categories. The key water-using subsectors are defined as those in which water-using activities are critical due to the volume of water used. All data shown in the following sections is provided in Annex 4.

11.2 Water Use and Impact

11.2.1 Abstractions

Abstractions from water bodies are undertaken for a number of purposes, including providing drinking water for households and use of water in agricultural and industrial processes

11.2.1.1 Agricultural use of water

The structure of agricultural holdings in Albania and in the river basin largely reflects the results of the privatization process. However, since privatization, further land fragmentation has occurred, as land allocated to each rural family has been fragmented into many different parcels. According to the agriculture census in 2012 (the last data), the utilized agricultural area was owned by 324,013 holdings and the farm size on average was less than 2 ha. Most of these holdings are subsistence farms with no market orientation. Subsistence or semi-subsistence farms tend to be concentrated in mountainous areas, where land is least fertile and where about 60% of the rural population lives.

Since the last census in 2012 the number of farms larger than 2 ha has not increased. According to most recent studies the opposite is likely to be the case, due to further fragmentation, primarily caused by inheritance and no clear incentives provided through government policy to prevent further fragmentation or encouragement of an effective land market.

The statistical data related to the number of the agricultural holdings and arable land in the Drini-Buna River Basin Districts are shown in Tables 11.1 to 11.4 below.

Table 11.1: Arable land with field crops in the Drini-Buna River Basin, 2015[198]

District	Total Agriculture Holdings	Arable land (000 ha)
Dibër	19,981	29
Korçë	33,685	16
Kukës	10,638	13
Lezhë	17,196	23
Shkodër	28,854	34

The use of the arable lands is shared between the following main categories of crops: cereals, vegetables, potatoes, white bean, tobacco, sunflower, soya and forage.

Existing statistical data on animal farms in the river basin include the following main categories of livestock: beef cattle, milked cows, sheep, milked sheep, goats, milked goats, pigs, horses and related animals and poultry. Statistical data also includes the following related categories: milk, meat, eggs and wool.

Agricultural use of water for the plant-growing subsector was determined by multiplying the per hectare irrigation value by total hectares of plantation. The per hectare irrigation value was considered at an average volume of 18,338 m3/ha/year (based on 2010 data). The irrigation water used in the Drini-Buna River Basin, based on districts, is shown in Table 11.2.

Table 11.2: Irrigation water in the Drini-Buna River Basin, 2015

District	Arable land (000 ha)	Irrigation water volume (000m^3)
Dibër	29	531,802
Korçë	16	293,408
Kukës	13	238,394
Lezhë	23	421,774
Shkodër	34	623,492

Multiplying per unit use estimates by animal counts derived the animal farm water use values. For the purpose of economic analysis, the per unit water use, as shown in Table 11.3 was considered as:

[198] INSTAT: Agriculture Statistical Yearbook 2015, Agriculture census, 2012

Table 11.3: Daily animal water use

Animal	Water use (l/day)
Cattle	60
Cow	40
Sheep/ goats	5
Milked sheep/ milked goats	10
Pigs	5
Horses	35
Poultry	0.25

Based on the above considered unit values, the water demand of the existing animal farms is as shown in Table 11.4 below:

Table 11.4: Animal farm water use in the Drini-Buna River Basin, 2015

Animal	No. (000 heads)	L/day	Total m^3/day	Water use (m^3/ year)
Cattle	208	60	12,480	4,555,200
Cows	145	40	5,800	2,117,000
Sheep	452	5	2,260	824,900
Milked sheep	350	10	3,500	1,277,500
Goats	306	5	1,530	558,450
Milked goats	228	10	2,280	832,200
Pigs	123	5	615	224,475
Equidae	30	35	1,050	383,250
Poultry	1,887	0.25	472	172,189

11.2.1.2 Industrial use of water

The water used in the industrial/ commercial/ institutional (ICI) sector is for technological and hygiene purposes, also. It can be non-drinkable industrial water or drinking water and can be supplied by water utility companies or produced on self-service basis.

There are very limited data available to estimate the economic impact of this water in terms of annual turnover, income and employment of the ICI sector. In this case the only available data to estimate the impact is referring the registered number of companies and the annual quantity of water supplied by the water utilities. The figures are shown in Table 11.5 below:

Table 11.5: Active enterprises by district and legal form in the Drini-Buna River Basin, 2015

District	Farmers	Companies
Dibër	75	545
Korçë	1,177	316
Kukës	88	368
Lezhë	378	824
Shkoder	2,275	1,571

The volume of industrial, commercial and institutional (ICI) water was estimated considering the data provided by the local/regional water utilities and is referring to the drinking water supply. No reliable data were available on the non-drinkable water use and on the self-service water.

According to these data, in the Drini-Buna river basin, the ICI annual water consumption in 2015 was 705,000 m3 for the industrial and commercial sector, 842,000 m^3 for the institutions and 1,547,000 m^3 in total.

11.2.1.3 Domestic use of water

The water for domestic use was supplied by the existing water utility companies or was obtained from own sources (self-service).

The domestic water use valuations were calculated by utilizing a per capita consumption rate both for centralized and self-service sources. Census 2011 population data were used as unit multipliers for the domestic water use valuations.

The Census 2011 population data for the main cities in the river basin are shown in Table 11.6 below.

Table 11.6: Census 2011 population data in Drini-Buna River Basin

District	Population (Number of Inhabitants)
Shkodër	237,696
Kukës	63,338
Dibër	46,895
Lezhë	35,000
Korçë	59,680

Based on the Census 2011 data and on the coverage rate of the water services and per capita consumptions reported by the water utilities, the annual domestic consumption from centralized resources is 13,593,424m3 in the Drini-Buna River Basin.

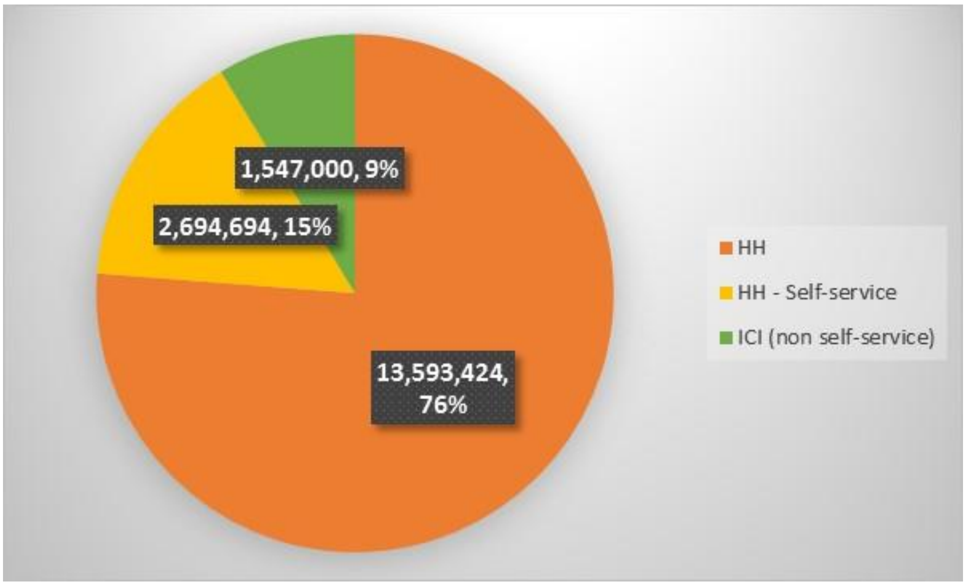
Population not supplied with water from centralized sources has access to water resources on self- service arrangements.

Data on self-services, such as private water supplies and wastewater treatment (employing septic tanks) are difficult to identify as there is not a comprehensive dataset available on numbers of services, locations, volumes, etc. Estimations have been made based on the population without centralized water supply and the average water consumption (l/c/d) in the River Basin district.

In the Drini-Buna River Basin the average per capita water consumption considered is 96.65 l/c/d, and using this value, the self-sourced annual domestic water consumption is calculated at 2,694,694m3.

Taking into account the data above, the structure of the household (HH) and ICI use of water can be represented as shown in Figure 11.1. Due to the low industrial/ commercial activity in the river basin, the ICI water consumption is much smaller than the domestic consumption. This fact reduces the economic impact of the water in the region.

Figure 11.1: The Structure of water use (m^3/year) in the Drini-Buna River Basin



11.2.2 Non-abstractive use of water

11.2.2.1 Hydropower plants

Albania has a high hydro-energetic potential with less than 40% used to date (Ministry responsible for Energy). The country has a total installed capacity of 1,466 MW and marks an average hydropower production of 5,283 GWh. The total hydro-energetic reserves enable the installation of 4,500MW power network and its annual electric power production could reach up to 16TWh. According to NANR at the end of 1st trimester 2018, in Albania there were 197 concession contracts concluded for building 555 small hydropower plants, out of which 180 active contracts forecasting the construction of 486 SHPPs (17 contracts were terminated). The hydropower potential supply of the 'concession- granted' SHPPs is of about 1,840 MW and an annual production of about 7,540 GWh. For the 119 HPPs which are not subject to concession, the total potential capacity goes up to about 230 MW and the annual production would be of about 40 GWh.

On the Drin River, there are three big operational hydropower plants with a total installed capacity of 1350 MW, “Vau i Dejës” HPP, “Fierza” HPP and “Koman” HPP. A concessionary contract has been concluded for “Ashta” hydropower plant on Drin river between the Ministry of Economy, Trade and Energy and Austrian Company “Österreichische Elektrizitätsëirtschafts - Aktiengesellschaft”, with an installed capacity of 48.2 MW.

The economic impact of operating these HPP is expressed in the monetary value of the energy produced. The unit price of energy is 9.5 Lek/kWh, without VAT. In this case the average annual value of the energy is 47,021,988,500 Lek (€343,263,777), as shown in Table 11.7.

Table 11.7: The average annual income from hydropower plants in the Drini-Buna River Basin[199]

Hydropower Plants	**Average Annual Production (MWh)**	**Average Annual Income from Energy (Lek/year)**	**Average Annual Income from Energy (Euro/year)**
“KESH” sha Hec "Fierze"	1,636,522	15,546,959,000	113,493,879
“KESH” sha Hec "Koman"	1,882,721	17,885,849,500	130,567,942
“KESH” sha Hec "V. Dejës"	932,732	8,860,954,000	64,685,579
"Energji Ashta" sh.p.k Hec "Ashta"	235,604	2,238,238,000	16,339,293
Hec "Bulqizë" (Dibër)	1,363	12,948,500	94,525
Hec "Homesh" (Dibër)	400	3,800,000	27,740
Hec "Zerqan" (Dibër)	1,035	9,832,500	71,778
Hec "Arras" (Dibër)	15,648	148,656,000	1,085,199
Hec "Orgjost" (Kukës)	4,257	40,441,500	295,226
Hec "Lekbibaj" (Tropoje)	4,970	47,215,000	344,673
Hec "Dukagjin" (Shkoder)	2,414	22,933,000	167,412
Hec "Muhur" (Dibër)	863	8,198,500	59,850
Hec "Lure" (Dibër)	692	6,574,000	47,991
Hec "Cernaleve "	15,263	144,998,500	1,058,499
Hec "Pobreg"	36,373	345,543,500	2,522,492
Hec”Ostren i Vogel”	790	7,505,000	54,787
Hec”Lura 1”	3,961	37,629,500	274,698
Hec”Trebisht”	1,264	12,008,000	87,659
Hec”Tucep”	982	9,329,000	68,102
Hec”Shales”	1,570	14,915,000	108,881
Hec "Bicaj"	51	484,500	3,537
Hec "Orenjë"	1,115	10,592,500	77,326
Hec "Tamarë"	745	7,077,500	51,666
Hec "Sasaj"	25,000	237,500,000	1,733,766

[199] Operational HPPs in 2016

Hydropower Plants	Average Annual Production (MWh)	Average Annual Income from Energy (Lek/year)	Average Annual Income from Energy (Euro/year)
Hec"Perrollaj"	214	2,033,000	14,841
Hec"Peshqesh"	28,711	272,754,500	1,991,127
Hec"Bele 1"	114,423	1,087,018,500	7,935,310
Total	4,949,683.00	47,021,988,500	343,263,777

11.3 The Value of Water

The value of water consumed by the domestic, agricultural, industrial users was estimated taking into account the quantity of water consumption and the relevant tariffs applied by the service providers.

The figures used in this section reflect the effort of the suppliers to deliver the water than the real value of water abstracted from the natural resources. However, we consider a good mean to estimate the monetary impact of the consumption.

11.3.1 Domestic use of water

The annual value of water for domestic use in the case of centralized water supply was estimated taking into account the existing water tariffs in the different regions of the River Basin district. As noted above, self-service water value is not included as there are no accurate data on the real consumption and no adequate methods are available to value this water.

The figures for the value of domestic water in each district belonging to the river basin are shown in Table 11.8 below.

Table 11.8: The value of water for domestic use in the Drini-Buna River Basin[200]

District	Water Consumption (m^3/year)	Domestic water value (Lek/year)	Domestic water value (Euro/year)
Shkodër	7,856,801	339,714,645	2,479,940
Kukës	1,440,413	33,655,421	245,687
Dibër	1,395,322	30,932,654	225,810
Lezhë	1,164,238	67,525,804	492,943
Korçë	1,223,061	75,829,782	553,563

11.3.2 Industrial, commercial and institutional use of water

The annual (2015) value of water for industrial, commercial and institutional (ICI) use in case of centralized water supply was estimated taking into account the existing water tariffs in the different regions of the River

[200] The values stated in Euro were calculated at an exchange rate of 136.985 Lek/Euro

Basin (Table 11.9). Self-service water value is not included as no reliable data were available on this matter.

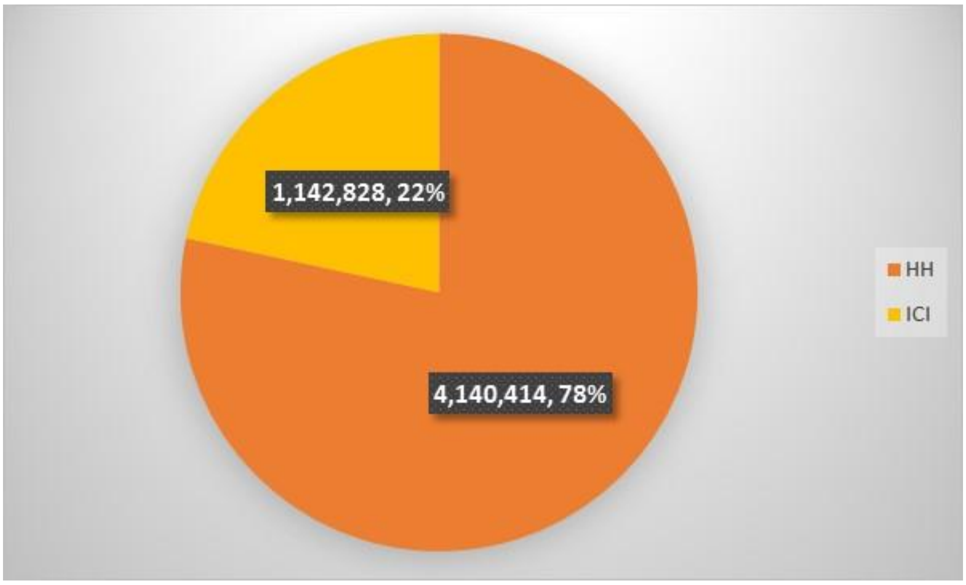
Table 11.9: The annual value of water for industry, commerce and institutions (ICI) in the Drini- Buna River Basin[201]

Utility Name	Total Water Volume Sold (000m^3)	Water Tariff (Lek/m^3)	Total Water Volume Sold (000m^3)	Water Tariff (Lek/m^3)	ICI Water Value (Lek/year)	ICI Water Value (Euro/year)
	Commercial and Institutional		Industrial			
Bashkia Pukë UK	9	140	18	130	3,563,700	26,015
Vau i Dejës U Sh.A	6	80	14	80	1,580,000	11,534
Tropojë U Sh.A	24	80	32	60	3,840,000	28,032
Lezhë UK Sh.A	143	145	75	135	30,860,000	225,280
Pogradec UK Sh.A	122	111	32	111	17,077,350	124,666
Shkodër UK Sh.A	187	110	335	110	57,399,100	419,017
Pukë fshat	2	80	5	60	469,400	3,427
Shkodër (F) U Sh.A	19	120	20	120	4,750,800	34,681
Fushë Arrëz UK Sh.A	7	80	9	80	1,313,600	9,589
Librazhd UK Sh.A	55	100	39	100	9,436,000	68,883
Peshkopi U Sh.A	47	85	74	65	8,807,000	64,292
Bulqizë U Sh.A	26	75	90	55	6,857,100	50,057
Has U Sh.A	17	80	23	60	2,756,200	20,120
Kukës UK Sh.A	40	80	77	60	7,840,000	57,233
Total					**156,550,250**	**1,142,828**

[201] The values stated in Euro were calculated at an exchange rate of 136.985 Lek/Euro

Taking into account the data above for domestic and ICI water use, Figure 11.2 illustrates the structure of the HH and ICI values of water in the Drini-Buna River Basin.

Figure 11.2: The structure of water use values for households and ICI in the Drini-Buna River Basin



11.3.3 Agricultural use of water

The agricultural water, as a service provided, is mainly for irrigation purposes. The service is provided at a price of 2,000 Lek/ha for the 1st irrigation, 1,500 Lek/ha for the 2nd irrigation and 1,500 Lek/ha for the 3rd irrigation, equating to a total for the year of 5,000 Lek/ha (€36.5/ha). Considering the prices above, the value of irrigation can be assessed as shown in Table 11.10.

Table 11.10: Irrigation water value in the Drini-Buna River Basin

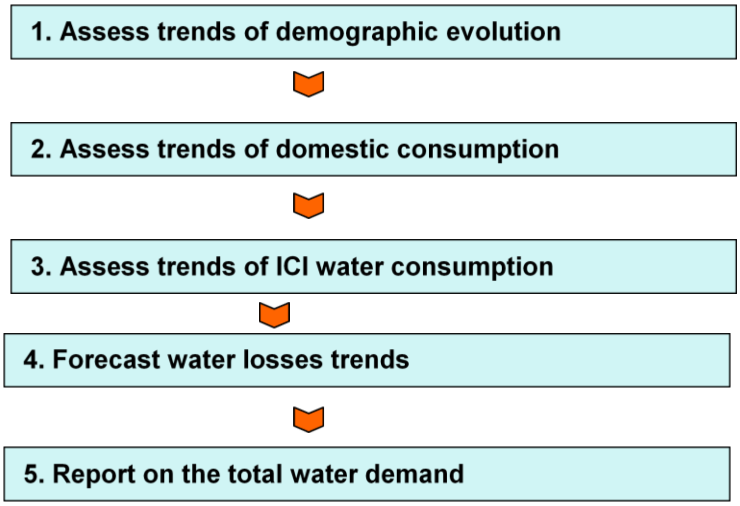
District	Arable Land (000 ha)	Irrigation Value (Lek/year)	Irrigation Value (Euro/year)
Dibër	29	145,000,000	1,058,510
Korçë	16	80,000,000	584,006
Kukës	13	65,000,000	474,505
Lezhë	23	115,000,000	839,508
Shkodër	34	170,000,000	1,241,012

11.4 Trend Projections

In this section estimations are made regarding the future water consumptions as a base for abstracted water demand projections. The future trends are estimated for the water used to supply drinking water. Other types of water (industrial non-drinking water, irrigation water) are not currently considered, as reliable data were not available for forecasting purposes.

The forecasting process included the following main steps outlined in Figure 11.3. Assumptions were made at each step, which are explained at the relevant sub-sections. If there were official data on different trends, these data were used to perform the projections. In other cases, international best assumptions were considered. The results of the forecasting process are presented in the sub- sections below.

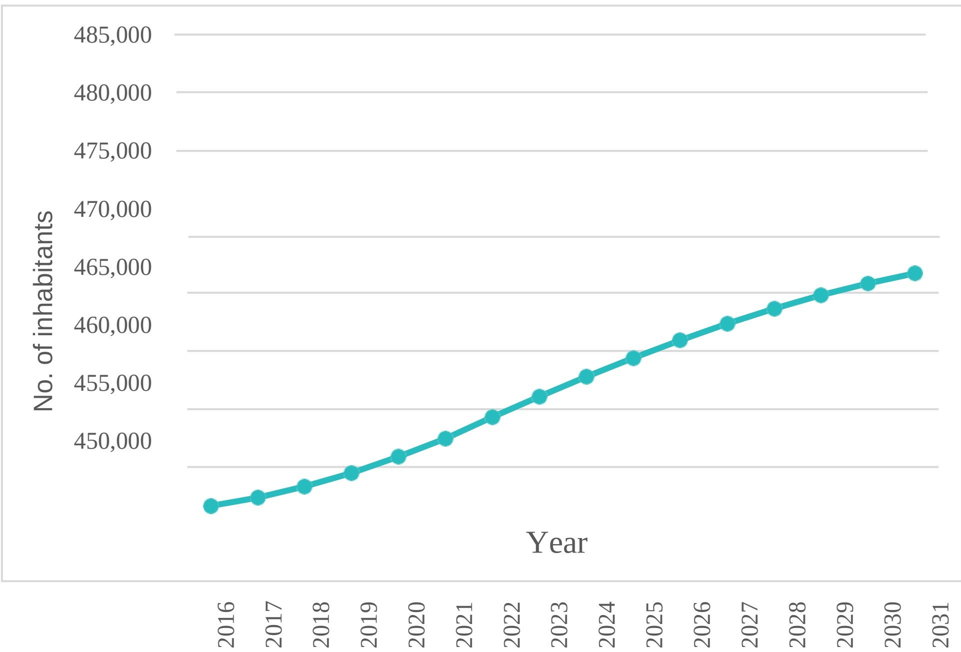
Figure 11.3: The main steps in the process of forecasting



11.4.1 Demographic projections

The projections regarding demographic evolution in the River Basin District were based on the “ALBANIA Population Projections 2011 – 2031” issued by INSTAT – Institute of Statistics of Republic of Albania in 2014, high growth scenario. The population data available from the 2011 census were projected for each District in the river basin according to the national trend forecasted in the above document. The results are shown in the Figure 11.4 below.

Figure 11.4: Demographic projections in the Drini-Buna River Basin



The demographic trend in Table 11.4 shows an increase in the number of inhabitants within the next 15 years. The growth is about 4.4%, which will not have a significant impact on the total (centralized and self-service sources) volume of water used by the households.

11.4.2 Domestic and ICI water consumption trends

The domestic water consumption trends were considered in relation with the increase of the number of inhabitants in the region as was forecasted in the previous section. Other driving factors taken into account were the coverage rate of water services and the per capita water consumption.

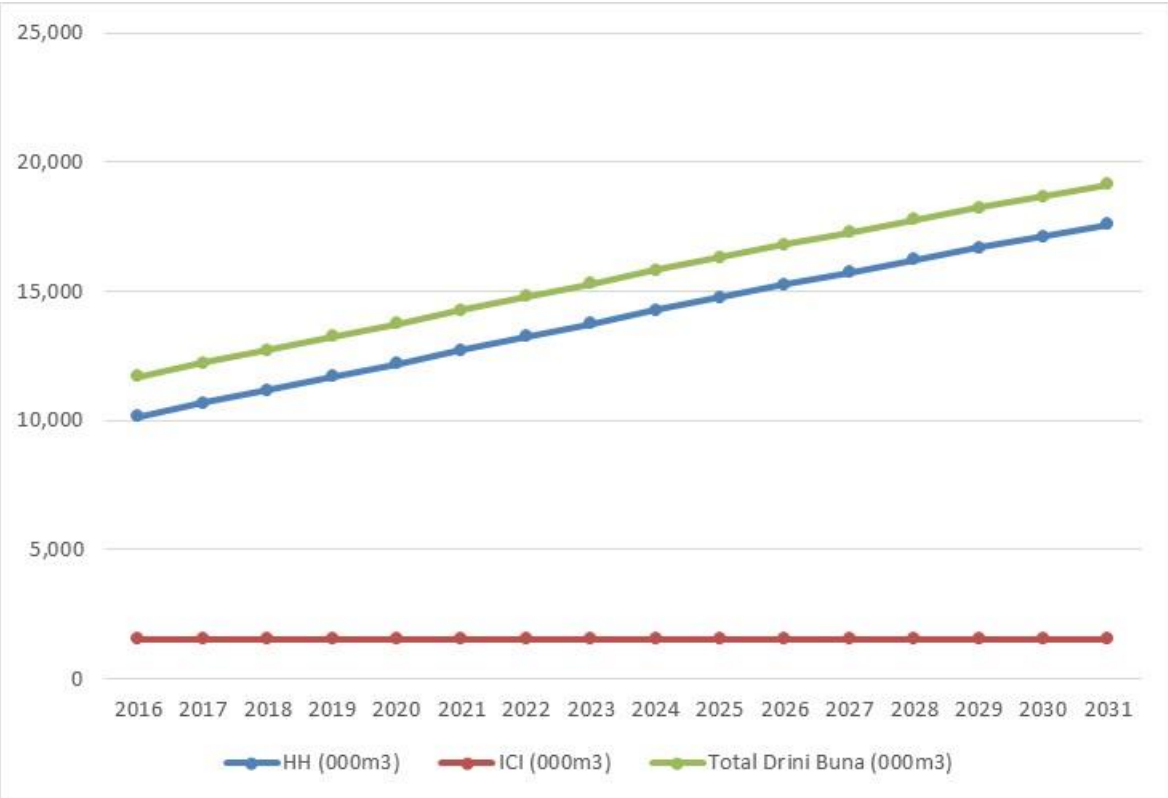
The ICI water consumption trends are driven by the changes in economic activity (new industries, new technologies, volume of production, employment, etc.). As no relevant and trustful data were available regarding these changes in the region, the economic activity was considered to be static in the next period.

The domestic and ICI (industrial, commercial and institutional) water consumption from centralized sources in the next years were forecasted considering the following assumptions:

- The base year for the projections was considered to be the year 2015
- The demographic growth was considered to be as forecasted in the previous chapter
- It is assumed the coverage rate of water services will be 100% at the end of the year 2031
- The per capita consumption will be at about 100 l/c/d in the year 2031
- The ICI water demand will be considered to be constant until the year 2031, as no any data are available regarding changes in this area

Based on the above assumptions, the following trends in domestic and ICI water consumption were identified in the river basin: (Figure 11.5).

Figure 11.5: Trends in domestic and ICI water consumption in the Drini-Buna River Basin



The trend is an increasing one mainly due to the domestic consumption as the ICI consumption was considered to be constant in the 15-year period. As this assumption was taken in the lack of better available data, if any ICI development will be recorded in the river basin, the projection has to be reviewed properly.

The growth in consumption is about 64%, which will have a significant impact on the supply side. If no actions will be taken to radically reduce the water losses (see below in Section 11.4.3), the water utilities in the water basin will be forced to extend their treatment and supply capacity. As the worst scenario, this will also have an impact on the water sources.

11.4.3 Water losses

Each water utility in the river basin is facing serious problems regarding the water losses in the supply system. The average level of non-revenue water (NRW)[202] in the basin is achieving the value of 63%, which means an effort not only for the water utility but for the water resources also. The level of NRW in each utility is as shown in Table 11.11.

Table 11.11: Present losses of water in the Drini-Buna River Basin, 2015

Enterprise Name:	Net volume of system input (000 m^3)	Total Water Sold (000m^3)	NRW (000m^3)	NRW (% of system input)
Bashkia Pukë UK	347	138	209	60%
Vau i Dejës U Sh.A	695	161	534	77%
Tropojë U Sh.A	1,488	421	1,067	72%
Lezhë UK Sh.A	2,182	1,193	989	45%
Pogradec UK Sh.A	2,424	1,293	1,131	47%
Shkodër UK Sh.A	12,908	3,491	9,417	73%
Pukë fshat	420	127	293	70%
Shkodër (F) U Sh.A	1,699	1,137	562	33%
Fush Arrez UK Sh.A	461	115	346	75%
Librazhd UK Sh.A	720	554	167	23%
Mallakastër UK Sh.A	1,176	513	663	56%
Peshkopi U Sh.A	1,859	722	1,137	61%
Bulqizë U Sh.A	1,592	605	987	62%
Has U Sh.A	629	276	353	56%
Kukës UK Sh.A	986	856	130	13%

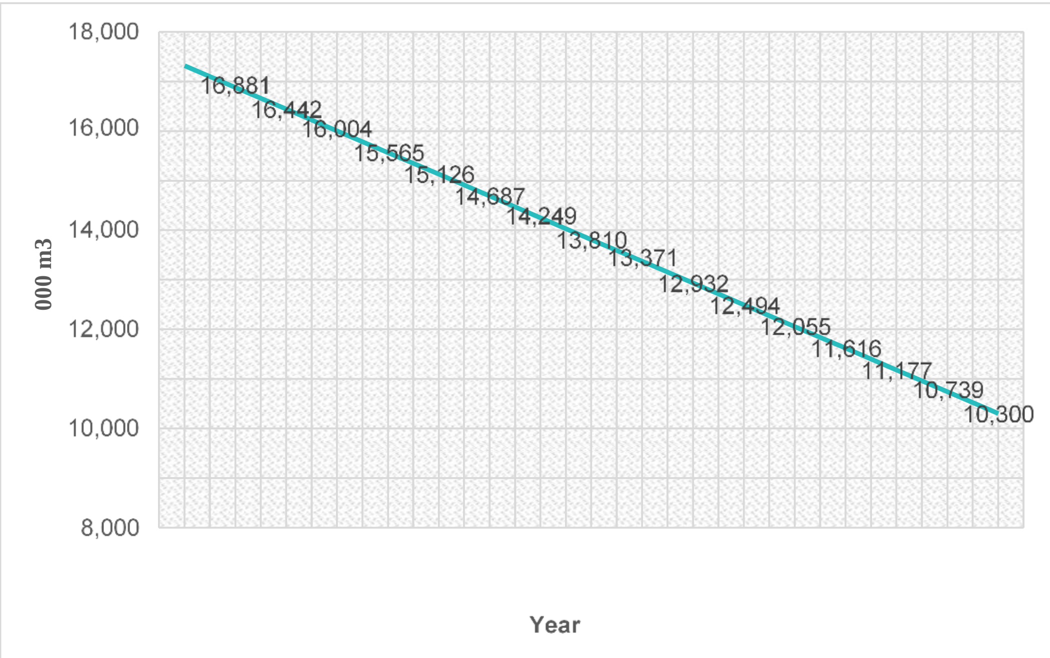
The water losses in the next years were forecasted considering the following assumptions:

[202] Non revenue water (NRW) is water that has been produced and is “lost” before it reaches the customer. Losses can be real losses (through leaks, sometimes also referred to as physical losses) or apparent losses (for example through theft or metering inaccuracies).

- The base year for the projections was considered to be the year 2015
- At the end of the period (year 2031) the losses will be at the level of 35% of system input. This assumption considers the water utilities will make some investments and will implement a NRW reduction strategy to increase their operational and financial performances.
- The reported NRW (2015) is considered equal to the physical water losses in the water supply system. This assumption was made as no trusted data were available on the components of the unaccounted for water to draw out the accurate value of the physical losses.
- The total water losses in the river basin were considered to be the sum of the losses recorded by each water utility in the region.

Based on the above assumptions, the following trends in water losses were identified in the river basin (Figure 11.6).

Figure 11.6: Projections of future non-revenue water (NRW) in the Drini-Buna River Basin



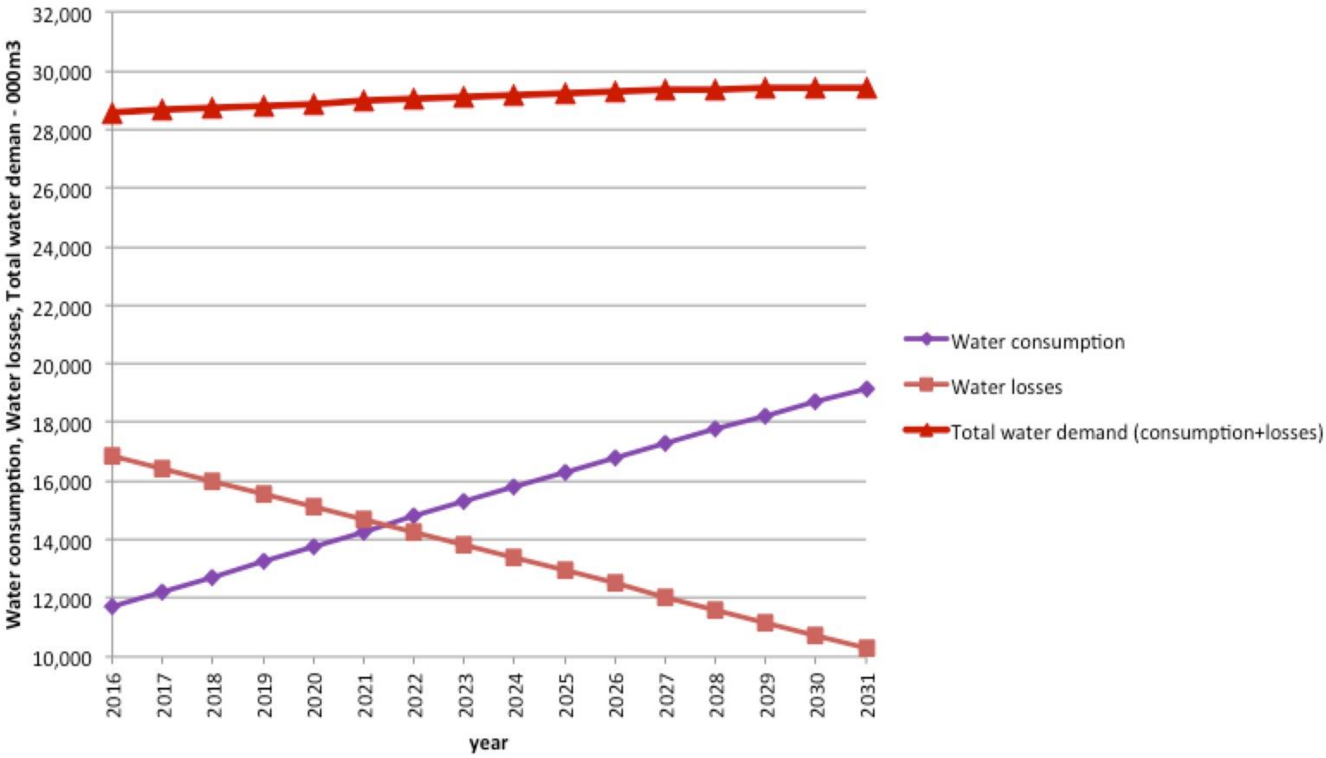
11.4.4 Total water demand trends in the river basin

Total water demand is assumed to be the sum of the water consumption (domestic and ICI) and the water losses in the supply system. Due to the reverse trends of the consumption (increasing) and the water losses (decreasing), no major changes in the total water demand were identified in the river basin. This fact is true only in the case of the adopted assumptions, mainly:

- There will not be major investments in water consuming industries in the region
- Domestic consumption will tend to an average value of 100 l/c/d
- The Water Utilities will adopt and implement appropriate measures to control and to reduce the physical water losses

The figures of the trend of the water demand are illustrated d in Figure 11.7.

Figure 11.7: The trend for water demand in the Drini-Buna River Basin.



11.5 Cost Recovery of Water Services

The approach that is proposed here for analysing and reporting on cost recovery is as stated in the Guidance Document No 1: Economics and the Environment – The Implementation Challenge of the Water Framework Directive[203].

11.5.1 Identified water services in the River Basin District

Water services are defined in Article 2 of the WFD as: "all services which provide, for households, public institutions or any economic activity: (a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater; (b) waste water collection and treatment facilities, which subsequently discharge into surface water."

Water services are seen as intermediaries between the natural environment and actual water use. In the Drini-Buna River Basin, the following water services were identified as follows:

- Drinking water supply for households, companies and institutions, which includes:
  - Abstraction
  - Storage
  - Treatment
  - Distribution
- Sewerage services for households, companies and institutions, which includes:

[203] http://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm

- Wastewater collection
- Wastewater treatment facilities

11.5.2 Water and wastewater services providers

The providers are the entities supplying the water and wastewater services. For public water supplies and wastewater collection and treatment, there is a single organization providing all stages of the services (e.g. abstraction, storage, treatment and distribution of surface water or groundwater). The identified list of organization(s) of water supply and wastewater companies are shown in Table 11.12.

Data on self-services, such as agricultural abstraction and private water supplies and wastewater treatment (employing septic tanks or cesspools) are difficult to identify as there is not a comprehensive dataset available on numbers of services, locations, volumes, etc.

Table 11.12: Water and wastewater service providers in the Drini-Buna River Basin

County	Locality	Urban/ Rural	Ëater supply Company	Ëasteëater Company
Shkodër	Puke, Gjegjan, Rrape, Qelez, Qerret	U	Bashkia Pukë UK	Bashkia Pukë UK
		R	Puka Village UK	Puka Village UK
Shkodër	Fushe Arrez, Fierze, Blerim, Qafe Mali, Iballe	U	Fushë Arrëz Sh.a.	Fushë Arrëz Sh.a.
		R	Fushë Arrëz Sh.a.	N/A
Shkodër	Vau Dejes, Bushat, Vig Mnele, Hajmel, Temal, Shllak	U+R	Vau i Dejës U.Sh.a	N/A
Shkodër	Koplik, Gruemire, Kastrat, Kelmend, Qender, Shkrel	U+R	Shkodër Village U.Sh.a & Malësi e Madhe U.K.Sh.a	N/A
Shkodër	Shkoder, Ana e Malit, Berdice, Dajç, Guri I Zi, Postribe, Pult, Rrethinat, Shale, Shosh, Velipoje	U+R	Shkodër U.K.Sh.a	Shkodër U.K.Sh.a
Kukës	Has, Krume, Fajza, Gjinaj, Golaj	U+R	Has U.Sh.a	N/A
Kukes	Kukes, Malzi, Bicaj, Ujmisht, Terthore, Shtiqen, Zapod, Shishtavec, Topojan, Bushtrice, Gryk Caje, Kalis, Surroj, Arren, Kolsh	U	Kukës U.K.Sh.a	Kukës U.K.Sh.a
		R	Kukës U.K.Sh.a	N/A
Kukës	Tropoje, Bajram Curri, Fierze, Lekbibaj, Margegaj, Llugaj, Bujan, Bytyc,	U+R	Tropojë U.Sh.a	N/A
Dibër	Peshkopi/Diber, Tomin, Melan, Kastriot, Lure, Maqellare, Muhurr, Luzni, Selishte, Sllove, Kala e Dodes, Zall Dardhe, Zall Rec, Fushe Cidhen, Arras	U	Peshkopi U.Sh.a	Peshkopi U.Sh.a
		R	Peshkopi U.Sh.a	N/A
Dibër	Peshkopi/Diber, Tomin, Melan, Kastriot, Lure, Maqellare, Muhurr, Luzni, Selishte, Sllove, Kala e Dodes, Zall Dardhe, Zall Rec,	U	Peshkopi U.Sh.a	Peshkopi U.Sh.a

County	Locality	Urban/ Rural	Ëater supply Company	Ëasteëater Company
	Fushe Cidhen, Arras			
Lezhë	Lezhe, Shenkoll, Shengjin, Zejmen, Balldren, Kallmet, Blinisht, Dajç, Ungrej, Kolsh	R	Peshkopi U.Sh.a	N/A
Korçë	Pogradec, Udenisht, Bucimas, Cerrave, Dardhas, Trebinje, Proptisht, Velcan	U+R	Pogradec U.K.Sh.a	Pogradec U.K.Sh.a

11.5.3 Water users

Water use is defined in Article 2 as: “water services together with any other activity identified under Article 5 and Annex II having a significant impact on the status of water. This concept applies for the purposes of Article 1 and of the economic analysis carried out according to Article 5 and Annex III, point (b).” Article 9 of the Directive specifies that the water uses should include at least households, agriculture and industry.

Key data that can be collected:

- Population covered by the water service, including coverage rate and number of water connections (Table 11.13).
- The number of industrial, commercial and institutional water and wastewater connections (Table 11.14).

Table 11.13: Population covered by the water services in the Drini-Buna River Basin, 2015

	Population Served	Coverage	Number of Connections
Bashkia Pukë UK	2,778	52%	902
Vau i Dejës U Sh.A	5,646	45%	860
Tropojë U Sh.A	7,328	74%	1,330
Lezhë UK Sh.A	33,920	97%	7,996
Pogradec UK Sh.A	58,652	98%	13,310
Shkodër UK Sh.A	89,267	74%	25,156
Pukë fshat	2,347	20%	500
Shkodër (F) U Sh.A	23,364	29%	5,705
Fushë Arrëz UK Sh.A	1,882	39%	529
Librazhd UK Sh.A	18,370	96%	4,314
Peshkopi U Sh.A	30,963	100%	2,952
Bulqizë U Sh.A	12,104	76%	2,477
Has U Sh.A	8,606	64%	1,215
Kukës UK Sh.A	39,952	100%	4,588

Table 11.14: Industrial, commercial and institutional water users in Drini-Buna River Basin, 2015

	Industrial and Commercial Water Connections	Institutional Water Connections	Industrial and Commercial Sewerage Connections	Institutional Sewerage Connections
Bashkia Pukë UK	163	40	163	40
Vau i Dejës U Sh.A	76	7		
Tropojë U Sh.A	147	19		
Lezhë UK Sh.A	755	35	755	35
Pogradec UK Sh.A	959	76	762	66
Shkodër UK Sh.A	2,397	155	2,292	143
Pukë fshat	15	8	16	8
Shkodër (F) U Sh.A	94	42	22	1
Fushë Arrëz UK Sh.A	62	13	59	8
Librazhd UK Sh.A	810	67	798	66
Peshkopi U Sh.A	481	56	414	55
Bulqizë U Sh.A	227	43		
Has U Sh.A	125	12		
Kukës UK Sh.A	369	70	369	70

11.6 Financial Costs of the Water Services

The financial data regarding the costs of water and wastewater services were gathered from the water utility companies operating in the river basin. The following financial costs data were available to be collected:

- Operating and maintenance costs. These costs are those that relate to providing the service and include, amongst others, employment costs, energy costs, material costs and the costs of employing third parties. Maintenance costs relate to keeping the assets in serviceable condition throughout their economic life.
- Capital costs. These are the costs of the principal and interest payments (and cost of capital as appropriate) associated with expenditure on assets that is externally financed through loans, bonds, equity and also other financial mechanisms. These costs also include the annual depreciation of the existing fixed assets operated by the water utilities.
- Administrative costs. These relate the interests and other financial expenses paid by the utilities to run their water business.

- Taxes & subsidies: These include the general and other specific taxes paid by the water companies. Later analysis of cost recovery based on the economic rather than financial costs would need to remove general taxes and other transfers. The financial costs for water and wastewater services for the year 2015 are as shown in the Table 11.15.

Table 11.15: Financial costs for water and wastewater services in the Drini-Buna River Basin, (2015)

Water Services	000 Lek	000 Euro
Operating and Maintenance costs		
Labour cost	273,464	1,996
Material costs (incl. Chemicals)	11,464	84
Energy Costs	246,095	1,797
Cost of Repair and Maintenance	35,000	256
Cost of Contracted Services	33,110	242
Other costs	22,673	166
Capital Costs		
Depreciation	198,952	1,452
Repayment of Debt (Principal)	2,520	18
Administrative Costs		
Interest	3,264	24
Other financial expenses	12,196	89
Taxes and Subsidies		
Taxes and duties	2,060	15
Total Financial Costs for Water	**840,799**	**6,138**
Wastewater Services	**000 Lek**	**000 Euro**
Operating and Maintenance Costs		
Labour cost	84,019	613
Material costs (incl. Chemicals)	2,482	18
Energy Costs	12,069	88
Cost of Repair and Maintenance	9,682	71
Cost of Contracted Services	2,435	18
Other costs	5,937	43
Capital costs		
Depreciation	87,281	637
Administrative Costs		
Interests	4	0
Other financial expenses	5,332	39
Taxes and Subsidies		
Taxes and duties	914	7
Total Financial Costs for Wastewater	**210,155**	**1,534**
Total Financial Costs for Water and Wastewater Services	**1,050,954**	**7,672**

11.6.1 Environmental and resource costs

Resource costs are defined as the opportunity costs of using water as a scarce resource in a particular way (e.g. through abstraction or wastewater discharge) in time and space. They equal the difference between the economic value in terms of net benefits of present or future water use (e.g. allocation of emission or water abstraction permits) and the economic value in terms of net benefits of the best alternative water use (now or in the future). Resource costs only arise if alternative water use generates a higher economic value than present or foreseen future water use.

Due to the relatively low industrial and agricultural activity in the area of the river basin and the availability of the water resources, no resource costs were identified in this analysis.

Environmental costs consist of the environmental damage costs of aquatic ecosystem degradation and depletion caused by a particular water use (e.g. water abstraction or the emission of pollutants). A distinction can be made between damage costs to the water environment and to those who use the water environment. Interpreted in terms of the concept of total economic value, one could argue that the environmental damage costs refer to non-use values attached to a healthy functioning aquatic ecosystem, while the costs to those who use the water environment refer to the corresponding use values.

In the river basin, there are some cases of water pollution due to the untreated wastewater discharges in the river. Unfortunately, due to the lack of trustworthy data, the value of these damage costs couldn’t be estimated. In the cost recovery analysis, these costs were not considered. If and when trusted data will be available, the environmental costs will be estimated and included in the economic costs recovery analysis.

11.6.2 Cost recovery mechanism

In Albania, regulation is intended to ensure that the price of water and wastewater is appropriate relative to the quality of the service. Tariff regulation according to the Tariff Setting Guideline by the Water Regulatory Authority of Albania consists of:

- Scrutinizing the costs,
- Giving incentives to companies to improve for the benefit of all Albanians,
- Structuring the tariff-setting process, and
- The approval of tariffs.

Pursuant to Law No. 8102 of 28th March 1996 “On the Regulatory Framework of the Water Supply and Wastewater Disposal and Treatment Sector”, and its amendments, the Water Regulatory Authority is performing these important regulatory functions in the Albanian water supply and sewerage sector.

The objectives of the Water Regulatory Authority in its approval of tariffs and other service fees are thus to:

- Protect consumers against monopoly prices, and to
- Enable licensees to recover reasonable costs incurred in order to deliver effective services, including the possibility to achieve some return on their investment that would be sufficient for improvements and other construction works.

The second purpose is particularly important since most of the water service providers in Albania are still not able to cover their current costs due to low tariff levels. It is therefore an immediate objective of tariff regulation to first achieve the coverage of operation and maintenance costs and later of the total costs. The Water Regulatory Authority thus aims to support the gradual achievement of full cost recovery in accordance with the EU Water Directives.

The **Tariff Setting Guideline** specify the following tariff setting mechanisms for water and wastewater services:

11.6.3 Tariffs for water services

Where metering exists (metered customers), the WRA will require **two-part tariffs**, of which:

- One part is a charge covering the fixed costs. This will be recovered from customers through a monthly fixed tariff component;
- The other part is a charge associated with volumetric (usage) costs. A two-part tariff helps to ensure that a service provider does not significantly over- or under-recover fixed costs if the sales volumes or customer connections end up being different from those forecasted. It is Government policy that all customers are to be metered. Where service providers have not yet achieved this objective, they must propose a fixed monthly tariff for customers without meters (unmetered customers) and a plan to move to 100% metering.

For unmetered customers, a flat rate tariff (the customer pays a pre-determined price without a volumetric specification) needs to be applied. This tariff should be set at a level that incentivizes the customers to switch to metered supply.

11.6.4 Tariffs for wastewater services

- The costs for wastewater services are determined by the amount of wastewater generated by each consumer. The amount of wastewater shall be 100% of the amount of consumed water.
- Only in cases where customers obtain water from a borehole or other resources additional metering is needed. A fixed sewerage component apart from the volumetric component is possible.
- A service provider may impose special surcharges for heavy polluters. In addition, special tariffs for e.g. on-site sanitation can be demanded. They should cover real costs.

The actual levels of tariffs that are applied by the Water Utilities in the Drini-Buna River Basin are shown in Table 11.16.

The water/wastewater utilities obtain their operational revenues using the above tariff structure applied on the quantities of services provided. Furthermore, beside the above cost recovery mechanism, some of the water service providers benefit of subsidies for operations. These subsidies supplement the financial revenues of the water utilities contributing to their financial cost recovery.

Taking into account the above financial sources, the following financial revenues were obtained by the water utilities in the river basin in 2015 (Table 11.17).

Table 11.16: Current tariffs applied by the water utilities in the Drini-Buna River Basin[204]

Water Utility	Drinking water (Lek/m^3)			Service Fee (Lek/month)			Wastewater (Lek/m^3)		
	Family	Institution	Private	Family	Institution	Private	Family	Institution	Private
Bulqizë	17	55	75	100	100	100			
Fushë Arrëz									
Has	25	60	80						
Kukës	25	60	80				7	15	20

[204] Source: Albanian Regulatory Authority of the Water Supply and Waste Water Disposal and Treatment Sector

Water Utility	Drinking water (Lek/m³)			Service Fee (Lek/month)			Wastewater (Lek/m³)		
Lezhë	58	135	145	200	200	200	18	22	27
Librazhd	38	100	100				13	22	23
Peshkopi (Dibër)	27	65	85				10	15	18
Pogradec	22/62	37/111	37/111	200+ 100	400+ 100	400+ 150	11/33	12/36	12/36
Pukë	35	130	140	100	100	100	8	16	16
Pukë Fshat									
Shkodër	40	110	110	100	100	100	15	20	20
Shkodër Fshat	50	120	120						
Tropojë	19	60	80						

Table 11.17: Revenues from water services in the Drini-Buna River Basin, 2015

Revenue from water services (000 Lek)	Revenue from Waste Water Services (000 Lek)	Total Operational Revenue (000 Lek)	Subsidies (000 Lek)	Total Financial Revenues (000 Lek)	Total Financial Revenues (000 Euro)
581,721	119,979	701,700	81,710	783,410	5,719

11.6.5 Rate of cost recovery

The overall cost recovery of costs is the extent to which the costs of providing the water service are covered by charges to water users and other cost recovery mechanisms.

The Cost recovery rate is estimated in this report as:

Cost recovery rate = total revenues / total costs x 100 [%]

The cost recovery rates are estimated both for financial as well as for economic costs for drinking water and wastewater services in the river basin. The estimations are based on the 2015 data from the water utility companies providing water/wastewater services in the River Basin area.

11.6.6 Cost recovery of financial costs

The rate of the cost recovery of financial costs considers all the financial costs incurred by the service providers and all the revenues, including subsidies.

Each water utility in the river basin, having different financial data, reports a different financial cost recovery rate. At level of the river basin, the figures are as shown in Table 11.18 below.

Table 11.18: Financial cost recovery in the Drini-Buna River Basin, 2015

Financial Costs	(000 Lek)
Water Services	
Total Financial Costs - Water	840,799
Wastewater Services	
Total Financial Costs - Wastewater	210,155
Total Financial costs – Water and Wastewater	**1,050,954**
Financial Revenues	
Water Services	
Total Amount of Water Bills- Total	581,721
Wastewater Services	
Total Amount of Sewer Bills- Total	119,979
Subsidy for Operation	81,710
Total Financial Revenues – Water and Wastewater	**783,410**
Financial Cost recovery rate (%)	**75%**

11.6.7 Cost recovery of economic costs

The analysis of the recovery of economic costs for the water and wastewater services was performed based on the above financial costs but the following corrections were applied:

- The material and energy costs were considered net of 20% VAT
- Labour cost were considered net of the following contributions:
  - Employee health care contributions: 1.7%
  - Employee social security contributions: 9.5%
  - Employer health care contributions: 1.7%
  - Employer social security contributions: 15%
- Different taxes and subsidies were not considered in the economic cost recovery
- Financial revenues were decreased to be net of 20% VAT
- Subsidies were not considered
- Resource and environmental costs were considered with 0 values.

The results of the economic costs recovery analysis are shown in Table 11.19 below.

Table 11.19: Economic cost recovery in the Drini-Buna River Basin, 2015

Economic Costs	(000 Lek)
Water Services	
Total Economic costs - Water	730,434
Wastewater Services	
Total Economic costs - Wastewater	186,729
Economic Revenues	
Water Services	
Total Amount of Water Bills	484,768
Wastewater Services	
Total Amount of Sewer Bills	99,982
Economic Cost Recovery Rate – water	66%
Economic Cost Recovery Rate – Wastewater	54%
Economic Cost Recovery Rate – Water and Wastewater	64%

11.7 Conclusions

Considering the data estimated above (financial and economic cost recovery rates), an unsatisfactory recovery of costs may be marked out. The financial cost recovery rate is as high as 75%, while the economic rate is lower (64%) in the context of missing resource and environmental costs.

The cost recovery rates for local water service providers are very different. In some cases, the cost recovery rates of individual water utilities are well below of the average value in the River Basin (Vau Dejes U Sh.A – 25%, Has U Sh.A – 34%) in other cases these rates amount to values close to 100% (Peshkopi U Sh.A – 87%, Librazhd UK Sh.A – 83%). Usually the bigger water utilities have bigger rates of cost recovery.

The recovery rate of financial costs is below 100% at each service provider despite the operational subsidies they get. One of the reasons for this loss is that there is gap between billed water consumption and the system input, implying that a certain amount of losses exists.

The low level of the river basin average economic cost recovery rate is showing weaknesses in the applied cost recovery mechanism (mainly in the tariff setting procedures but not only) which is not oriented on the polluter pay principle but more on the affordability of tariffs and on the water service providers operational performances.

The Albanian Regulatory Authority of the Water Supply states: *"The tariff setting methodology on the water supply and wastewater treatment and disposal service is based on four objectives of the tariff policy:*

- *Coverage of costs: at first the coverage of the operation and maintenance costs step by step up to the total cost coverage of the company related to the performance of its activity in providing the relevant services.*
- *Management efficiency*
- *Affordability by the consumers in need, and*
- *Environmental efficiency"*

However, the recovery of environmental and resource costs as internal costs is not allowed in the tariffs.

As a conclusion, there is a need to alter present pricing policies to meet the requirements of the Water Framework Directive. The present arrangements deliver charges by water and sewerage undertakers that do not recover the costs of these services. This system does not take account of the principles and objectives of the Directive and the provisions of WFD Article 9 in particular.

Another issue related to the tariffs is their adjustments over the time when the increasing costs must be followed by appropriate changes in the tariffs. The Regulatory Authority declares that: "*no tariff or part of it can be changed more frequently than once a year*" but, in practice, the water utilities do not apply annually for tariff adjustments. In this case the tariffs approved in the past can't cover the actual, increased costs.

In the case of economic cost recovery rate, the estimations do not include resource and environmental costs. This is due to the lack of trustworthy data on these types of costs. In developing the RBMPs, suggestions should be made on an appropriate data collection and recording system (national/ regional level) as future cost recovery analysis does not incur the missing data issue.

The cost recovery of irrigation water services was not analysed. This is due to the lack of financial data of the service providers. If trustworthy data will be available, the estimation of the recovery rates may be extended to these services in the future analyses.

12 Programme of Measures

12.1 Introduction

The EU WFD requires the establishment for each river basin, or for the part of an international river basin within its territory, a Programme of Measures (PoMs), taking account of the results of the analyses required under Article 5[205], in order to achieve the environmental objectives established under Article 4 (see Section 10). Article 11 of the EU WFD requires that each programme of measures shall include the 'basic measures' and, where necessary, 'supplementary' measures'. Table 12.1 provides a generic list of such measures.

Table 12.1: Outline of 'Basic' and 'Supplementary' Measures Specified by Article 11 of the EU WFD

Basic Measures	
a)	Measures required to implement Community legislation for the protection of water, including measures required under the legislation specified in Article 10 (the combined approach to point and diffuse sources) and in measures required under the daughter Directives of the WFD (specified in part A of Annex VI of the EU WFD).
b)	Measures deemed appropriate for the purposes of recovery of costs for water services (Article 9).
c)	Measures to promote an efficient and sustainable water use in order to avoid compromising the achievement of the specified environmental objectives (Article 4).
d)	Measures to meet the requirements of waters used for the abstraction of drinking water, including measures to safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water (Article 7).
e)	Controls over the abstraction of fresh surface water and groundwater, and impoundment of fresh surface water.
f)	Controls, including a requirement for prior authorization of artificial recharge or augmentation of groundwater bodies.
g)	Measures to regulate point source discharges liable to cause pollution (Articles 10 and 16).
h)	Measures to prevent or control the input of diffuse source pollutants.
i)	Measures for any other significant adverse impacts on the status of water identified under Article 5 and Annex II, in particular measures to ensure that the hydromorphological conditions of the bodies of water are consistent with the achievement of the required ecological status or good ecological potential for bodies of water designated as artificial or heavily modified.
j)	Prohibition of direct discharges of pollutants into groundwater.
k)	Measures to eliminate pollution of surface waters by those substances specified in the list of priority substances (Article 16).
l)	Measures required to prevent significant losses of pollutants from technical installations, and to prevent and/or to reduce the impact of accidental pollution incidents for example as a result of floods.
Supplementary Measures[206]	
These measures include: (i) legislative instruments; (ii) administrative instruments; (iii) economic or fiscal instruments; (iv) negotiated environmental agreements; (v) emission controls; (vi) codes of good practice; (vii) recreation and restoration of wetlands areas; (viii) abstraction controls; (ix) demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought; (x) efficiency and reuse; (xi) construction projects; (xii) desalination plants; (xiii) rehabilitation projects; (xiv) artificial recharge of aquifers; (xv) educational projects; (xvi) research, development and demonstration projects.	

To realize the vision for a period of ten years and onwards for the water sector, goals have been identified that are expressed in function of the three pillars of the water sector: water use, water protection and

[205] Article 5 includes an analysis of the characteristics of the river basin, a review of the impact of human activity on the status of surface waters and on groundwater, and an economic analysis of water use.

[206] Non-exclusive list of supplementary measures which Member States within each river basin district may choose to adopt as part of the programme of measures required under Article 11(4) of the EU WFD.

protection from water. These three pillars and their respective goals are embodied in the Environmental Quality Objectives for the River basin, as described in Section 10.

To achieve the objectives for the water sector in the Drini-Buna River Basin during the next decade and beyond, a number of necessary measures have been proposed in line with the EU WFD, which also reflect the National Plan for the Water Sector (NPWS)[207].

These measures for the Drini-Buna River basin are divided into two categories:

- 'Basic' measures, which include concrete investments, which can also be co-financed or supported by the State budget, donors or local funds.
- 'Supplementary' measures, which include necessary background or feasibility studies, which can be directly funded from international donors, the State budget or local funds.

Measures have been developed based directly in line with the Environmental Objectives (Section 10) reflecting the seven distinct categories of the EOs, each of which is inclusive of 'basic' and/or 'supplementary' measures:

1. To promote the sustainable use of water resources, their fair distribution among users, maximizing economic benefits in respect of environmental conditions and sustainable management principles, which includes measures for:
    a) Improved water supply
    b) Improved collection of waste water
    c) Water for irrigation for agriculture land
    d) Improvement drainage network for irrigated agriculture land
    e) Sustainable development aquaculture in specified zones
    f) Use of hydro energy potential
    g) Fulfilling of industrial water requirement
2. Preservation and achievement of minimal "good" ecological and chemical status for surface water bodies that have "less than good", "poor" or "very poor" status. (Rivers, lakes, transitional / transitional waters, coastal, artificial and highly modified water bodies). Specific measures will result in the following:
    a) Improvement of monitoring for all water bodies
    b) Improvement of ecological status and chemical quality for all surface water body types
    c) Introduction of good agricultural practices – assessment, monitoring and management
    d) Reduction of contamination from use of pesticides in agriculture
    e) Reduction of illegal use of inert and river gravels
3. Prevention of pollution in order to avoid a deterioration of groundwater quality and to attain a good chemical status in GWBs. Based on the EO, which has two sub activities:
    a) Elimination/reduction of the amount of hazardous substances and nitrates entering groundwater bodies
    b) Increase of wastewater treatment efficiency in order to avoid GW pollution from urban and industrial pollutions sources
4. Preservation and achievement of minimal "good" quality for bathing water (internal, coastal and transitional), which requires:
    a) Increasing the number of coastal monitoring stations for microbiological elements
    b) Increasing the number of monitoring parameters according to the requirements of the European directives

[207] The National Plan for the Water Sector (NPWS) sets perspective on the vision, goals and objectives of the sector in the year 2030, in line with the UN Sustainable Development Goals (2030 Agenda) and the cycle of drafting water basin management plans, which refers to the Water Framework Directive.

5. Reduction of flood risk and losses for life, livelihoods, health, economy, cultural and environmental assets of persons, businesses and communities, which has two sub activities:
    a) Reducing the number of residents affected by flooding
    b) Reducing the agriculture land affected by floods
6. Improvement of the safety irrigation dams
7. Preservation and/or reduction of the rate of erosion in rivers, required for:
    a) Less vulnerable areas (20% of the territory)
    b) Highly endangered areas (70% of the territory)

The PoMs have also been developed with an orientation for gender mainstreaming [208] line with the requirement of Law No. 9970/2007 on gender equality in society. In order to ensure a gender sensitive approach for water management in the Drini-Buna River Basin, key indicators and targets (Table 12.2) are included for all measures (Table 12.3), which will be used to evaluate the degree to which females and males participate in the economy and in decision-making in the public sector and civil society in relation to water management.

Table 12.2: Key Indicators for Gender Mainstreaming in the Programme of Measures[209]

Type of Measure	Key Indicator	Implementation of the PoMs
Supplementary	Representation in feasibility studies	>30% of both sexes
	Representation in key decision-making positions in the public sector	>30% of both sexes[210]
	Representation in key decision-making positions in the civil society	
Basic	Representation in infrastructure development	>30% of both sexes

12.2 Plan of Action

A clear plan of action is required in order for the main and supporting institutions to cooperate and coordinate resources in order to achieve effective water management in the Drini-Buna River Basin in the future.

To mitigate current and future problems in the River Basin, the action plan must include a description of the specific priority activities to be undertaken, the timeframe, the costs and national and regional or local obligations and/or responsibilities. The indication of the source of the funding is required although the exact names of the donors and the IFIs cannot be known at this stage. Suffice to say that funding will originate as either a loan co-financed with donor or local funds.

Table 12.3 below shows the timeline, estimated cost and institutional responsibility for the implementation of the Programme of Measures in the Drini-Buna River Basin from 2020-2032 divided in ‘basic’ and ‘supplementary’ measures in the short term, middle term and longer term.

The preliminary estimation of the costs for each planned infrastructure measure are based on cost estimation for the investment used on Water Supply and Sewerage Master Plan for Albania, on the

[208] Gender mainstreaming has been embraced internationally as a strategy towards realising gender equality. It involves the integration of a gender perspective into the preparation, design, implementation, monitoring and evaluation of policies, regulatory measures and spending programmes, with a view to promoting equality between women and men, and combating discrimination.

[209] The PoMs are shown in Table 12.3

[210] In accordance with Law No. 9970/2007, Article 15

Government Plan of Measures (draft document) and on local and international experience. The targets based on the Environmental Objectives (Section 10), which are line with the National Plan of the Water Sector (NPWS) are provided for each of the activities at three timeframes (2020, 2022 and 2029).

There is little doubt however that the former national and local institutional setup for water management clearly resulted in overlapping responsibilities. The current institutional arrangements for the future implementation of the WFD are under review on a national level. Where there is doubt over the responsibilities of future implementing agencies for implementation of specific measures, these are highlighted in bold in Table 12.3.

Table 12.4 shows the preliminary estimated cost for each Environmental Objectives in the short term (2020-2022), middle term (2023-2028) and longer term (2029-2032).

Table 12.5 provides the estimated cost for each Environmental Objectives divided in ‘basic’ and ‘supplementary’ measures in the short term, middle term and longer term for the Drini-Buna River Basin. The total cost for the implementation of the proposed measures for the Drini-Buna River Basin is € 512,700,000 with approximately 10% of the costs attributed to ‘supplementary’ measures.

Table 12.3: Timeline, Estimated Cost and Institutional Responsibility for the Implementation of the Programme of Measures for in the Drini-Buna River Basin (2020-2032)

Note 1: Each proposed measure is designated in the timeline as either a 'basic' (red boxes) or 'supplementary' measure (dark blue box) according to Article 11 of the EU WFD[211] .

Note 2: All measures are subject to the reporting of key indicators for gender mainstreaming according to Table 12.2.

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
1. To promote the sustainable use of water resources, their fair distribution among users, maximizing economic benefits in respect of environmental conditions and sustainable management principles																
1a) Improved water supply																
Study on completion of all abstraction wells, pumping stations and water tanks with requirement of DCM no. 379, date 25.05.2016, "For Approval of Regulation on Quality of Drinking Water, including sanitation zone.	0.2	Ministry responsible for water supply and sewage; Ministry responsible for irrigation&drainage (AGS; Municipalities)	National &/or Donors Funds[213]	■	■											
Implementation of DCM no. 379, date 25.0.5.2016 requirements	1.6		Part Loan+ National &/or Donors Funds		■	■	■	■								
Preparation of feasibility projects for the rehabilitation/extension /new system of water supply networks in urban/rural	3.7	Ministry responsible for	National &/or		■	■	■									

[211] In some cases, the proposed measures include 'basic' and 'supplementary' measures. The latter include include necessary background or feasibility studies required to be completed prior to undertaking the 'basic' measures.

[212] Supporting institutions in parenthesis

[213] Includes IPA funding

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s) [212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
areas		Infrastructure, WRMA (Municipalities) , WRA	Donors Funds													
Development of water supply investment projects (rehabilitation, extension or new network) in urban and rural areas	47.0	Ministry responsible for Infrastructure WRMA (Municipalities) , WRA	Loan + Donors Funds													
Consolidation and strengthening of Local Authority & water supply staff	1.3	Ministry responsible for Infrastructure, WRMA (Municipalities)	National &/or Donors Funds													
Develop and implement a study for unaccounted water control and losses reduction strategies and programmes of measures, including revision of tariffs	1.0	Ministry responsible for Infrastructure, WRMA/AOBW (Municipalities) , WRA	National &/or Donors Funds													
Target: % of population served in urban areas				84			89						94			
Target: % of population served in rural areas				35			40						58			
Target: Average water supply (hours/day)				9			12						17			
1b) Improved collection of waste water																
Preparation of feasibility, projects for the rehabilitation/extension /new system of waste water collection in urban and rural areas	1.9	Ministry responsible for Infrastructure,	National &/or Donors Funds													

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s) [212]	Expected Type of Funding	Short-term 2020	2021	2022	Medium-term 2023	2024	2025	2026	2027	2028	Long-term 2029	2030	2031	2032
		AOBW (Municipalities) , WRA														
Rehabilitation/development of sewerage network in urban and rural areas <50k inhabitants.	34.6	Ministry responsible for Infrastructure , AOBW (Municipalities)	Loan + National &/or Donors Funds (Background/ Feasibility studies)										■	■	■	■
Rehabilitation/development of sewerage networks in urban and rural areas 50k-100k inhabitants.	109.0	Ministry responsible for Infrastructure, AOBW (Municipalities)					■	■	■	■	■	■				
Rehabilitation/development of sewerage network in urban and rural areas >100k inhabitants.	84.0	Ministry responsible for Infrastructure, AOBW (Municipalities) , WRA					■	■	■	■	■	■				
Target: % of population served in urban areas				64			65						70			
Target: % of population served in rural areas				18			24						30			
1c) Water for irrigation for agriculture land																
Feasibility study on opportunity of increasing water use availability and efficiency in irrigation, considering new method of irrigation, strengthening of WUA, introducing land agriculture reform, etc.	2.5	Ministry responsible for Irrigation & Drainage (WUA)	National &/or Donors Funds	■	■											

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Rehabilitation/development of irrigation network including dams for Increasing the agriculture irrigated land in basin	18.0	Ministry responsible for Irrigation & Drainage (WUA)	Loan + Donor Funds (Background / Feasibility studies)													
Strengthening of Irrigation and Drainage Regional Boards in respective Municipalities	2.0	Ministry responsible for Irrigation & Drainage /AOBW/ Drainage Boards (Municipalities)	National &/or Donors Funds													
Target: Irrigated agriculture land (000ha)				**28**			**35**						**45**			
1d) Improvement drainage network for irrigated agriculture land																
Feasibility study on improving drainage network for areas to be irrigated and modernisation of drainage pumping station (hidrovor)	1.5	Ministry responsible for Irrigation & Drainage /AOBW/ Drainage Boards (Municipalities)	National &/or Donors Funds													
Rehabilitation/development of drainage network and modernisation of drainage pumping station	32.0		Loan + Donor Funds (Feasibility studies)													
Target: Area with drainage network (000ha)				**40**			**50**						**60**			
1e) Sustainable development aquaculture in specified zones																
Study for determination of dedicated																

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s) [212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
aquaculture zone	0.1	Ministry responsible for Irrigation & Drainage /WRMA	National Funds													
Feasibility study on capacity of water resources in disposition of aquaculture technology used for pollution reduction, and improving ecosystem condition	0.5	Ministry responsible for Irrigation & Drainage /WRMA	National Funds		■											
Target: % of active economy in specified zone					10				30					60		
1f) Use of hydro energy potential																
Completion of studies for potential of hydro energy production for each rivers branch, starting from upstream and considering SHPPs	3.0	Ministry responsible for Energy/NCLD/ WRMA (NSLD)	National &/or Donors Funds	■	■											
Study on optimisation of existing hydro energy production scheme	1.1	Ministry responsible for Energy/NSLD	National &/or Donors Funds	■	■											
Study for evaluation of existing SHPP Concessioner Contract not yet constructed, on coherence between natural potential and installed one for each case.	0.6	WRMA/Ministry responsible for Energy (AOBW)	National &/or Donors Funds	■	■											
Review of all the existing hydropower permits and projects for restoration measures and establishment of an ecological flow downstream of	1.1	WRMA/NANR/ Ministry responsible for	National &/or Donors Funds	■	■											

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
hydropower plants, fish passes and other mitigation measures to restore river continuity		Energy (AOBW)														
			Target: % compared with country max capacity	70			80						95			
1g) Fulfilling of industrial water requirement																
Strengthening staff and capacity on applying polluter pays principle to industries; include in permits system the requirement that the industrial wastewater must be pre-treated onsite.	0.1	WRMA (Industrial Operators)	National &/or Donors Funds	■	■											
Cadastral evaluation of potential water source to be used in different industries	0.2	WRMA (AOBW)	National &/or Donors Funds		■	■										
Study on water reuse, considering water quality requirement from different industries and existing water reservoirs in the area.	0.7	WRMA/MoIE (AOBW)	National &/or Donors Funds			■										
Study on surface water and rainfall water use possibilities from different industries	0.5	WRMA (AOBW)	National &/or Donors Funds			■										
			Target: % compared with demand	90			100						100			
2. Preservation and achievement of minimal "good" ecological and chemical status for surface water bodies that have "less than good", "poor" or "very poor" status. (Rivers, lakes, transitional / transitional waters, coastal, artificial and highly modified water bodies)																
2a) Improvement of monitoring for all water bodies																
Study on completion of necessary surface and ground water monitoring stations, including coast areas	0.3	Ministry responsible for Environment /WRMA (AOBW/AGS)	National &/or Donors Funds	■	■	■										

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Set up and observe monitoring stations for all surface and groundwater delineated water bodies in accordance with EU requirements (6-year requirement)[214]	12.0	Ministry responsible for Environment /WRMA (MoHSC, MoIE, MoFE, AGS, Industrial Operators)	National &/or Donors Funds													
Increasing staff capacity and their equipment on water quality factors and their monitoring, especially on beach areas	0.7	Ministry responsible for Environment /MoHSC/IPH (AOBW)	National &/or Donors Funds													
Complete the records and create register on water monitoring parameters (qualitative & quantitative) for all water body especially on sensitive areas.	0.1	Ministry responsible for Environment /WRMA (NANR/REA)	National &/or Donors Funds													
Target: % of monitoring stations at agreed locations providing relevant data				**20**			**50**						**100**			
2b) Improvement of ecological status and chemical quality for all surface water body types																
Enforcement and implementation of Environmental Permit Regime in relation to the discharge of the water use	1.15	Ministry responsible for Environment /NWC	National &/or Donors Funds													

[214] The set-up of a monitoring programme will include the initial purchase of hardware and software required to meet the EU WFD requirements plus the cost of all analysis.

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s) [212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		(WRMA)														
Operation of existing WWTPs in coherence with WFD 200/60/CE criteria/conditions	3.0	Ministry responsible for Infrastructure (Municipalities/ REA)	Loan + National &/or Donors Funds			■	■	■								
Preparation of Feasibility study for different area on waste water treatment solution for the Municipalities & different households	5.0	MoIE/WRMA (REA)	Loan + National &/or Donors Funds		■	■										
Develop a register of point sources of pollution in the RB, develop and implement a programme of control of point sources, develop pollution reduction programmes of measures	0.05	AOBW/WRMA Ministry responsible for Environment (Industrial Operators)	National &/or Donors Funds		■	■										
Construction of water treatment plant for urban and rural area with more than > 2,000 habitants	38.0	Ministry responsible for Environment (WRMA/MoTE)	Loan + National &/or Donors Funds						■	■	■	■	■	■	■	■
Construction of septic tanks for separate households which cannot be connected to the common waste water collection network	3.5	Ministry responsible for Environment (MoTE/AGS/ Local Government)	National &/or Donors Funds			■	■									
Study on improving/ closing urban waste site with no sanitary conditions and creation of UWTP side (landfill)	1.0	MoIE/ Ministry responsible for	National &/or Donors Funds		■	■										

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s) [212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		Environment /MoHSC, Municipalities)														
Study on rehabilitation of mines and areas in existing and abandoned mines	0.4	MoIE/ Ministry responsible for Environment (AGS/REA)	National &/or Donors Funds		■	■										
Target: % reduction of discharges of untreated wastewater from towns with >2,000 PEs				**10**			**50**						**95**			
Target: % of population connected to the waste water treatment plant				**22**			**40**						**70**			
Target: Construction of septic tanks for % of population not in wastewater collection network				**15**			**25**						**50**			
Target: % reduction of discharges of untreated wastewater from industry & Agriculture				**10**			**50**						**95**			
2c) Introduction of good agricultural practices – assessment, monitoring and management																
Feasibility study on agriculture land consolidation	0.35	Ministry responsible for Irrigation & Drainage/WRMA (Local Government/ Municipalities)	National &/or Donors Funds	■	■											
Implementation of mandatory restrictions of using chemical fertilizers in zones with drinking water wells	0.1	Ministry responsible for Irrigation & Drainage /WRMA (Local Government/ WUA)	National &/or Donors Funds		■	■										
Preparation of pilot projects on advantages of common agriculture association	0.3	Ministry responsible for Irrigation &	National &/or Donors Funds		■	■										

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		Drainage /WRMA (AOBW/Drainage Boards/NGOs)														
Develop and Implement Farmers' awareness programmes regarding negative effects of pesticide use and on the availability of alternatives	0.4	Ministry responsible for Irrigation & Drainage (AOBW/NGOs)	National &/or Donors Funds			■	■									
Target: % of compliance cases of water quality indicators for nutrients (diffuse sources)				30			50						95			
2d) Reduction of contamination from use of pesticides in agriculture																
Study on assessment of groundwater contamination from agriculture practices.	1.2	Ministry responsible for Irrigation & Drainage /MoTE/ WRMA (AGS/REA)	National &/or Donors Funds		■	■										
Strengthening of Local Authority skill on controlling and monitoring of use of inputs in agriculture	0.5	Ministry responsible for Irrigation & Drainage / (Municipalities)	National &/or Donors Funds		■	■										
Target: % of contamination reduction				50									80			
2e) Reduction of illegal use of inert and river gravels																
Enforcement and implementation of Permit Regime in relation to the use of		Ministry responsible for			■	■										

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
river gravel and inert.	0.2	Environment /NWC/ WRA (NEA)	National &/or Donors Funds													
Study on rehabilitation - normalisation of river bed	0.6	Ministry responsible for Environment /WRMA (REA)	National &/or Donors Funds		■	■										
Target: % reduction of companies carrying out illegal activities on river beds				**5**			**50**						**100**			
3. Prevention of pollution in order to avoid a deterioration of groundwater quality and to attain a good chemical status in GWBs																
3a) Elimination/reduction of the amount of hazardous substances and nitrates entering groundwater bodies																
Register of all industrial farms and their surface of agriculture land.	0.05	Ministry responsible for Irrigation & Drainage /WRMA (AOBW)	National &/or Donors Funds		■	■										
Increasing staff and skills on local authority on controlling and monitoring of agriculture inputs	0.3	Ministry responsible for Irrigation & Drainage / Ministry responsible for Environment (Municipalities)	National &/or Donors Funds	■	■	■	■									
Target: % of contamination reduction				-			**50**						**80**			
3b) Increase of wastewater treatment efficiency in order to avoid GW pollution from urban and industrial pollutions sources																

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Operation of existing WWTPs in coherence with WFD 200/60/CE criteria/conditions	7.0	MoIE (REA)	Loan + National &/or Donors Funds			■	■	■	■							
Feasibility study on use of efficient technology of WWTP, based on capacity and local conditions	0.8	Ministry responsible for Environmental /WRMA (REA)	National &/or Donors Funds		■	■										
Study on technology of septic tanks to protect GW	0.2	Ministry responsible for Environment /WRMA (AGS/ Municipalities)	National &/or Donors Funds		■	■										
Target: % reduction of discharges of untreated wastewater from towns with >2k PE*s*				10			50						95			
4. Preservation and achievement of minimal "good" quality for bathing water (internal, coastal and transitional)																
4a) Increasing the number of coastal monitoring stations for microbiological elements																
Completion of monitoring station on coast areas	2.3	Ministry responsible for Environment /WRMA	National &/or Donors Funds	■	■											
Enforcement of skills and capacities on local level in relation to the monitoring of coastal and beach areas.	0.4	Ministry responsible for Environment /WRMAIPH (REA)	National &/or Donors Funds		■	■										
Enforcement of requirement for the hazards activities close to the coastal areas in case of catastrophes	0.1	MoI/ Ministry responsible for Environment	National &/or Donors Funds			■										

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Study on contamination risk assessment from the sea transport	0.2	MoIE/ Ministry responsible for Environment (REA)	National &/or Donors Funds			■	■									
Target: Number of monitoring stations				20			30						40			
4b) Increase the number of monitoring parameters according to the requirements of the European directives																
Gradually increase of monitoring parameters in coast areas station	0.3	Ministry responsible for Environment / (REA/IPH)	National &/or Donors Funds		■	■	■	■	■							
Improving change of information between Local Authority and Regional Environmental Agency	0.1	REA (Local Authority)	National &/or Donors Funds			■	■									
Target: % of parameters regularly monitored according the EU Bathing Water Directive				50			75						100			
5. Reduction of flood risk and losses for life, livelihoods, health, economy, cultural and environmental assets of persons, businesses and communities																
5a) Reducing the number of residents affected by flooding																
Feasibility study on flood risk assessment for the Shkoder area and preparation of flood risk assessment map, protection of agriculture land and urban zone.	0.8	WRMA (AOBW/REA /CE)	National &/or Donors Funds		■	■	■									
Study on assessment on flood risk for the settlements and decreasing the risk of population.	0.4	Ministry responsible for Environment /MoUD (Municipalities)	National &/or Donors Funds			■										
Preparation of an emergency plan to improve the capacity in local level for flooding.	0.2	CE/MoI	National &/or		■	■										

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		Municipalities	Donors Funds													
Target: % of population affected				>10			>5						>1			
5b) Reducing the agriculture land affected by floods																
Implementation flood protection infrastructure on in the Drini-Buna River Basin for protection of agricultural land and urban zones.	80.0	WRMA/MoUD (Municipalities)	Loan + Donors Funds (planning studies)					■	■	■	■	■	■	■	■	■
Target: Agriculture land surface affected (000ha)				3.0			1.7						1.0			
6. Improvement of the safety irrigation dams																
6a) Assessment and the provision of measures to improve the safety of dams																
In cooperation with respective DIRB prepare a list on dam conditions, and prepare a study for rehabilitation based on safety.	0.2	NCLD/ Ministry responsible for Irrigation & Drainage (NSLD)	National &/or Donors Funds		■	■										
Increase the staff capacity and knowledge on safety parameters of the dams, especially those in risk and in strong climatically condition	0.3	NCLD Ministry responsible for Irrigation & Drainage (NSLD)	National &/or Donors Funds		■	■										
Target: Number of dams restored				25			50						100			
7. Preservation and/or reduction of the rate of erosion in rivers																
7a) Less vulnerable areas (20% of the territory)																
Preparation of land vulnerability map of the area, incl. erosion phenomena	0.05	Ministry responsible for Irrigation &	National &/or Donors Funds	■	■											

Environmental Objective/Actions & Proposed Measures	Estimated Value (Million €)	Main & Supporting Implementing Institution(s)[212]	Expected Type of Funding	Short-term			Medium-term						Long-term			
				2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		Drainage /NANR														
Study on low cost forestation project of the areas in risk of erosion, based on local conditions	0.4	MARD (AOBW)	National &/or Donors Funds													
			Target: tons/ha/year	**5**			**4.5**						**3**			
7b) Highly endangered areas (70% of the territory)																
Study on low cost forestation and regulation of small streams regime of the areas in high risk of erosion, based on local conditions	0.5	Ministry responsible for Irrigation & Drainage	National &/or Donors Funds													
Implementation of pilot projects on reduction of erosion phenomena	1.0	Ministry responsible for Irrigation & Drainage /WRMA (AOBW)	National &/or Donors Funds													
			Target: tons/ha/year	**15**			**13**						**10**			

Table 12.4: Preliminary Estimated Cost for each Environmental Objective[215]

Environmental Objectives	Estimated Completion			Estimated Value (Million Euro)	Main Institutions Involved
	2020 - 2022	2023 - 2028	2029 - 2032		
1. To promote the sustainable use of water resources, their fair distribution among users, maximizing economic benefits in respect of environmental conditions and sustainable management principles	31.10	264.50	52.60	348.20	WRMA Ministry responsible for Environment Ministry responsible for Irrigation & Drainage
2. Preservation and achievement of minimal "good" ecological and chemical status for surface water bodies that have "less than good", "poor" or "very poor" status. (Rivers, lakes, transitional / transitional waters, coastal, artificial and highly modified water bodies)	16.00	23.80	29.05	68.85	WRMA Ministry responsible for Environment
3. Prevention of pollution in order to avoid a deterioration of groundwater quality and to attain a good chemical status in GWBs	2.35	6.05	-	8.40	WRMA AGS Ministry responsible for Environment
4. Preservation and achievement of minimal "good" quality for bathing water (internal, coastal and transitional)	3.05	0.35	-	3.40	Ministry responsible for Health
5. Reduction of flood risk and losses for life, livelihoods, health, economy, cultural and environmental assets of persons, businesses and communities	1.20	44.64	35.56	81.40	MoUD WRMA MI CE
6. Improvement of the safety irrigation dams	0.50	-	-	0.50	NCLD Ministry responsible for Irrigation & Drainage
7. Preservation and/or reduction of the rate of erosion in rivers	1.45	0.50		1. 95	WRMA
Total (Million Euro)	**55.65**	**339.84**	**117.21**	**512.70**	

[215] Environmental Objectives are specified in Section 10.

Table 12.5: Preliminary Estimated Cost for each Environmental Objectives divided in Basic and Supplementary Measures starting from 2020

Environmental Objectives	Basic Measures (Million Euro)	Supplementary Measures (Million Euro)	Estimated Value (Million Euro)
1. To promote the sustainable use of water resources, their fair distribution among users, maximizing economic benefits in respect of environmental conditions and sustainable management principles	318.32	29.88	348.20
2. Preservation and achievement of minimal "good" ecological and chemical status for surface water bodies that have "less than good", "poor" or "very poor" status. (Rivers, lakes, transitional / transitional waters, coastal, artificial and highly modified water bodies)	54.25	14.60	68.85
3. Prevention of pollution in order to avoid a deterioration of groundwater quality and to attain a good chemical status in GWBs	7.00	1.40	8.40
4. Preservation and achievement of minimal "good" quality for bathing water (internal, coastal and transitional)	-	3.40	3.40
5. Reduction of flood risk and losses for life, livelihoods, health, economy, cultural and environmental assets of persons, businesses and communities	80.00	1.40	81.40
6. Improvement of the safety irrigation dams	-	0.50	0.50
7. Preservation and/or reduction of the rate of erosion in rivers	-	1.95	1.95
Total	**459.57**	**53.13**	**512.70**

13 Summary of Public Consultation Activities

13.1 Introduction

Stakeholders' engagement process through public consultation is a cornerstone of the Water Framework Directive implementation, as stated in Art.17:

"Member States shall encourage the active involvement of all interested parties in the implementation of this Directive, in particular in the production, review and updating of the river basin management plans."

The Stakeholders' engagement process is meant to ensure stakeholder engagements in the level of national and local authorities, civil society (NGOs) and communities through key informants and focus groups representing the vulnerable groups (e.g. women, elderly, minorities and/or ethnic groups).

The RBMP project stakeholder engagement process was performed based on a Stakeholders' Engagement Activity Plan (Annex 5), and it was focused on two major processes, i.e. trainings and management.

These engagements were held during the planned timeframe in purpose of the preparation of a RBMP, between April 2016 and June 2017, and included the following engagement activities:

- Organising Training workshops in close co-operation with DWRP, on mutually agreed thematic relevant for the development of the RBMPs, for the trainings processes
- Organising the actual stakeholders' consultations for the management processes.
  - Finalizing the stakeholder lists and engagement strategy (national/regional);
  - Organizing the national and regional meetings (e.g. notification to authorities, letters of invitation, and liaison with regional and communal authorities);
  - Organizing of "note taking" during consultation meetings;
  - Preparing the current section of the RBMPs including sign sheet, pictures, feedback questionnaires and MoMs

Regarding the trainings, these aimed to strengthen the administration capacity to manage water resources and to sustainably improve the performance of water use systems in the project area. The training activities carried were out aiming a gender balance in the target audience and with a target to involve women at a participatory level.

The implementation of a stakeholders' consultation plan (outlined below in Figure 13.1), ensured effective stakeholder participation at the level of national and local authorities, civil society (NGOs) and communities. The following phases of consultations were completed based of the stakeholder plan:

- National-level stakeholder consultation;
- Regional and local-level stakeholder consultation:
- Focus group organized with vulnerable groups (women, elderly, Roma [if any] and other groups)
- Key informant interviews

Being comprehensive and culturally appropriate a process, Stakeholders' consultation included the exchange of information and knowledge, to understand the concerns of others, and to build relations based on cooperation. This allowed interested parties to understand the risks, impacts and opportunities of the project to achieve positive results.

The main objectives of the stakeholder engagement were:

- To ensure the provision of appropriate information in a timely manner to those affected or whom have a stake on the project,
- To ensure that these groups be given an opportunity necessary to express opinions and concerns
- Ensure that the comments made in time so that it can be considered in project decisions.

Social, economic and gender issues were addressed in the consultation meetings, through inclusion of, national policies, and previous strategies on gender and women in local decision-making.

13.2 Trainings

Trainings were held in order to create a common understanding among water management Stakeholders regarding the required steps in developing River Basin Management Plan. These trainings helped to strengthen the Government's capacity to manage water resources at both the national level and in the Drini-Buna River Basin and to sustainably improve the performance of irrigation systems in the project area. These activities were carried out with a gender balance and our target was to involve women at least 50% in participating in these trainings.

The trainings were also addressed to regional and local water administration public entities. In order to create a gender balance participation in these meetings, these entities were requested to submit the list of all members, positions and gender of each targeted departments. The trainings participation was set up to have at least 50% women participation. If certain departments could not meet this, participation of other women experts from other entities and civil society were taken into consideration. The project team invited the stakeholders to the training sessions officially by letter and also by phone.

The topics the trainings covered were as follows:

- What is integrated water resource management plan?
- What are Water Framework Directive, Floods Directive, etc.?
- Institutional cooperation, keeping, monitoring and sharing data
- What is modelling of surface and ground waters?
- What is cost efficiency planning investment?

Stakeholders that were part of these training activities were from the institutions below:

- AOBW (former RBA)
- RBC
- Municipalities
- Water Supply Utilities
- Drainage Board
- WUO
- Main Water Use Industries
- Regional Environmental Agency
- Health Regional Authority
- Water Policy Department
- Water Secretariat
- Civil Society

The eight training workshops delivered for the Drini-Buna River Basin target audience and relevant central institutions, were as per table below:

Table 13.1: Drini-Buna River Basin and common workshop deliveries

WS no.[216]	WS Title	Training objectives	Delivery
1	Significant Water Management Issues (Stakeholders Engagement) Workshop	Introduce the stakeholders into the integrated water management concept, the requirements of the WFD and get input on the subject to: 1.familiarise the target audience with the concept of Integrated Water Resource Management (IWRM), which includes the development of River Basin Management Plans (RBMP), 2.receive constructive feedback from regional and local organisations involved in water management, 3. understand the relevant issues of related to the main water uses and vulnerable groups in each river basin.	Shkoder, 25 April 2016
3	Water Management in the Drini-Buna River Basin – current and future requirements	Provide an overview from stakeholders of the current situation in water management on the regional level, identifying problematic areas and future interventions that are required for implementation of water law, which incorporates the requirements of the EU Water Framework Directive.	Shkoder, 19 July 2016
5	Biological Monitoring and Assessment, Typology, and Risk Assessment	Developing the capacity of the stakeholders, in order to familiarise those responsible for surface water monitoring and/or decision-making with the fundamentals of ecological monitoring.	Shkoder, 18 July 2016
7	Training on Economics of Water Use	Familiarise those responsible for economic decision-making support in the two river basins, with the fundamentals of economics of water use as envisaged by the Water Framework Directive.	Shkoder, 5 October 2016
8	Introduction to River Basin Modelling	Give an overview of the capabilities of MIKE HYDRO Basin modelling software package, with the target of enabling the participants to create models for water allocation and reservoir operation projects.	Tirana, 17-18 January 2017
10	WFD-Compliant Water Monitoring Programme in Drini-Buna River Basin	Provide participants with an overview of the WFD-requirements for water monitoring and also to discuss with them the roadmap to water monitoring in Drini-Buna River Basin in compliance with WFD.	Tirana, May 29, 2017
11	Mike Hydro / Basin Workshop – estimates of water supply demand balances under present and future conditions	Provide participants with an exercise carried out to estimate balances between water supply and demand in the Drini-Buna basins. The exercise includes the development of scenarios that are used to characterize supply and demand under both present and future conditions.	Tirana, June 8, 2017
12	Mike Hydro / Basin Workshop – presentation of scenarios and continuation of the MIKE HYDRO	Present preliminary results of the water balance analysis under present future conditions, so that end users understand how the MIKE HYDRO Basin software framework can be used to quantify supply and demand balances.	Tirana, June 9, 2017

The training workshops organised in Tirana with the target audience from Drini-Buna River Basin, and representatives of central institutions.

[216] Workshop numbers are according to the schedule of activities, i.e. some dates may not tally with the workshop number (e.g. WS No.3 and 5)

13.3 Stakeholder Consultations

River Basin management planning requires that the project ensure stakeholder engagements in the level of national and local authorities, civil society (NGOs) and communities through key informants and focus groups representing the vulnerable groups (e.g. women, elderly, minorities and/or ethnic groups). These engagements were held during the drafting of RBMP to take into accounts opinions comments from different levels of stakeholder groups that were used for finalizing the RBMP and at the draft RBMP to disclose the plan to all stakeholders and collect their opinions and comments. The stakeholder questionnaires that were used are those presented in the Stakeholders Engagement Activities Plan, and the completed questionnaires are available upon request, due to their large volume.

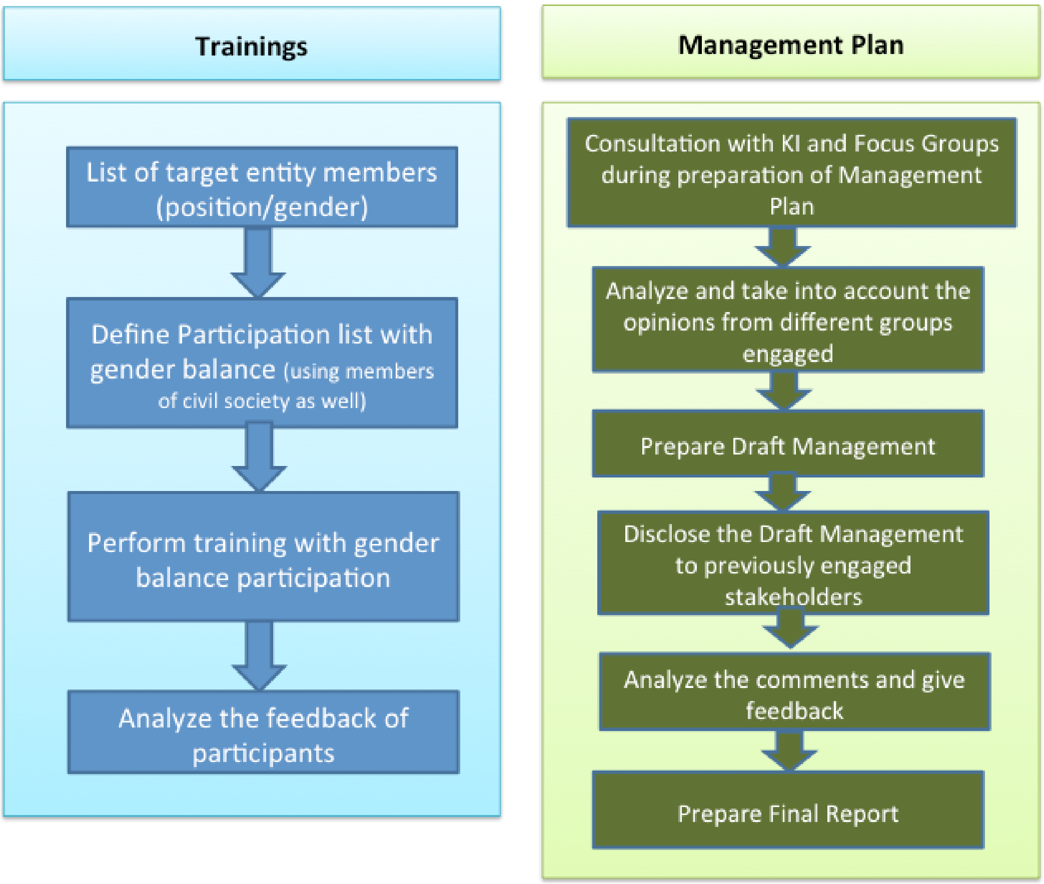
A stakeholder engagement action plan was developed, and the following phases of engagement were included in the action plan:

- National Level Stakeholder Engagement: stakeholders at central state level will be informed of the results achieved in the alternatives assessment in face to face meetings;
- Regional and Local Level Stakeholder Engagement: one plenary stakeholder meeting will be organized in each of the regions
- Key Informants Interviews
- Focus Group organized with vulnerable groups (women, elderly, Roma (if any) and other groups)

For each phase, the following tasks will be completed:

- Preparation Activities
- Notification to stakeholders
- Information Materials (Presentations)
- Disclosure Meetings
- Organization of ’note taking’ and registration during disclosure activities
- Registration of participants

Figure 13.1: Stakeholders engagement scheme



The involvement of stakeholders is a key element in strategic planning. The purpose of the stakeholder involvement is to allow interaction of stakeholders in the decision-making process, expressing their views and alleviate risk through technical solutions based on concerns raised during the process.

Stakeholder engagement was structures as a process of comprehensive and culturally appropriate, including the exchange of information and knowledge, are able to understand the concerns of others and to build relations based on cooperation. This allowed interested parties to understand the risks, impacts and opportunities of the project to achieve positive results.

The main objectives of the stakeholder involvement were: i) to ensure the provision of appropriate information in a timely manner to those affected or whom have a stake on the project, ii) to ensure that these groups be given an opportunity necessary to express opinions and concerns and iii) ensure that the comments made in time so that it can be considered in project decisions.

Field visits and stakeholder engagement process were designed to treat several different targets. Fieldwork was designed to use this existing knowledge to assess the relevant issues in order to plan for the management plan and ensure that the proposed project will address effectively the main requirements of task assigned in coordination with the stakeholders. Fieldwork ensured that all issues have been addressed and all stakeholders were consulted including all directly affected communities (stakeholder groups were consulted including all affected communities and settlements, special groups such as farmers and key informants as regional offices, women and directly involved stakeholders).

The methodologies described below were adapted to the requirements described above and particular attention was given to the more vulnerable members of society.

These engagement activities were undertaken in the following framework:

- Phase 1: High level consultation with national agencies
- Phase 2: Consultation with regional authorities
- Phase 3: Key informant interviews
- Phase 4: Focus Group with vulnerable people

All relevant stakeholders, i.e. those who were already involved in previous consultation during project workshops and new ones identified, were invited to participate in meetings to be informed about the findings and recommendations of the study team. The detailed stakeholders list is provided in Table 13.2.

Table 13.2: List of stakeholders at the national and regional level

Institutions and Stakeholder at National Level		
Ministry of Agriculture And Rural Development Water Resource Management Agency Ministry of Tourism and Environment Ministry of Infrastructure and Energy Ministry of Health and Social Care Ministry of Interior	Ministry of Defence Ministry of Finance and Economy, Directorate of social inclusion and gender equality under the Ministry of Health and Social Care Water Regulatory Authority The Albanian Institute of Geo-Sciences, Environment, Water and Energy The Drin Core Group The National Agency of Natural Resources	Albanian Geological Services General Directory of Water Supply and Sewerage, State Health Inspectorate National Agency of Protected Areas
Institutions and Stakeholder in Drini-Buna River Basin		
Administration Office of Basin Water of Drini-Buna Drainage and Irrigation Board of Korça and Lezhë Regional Environmental Agency(s) of Lezhë and Shkoder	Municipalities of Dibër, Fushë Arrëz, Has, Kukës, Lezhë, Librazhd, Malësi e Madhe, Pogradec, Pukë, Pustec, Shkoder, Tropojë, Vau i Dejës Hydro Energy Corporate State Inspectorate of Environmental, Forest and water, Qark(s) of Dibër, Kukes, Lezhe and Shkoder	Health State Inspectorate (for all Municipalities) Water and Sewerage Enterprises

13.3.1 Phase 1 and Phase 2 consultations (high level and regional level)

The following formats of meetings were organized:

- Face to face meetings with stakeholders at national level. Different representative departments of the institutions were invited to attend at the same meeting;
- Plenary meetings at regional/ district level: meetings were organized at regional/district level in the study area of the alternatives assessment

The venue for each of the regional meetings was selected in collaboration with main attendees and the final invitation list was agreed with the concerned regional and local representatives. The following meeting events were organised as part of Phase 1 and Phase 2 consultations, for the Drini-Buna RBMP component:

- Discussion on Drini-Buna Interim Draft River Basin Management Plan on 12th December 2016, at the Ministry of Agriculture premises (joint high level and regional level consultation)
- Meeting in Shkoder Prefecture in framework of River Basin on Drini-Buna Interim Draft River Basin Management Plan, on 12 February 2017 in the premises of Shkoder Prefecture (regional level consultation).

- Meetings with NGOs representatives, on 20th and 24th of March 2017

13.3.1.1 Meeting 1: Discussion on Drini-Buna Interim Draft River Basin Management Plan

The meeting was organized by the consortium on 12th December 2016, at the Ministry of Agriculture premises. The objectives of the meeting were:

- To present and discuss with the national stakeholders the basic concept of IWRM and RBMP as processes which promote the coordinated development and management of water in order to maximize economic and social welfare in a reasonable manner without compromising the sustainability of vital ecosystems, which should absolutely be taken in consideration,
- To present the Drini-Buna Interim Draft River Basin Management Plan preliminary findings and conclusions
- To answer to all the questions and concerns raised by the participant stakeholders and to collect their views regarding the presented aspects

During the meeting, questions and comments were raised in regards as of the above mentioned. Below are some of the answers were provided, also the comments and observations were taken on board, as follows:

- Explanations of the main elements and components that were taken in consideration to compile the Report
- All the International and National Directives were being studied and measured during the preparation phase of the Report. Due to fact that Albania is not being considered as an agricultural country the Managing of Water stays on how the Government and Local institutions levels operate
- Economic analysis is included to the Report due to the fact that the results are necessary to understand the actual costs of water and wastewater services and the level of service provided.

- Erosion is mentioned in the report. There are data collected for this aspect which will be elaborated in the future
- Incurred water losses are taken in consideration and a consolidated detailed report on water problematic issues and how to manage them. Also, it is mentioned that EU funded study/projects are required to financially cover this aspect of the River Basin Management Plans.
- The ecological status of surface waters is not currently measured due to a lock of experience in the country on the methodological approach. The relevance of the rapid “biological assessment” was provided in order for the audience to understand that this is a preliminary step required to identify polluted surface waters.

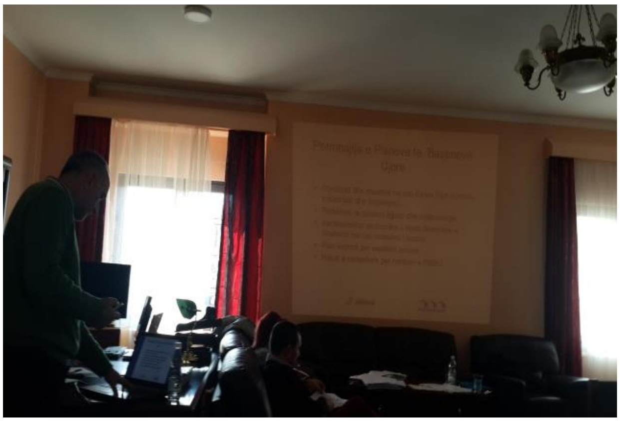
During the consultation, it was noticed that there is a certain sense of frustration at river basin level regarding the apparent disconnection between central government thinking and local realities. Some of the difficulties described may be attributable to the relatively recent establishment (last quarter of 2015) of the institutional structures described above. The male to female ratio at the meeting was 66%/34%.

13.3.1.2 Meeting 2: Shkoder Prefecture in framework of River Basin on Drini-Buna Interim Draft River Basin Management Plan

The meeting was held on 12 February 2017 in the premises of Shkoder Prefecture. The objectives of the meeting were:

- To present and discuss with the local stakeholders the basic concept of IWRM and RBMP as processes which promote the coordinated development and management of water in order to maximize economic and social welfare in a reasonable manner without compromising the sustainability of vital ecosystems, which should absolutely be taken in consideration,
- To present the Drini-Buna Interim Draft River Basin Management Plan preliminary findings and conclusions and answer to all the questions and concerns raised by the participant stakeholders

During this meeting, project team representatives held a presentation regarding the Drini-Buna Interim Draft River Basin and its integration into the wider concept of Integrated Water Resource Management. During presentation, some questions were raised, which were answered as follows:



- During the preparation phase for the RBMP draft, is there any road map of businesses and private/local activities alongside River Basins? Answer: The management plan is based on: consideration of the environmental hotspots of active or non-active private enterprises and activities; including industrial and urban area and their outcome of the urban pollution, and an indication of private business which use the natural water resources that ends with environmental pollution (livestock, leather processing, etc.)

13.3.1.3 NGO Engagement

Before the meetings with the NGOs were organized, a list with all the relevant NGOs with different background that might be helpful for the RBMP development was made. Some of the NGO's have answered the request for meeting arrangements.

The meetings were organized on the 20th and 24th of March 2017 in their respective offices. Project team representatives had conducted a short presentation of the river basin management plans with a main focus on the objective and the purpose of the project. In general, they support the water management plans and agree with the approach, but they also made some suggestions, as shown in Table 13.3 below.

Table 13.3: NGOs' questions and answers

Questions/Suggestions	Answer
As water is an irreplaceable asset, can it be exported? This may increase the income and also may help other places that are in need of water.	This is an issue that water management plan cannot give an exact answer to because first we need to define if the water is a product or a source. This is a decision to be taken by the government and the community of Albania.
The question raised is that before we define the vision is the actual and real status of the basins evaluated?	It is made a general inventory of the basins and this strategy is like an umbrella and after it, the individual management plans will be drafted.
How will water be managed?	Management of water is presented in the strategy that was finalized based on: - Water for People - Water for Food - Water for the Environment - Water for Industry Individual problems that every basin faces should be part of the management plan of each basin.
Besides the study, it is needed also a demonstration in practice and monitoring.	
As a priority, there should be drinkable water for people, as shown in your strategy.	
Irrigation system is overused?	
There is a lack of drinking water in many areas.	Water should be a natural resource and a community service.

13.3.2 Phase 3 and Phase 4 consultations (Key Informants and Focus Groups)

The stakeholder engagement process included interviewing a number of focus groups and key informants on water issues. With a special focus on women, this is a group that is directly impacted from water management. Other groups that were in the focus of this stakeholder engagement process are minorities such as Roma or Egyptian minorities, elderly people and other key informants such as farmers, who are using and managing water, and health workers, who as well have crucial water-use needs in their daily work process.

The purpose of key informant interviews was to gather qualitative information from an individual who has deep knowledge of a particular subject or area in question. Interviews with key informant were carried out in each municipality, however, specific issues facing different areas of the project dictate the exact location and number of interviews. Key informant interviews were conducted mainly at regional and local level to achieve the best information.

A series of focus group meetings were organized with the aim of targeting different audiences in different areas of the project. Various focus groups were selected based on their level of interest position, marginalization, information specialists or ability to influence the planning process of the project.

Marginalized groups in need are individuals or communities who are particularly susceptible to marginalization due to gender, age, gender, race, religion, disability of living, or location. Focus groups provide a forum for members of society who need to be heard, and allow open discussion about the project, its aim and suggested plans. In every municipality of the study area, all potentially marginalized groups such as women, elderly, manufacturers, seniors and subsidized agricultural groups were targeted through a series of focus group meetings. Discussions in focus groups with women and the elderly were carried out in each major municipality, and other vulnerable groups like agricultural producers were carried out in certain places in the villages where specific marginalized groups have been identified.

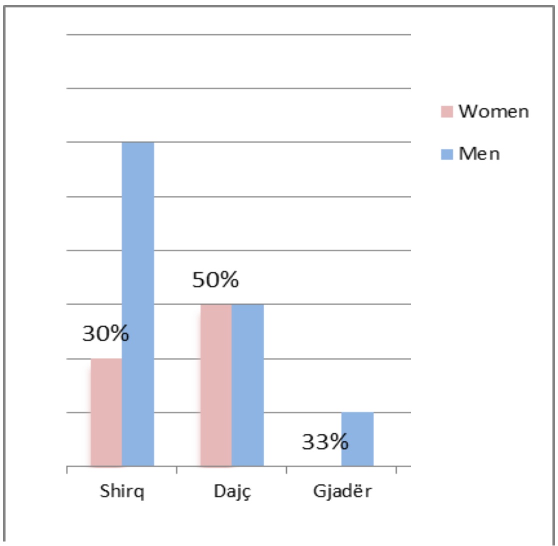
The project team guided participants to open a series of questions dealing with the subject. All information was registered and the key findings are summarised in this chapter. The total number of contacted people in both of the river basins is 67, of which 30 are women. In Drini-Buna river basin, out of 24 contacted people, 12 were women. The total number of interviews is broken down in Table 13.4

Table 13.4: Focus Groups and Key Informants in Drini-Buna River Basin

Basin	City	Administrative Unit	Focus group or key informants	Number of interviewees
Drini-Buna	Shkodër	Shirq	Roma	
			Elderly	3
			Woman	3
			Farmers	2
			Health workers	2 (2 women)
		Dajç	Roma	1
			Elderly	2
			Woman	3
			Farmers	3 (1 women)
			Health workers	1 (1 women)
	Lezhë	Gjadër	Roma	
			Elderly	1
			Woman	2
			Farmers	1
			Health workers	

The distribution of women within the number of interviews made is 45% of the total, with a good representation in each basin. For the Drini-Buna river basin, the representation of women is 50%. As shown in the table above, women have participated in this process not only to discuss gender issues, but also as health workers, and farmers.

Figure 13.2: Participation of women in focus groups or as key informants in the Drini-Buna RB



13.3.3 Main results and issues

In general, most of the cities contacted in this stakeholder process have limited access to water. Water supply hours in houses vary from 2-12 hours a day, and it is even more limited during the summer period, which is a dry season in Albania.

Table 13.5: Main problems

Basin	City	Administrative Unit	Water supply in houses (mean hours)	Problems with water supply
Drini-Buna	Shkodër	Shirq	0 hours	The inhabitants through the use of wells personally resolve the lack of water supply, the water of which, however, is not drinkable.
		Dajç	0 hours	There is not water supply service. The population has taken steps to this problem by opening personal wells in their home. From the analyses carried out this water is not drinkable because is rich in nitrates. From an experimental study conducted by the health center on the inhabitants, the use of this water is directly related to various health problems.
	Lezhë	Gjadër	6 hours	The water supply occurs twice a day, for about 3 hours each. This lack is a serious concern for local farmers, which have personally invested with the opening of private wells in their land. At the same time, they also mention the lack of operation of irrigation channels.

In the table 13.6 below the issues based on specific groups are identified, with a special focus on women and farmers, but other groups are also identified.

Table 13.6: Main issues of the specific groups

Basin	City	Administrative Unit	Focus group or key informants	Main issues
Drini-Buna	Shkodër	Shirq	Elderly	The number of elderly people in recent years has changed since their children want to live with them. They receive retirement pensions from the government, which is not sufficient to sustain the necessary expenses. Some of them are economically helped by children working in other countries. Problem is the healthcare service until 2 pm, rather than 24 hours. Services for this zona are covered by Dajc Health Centre for 16/24 hours.

Basin	City	Administrative Unit	Focus group or key informants	Main issues
			Woman	The role of women is considered to be the same as that of the men, even that women do more housekeeping activities. The social position of women has improved in recent years, having more right to speak, education and more freedom. Usually working opportunities are fair, as they generally deal with agriculture. Both women and men reach high school. Women have some control in the family's economic decision but they have fewer roles in decision making in the family and community.
			Farmers	Farmers are working for more than 15 years. There are problems with irrigation water but they have solved it with private wells. Existing irrigation channels are broken. They use pesticides and consult specialists on that.
			Health workers	Health issues that are treated in this health centre are of different types. They differ due to age, geographic areas, etc. but not different communities. The health centre has some hygienic problems and suffers lack of water. The infant and maternal mortality rate is zero. A few people still use some popular medications such as tea, etc.
		Dajç	Elderly	The number of elderly people in this city has grown recently because of the immigration of several families arriving from mountainous zones. Elderly people who have worked when younger obtain retirement pension. The main problems the society is facing are unemployment and economic problems.
			Woman	Women in the zone are mainly housewives if not working in the administration unit, education or health centres. They would work seasonally in the hotel industry by letting their houses for rent for summer vacation tourists. Depending on the family women may bring most of the family income or less than 20% if they are not working. They usually feel almost equal with their husbands and they cooperate in decision-making, but others feel they are less powerful than men and have a lesser voice in decision making of the family or community. Nevertheless, women go through higher levels of education. The main problems that women are facing are economic problems, unemployment, domestic violence in some cases and divorce, as well as rigid mentality.
			Farmers	Farmers in the zone are working for a long time. There is a big problem with irrigation due to the lack of channels. Other problems related to water are the water quality, which is not filtered but comes directly from the pumps and sometimes no water supply depending on the geographical zone. Agriculture is the main economic activity in the zone for most families. Women are also helping in farming works in the major part of tasks. Pesticides are being used and consulted with a specialist.

Basin	City	Administrative Unit	Focus group or key informants	Main issues
			Health workers	Health issues that are treated in this health centre are of different types. They differ due to age, geographic areas, etc. but not different communities. The health centre has some hygienic problems and suffers lack of water. The infant and maternal mortality rate is zero. A few people still use some popular medications such as tea, etc.
	Lezhë	Gjadër	Elderly	There is a big problem with irrigation due to the lack of channels. Other problems related to water are the water quality, which is not filtered but comes directly from the pumps and sometimes no water supply depending on the geographical zone.
			Woman	Women in the area are mostly housewives. Not much has changed in the past years. Some women feel they have the same role in a household while others feel that men are more favourable. Only a few of the families' incomes are generated by women. They do not have a bank account and they have access in the family's financial decisions only if they're working. Women go through a higher education level than men. Most problems women are facing nowadays are unemployment and poor economy
			Farmers	For a number of families farming is the main income-generating activity. Women are involved in almost every farming activity same as men.

13.4 Country Specifics on Gender Aspects

Defined as equality between men and women in all walks of life, both in the public and private sphere, gender equality means equal access to and control of the resources and benefits, equal participation in political decision-making, and equality under the law for women and men.

The Government of Albania has placed the issue of gender equality at the heart of its priority agenda, considering the women rights as an integral part of human rights. In this framework are approved important laws and policies aimed at elimination on gender discrimination.

13.4.1 Legal framework on gender aspects

The principle of parity of women and men occupies an important place in the Constitution of the Republic of Albania and in the national legislation. The Constitution, [in article 18, point 2] formulates the principle of non-discrimination in this way *"No one can be discriminated against for such reasons as gender, race, and religion…".*

Gender Equality and woman rights in Albania are among the main national issues. Ratification of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), as well as the adoption of laws on gender equality, anti-discrimination and anti-violence are an evidence to this will, along with the adoption of the national strategy on gender equality. The principles of equality e non-discrimination underlie also the Labour Code, Civil Code, Penal Code, Family Code and other parts of Albania Legislation.

Over the last two decades, many laws have been approved, which are also an important agent in changing the balance of gender equality in Albania:

- Law No. 7961 / 12.07.1995 specific amendment to "The Labour Code of the Republic of Albania".
- Law No. 7995 / 20.09.1995 "On promoting Employment".
- Law No. 8876 / 04.04.2002 "On reproductive rights".
- Law No. 9398 / 12.05.2005 "On Some Amendments and Amendments to the Law on People's Advocate."
- Law No. 9669 / 18.12.2006 'On Some Measures for Domestic Violence" - The First National Strategy on Gender Equality and the Elimination of Domestic Violence.
- Law No. 9914 / 12.05.2008 "On some amendments to law no. 9669, data 19.02.2006 "On some measures for domestic violence".
- Law No. 9970 / 24.07.2008 "On gender equality in society" (GEL)
- Law No. 10039 / 22.12.2008 "On Legal Assessment".
- Law No. 10221 / 04.02.2010 "On protection against discrimination",

The Government of Albania has established a National Strategy and Action Plan on Gender Equality (NSGE) adopted by Decision of Council of Ministers, no.733, on 20.10.2016, an important document that brings together many sectors and partners that will contribute to further development of these issues. The Government of Albania has had a continuous close collaboration with all stakeholders who believe that promoting gender equality and its mission for zero tolerance against domestic violence and gender-based violence is a key contribution for a democratic and emancipated society.

The main principles that lead the strategy on which the donors must recognize in order that all the projects will lead to a maximum impact on gender equality are:

- Gender equality, a prerequisite for a fair and socio-economically developed society –
- Sensibility towards and equal treatment towards: women and girls with disabilities, Roma, Egyptian, elderly, immigrant women, child mothers, of special needs of both genders
- Recognition, evaluation and respect for diversity – among girls and women, boys and men, regarding age, skills, sexual orientation, gender identity, ethnical and social origin, religious practices and life choices.
- Zero tolerance to violence against women and domestic violence – protection of life, human dignity and integrity is a prerequisite for the development of a country
- Inter-agency coordination and cooperation – stemming from the inter-agency characteristics and nature of issues constituting the pillars of this strategy, the state institutions, civil society organisations, as well as all interested stakeholders and partners should work together by coordinating their actions in order to most effectively address the gender-based inequalities and injustices to girls/women and boys/men

One of the principles that gender Mainstreaming aims to include, is increasing women's participation in decision-making by:

- Taking measures which ensure full access of women to politics;
- Increasing representation and participation of women in decision making to 30% at all levels through temporary special measures;
- Increasing participation of women in peacekeeping and police structures; and
- Increasing capability of women as citizens to participate in decision making and leadership

13.4.2 Statistic data on gender representation, following the legislative measures[217]

Following the application of gender quotas and other awareness raising measures the evolution of the situation in the general elections is according to the statistics:

- Parliamentary Elections 2005: the representation of women was only 10 out of 140. In the governmental cabinet, out of the election of 2005 the representation of women were 2 ministers from 14 in total or 14% and 7 women deputy ministers from 21 in total. In a prefecture level, there was 1 woman nominated as a prefect in 12 districts.
- Parliamentary Elections 2009: as a result of the application of the provided quota set in the Electoral Code during the electoral campaign for the June 2009 parliamentary elections, the candidate lists included 30% women MPs. The values of women and girl candidates were promoted through meetings, TV shows, etc. In the Parliament of the Republic of Albania, women hold 23 seats out of total 140, or 16.4% of the seats or double number of women compared to the previous parliamentary elections. In the government cabinet, there was one position of a woman minister or 7.1% of the Cabinet. Deputy ministers are in total 35, out of which 8 women or 23%. One woman was a prefect out of 12 districts
- Parliamentary Elections 2013: actually, there are 33 women of total of 140 members of parliament. This gives a rate of 24% of inclusion of women. The Law "On gender equality in society" (adopted in 2008) introduced a 30% expectation of representation quota for women in candidate lists for election, which is still not met yet[218]219. The government created after the 2013 general elections had a considerable increase in women representation, with 8 (eight) female ministers (or 42%) and 10 (ten) deputy ministers (or 34.4%). The role of women was strengthened with the creation of the Alliance of Women Members of Parliament (AWMP) in 2013, a group that encourages gender integration of laws and promotion of gender equality. In 2011, women and girls occupied 64.9% of specialist-level positions, and 39.2% of middle management positions. A series of awareness campaigns on gender equality and the fight against domestic violence were organised during 2007-2012. A National Shelter for victims of domestic violence is in place. Also, a coordination mechanism for the referral of cases domestic violence is fully operational.

Regarding the local elections, the evolution of the situation is the following:

- Local Elections 2007: In the local government referring to the last elections of 2007 the results were: A woman mayor municipality from 65 municipalities or 1.5%, 9 women are Heads of the Municipality Councils or 16%, Women members of the Municipality Councils are 157 from 1178 in total or 13.3%, From 11 mini-municipalities of Tirana 3 mayors are women or 27.3%, there are 6 women heads of the communes, from 309 in total, or 1.9%.
- Local Elections 2011: From 65 Municipalities – 3 are women Mayors of Municipalities or 7.7% (Burrel, Konispol, Patos), from 11 mini-municipalities of Tirana- 2 are Mayors or 18 % (Municipality Unit 1 dhe 5), Members of the Municipality Councils are 760 from a total of 6152 or 12 %.

Furthermore, women hold the positions of Chair of the Parliament, of the Supreme Court and the Attorney General. Also, women hold some leading positions of other important central institutions. Based on statistics by PAD in the public administrations there is a high participation of women and girls in the expert level, this proportion was 2008 or 58.8% and has increased to 64% in 2010.

In the mid-management level, the share was 42% women for year 2010. In the high management level, the representation of women and girls is 25%. In the Universities, 43.6% women as comparing to 56.4% men comprise the academic faculty. Meanwhile women with scientific degrees are 38% (year 2008). From 10

[217] INSTAT

[218] INSTAT draft data

rectors none is a woman, out of 10 deputy-rectors, 3 are women or 23%. In the rank of deans, women are 11 or 27% as compared to 29 men who comprise 72%.

Although the women presence in the public administration is encouraging, men are prevailing in leading positions. The analysis of employment according to groups of professions (based on the international classification of professions, ISCO 88) and gender shows that for some groups of professions, there are obvious differences in the employment rate of males and females. In the group of legislators, high officials and leaders, 23.7 percent of the employees are females and 76.3 percent males.

The level of participation in the labour force for the male and female population of 15-64 years of age is respectively 72.2% and 51.3%[220]. There is a gap of 20.9% between male and female populations in the labour force participation. According to INSTAT this means that males are more active in the labour market than females. The objective of increasing participation of women in the labour force to 65% has not been achieved as expected. The employment structure in accordance with the employment status shows that 42.6% of the employed are employees, 31.8% are employees contributing to their families and 25.6% are self-employed. Males dominate among the self-employed and females are 1.3 times more likely than males to be employees contributing to their families, a situation which puts them under economical dependency and impairs their economic empowerment.

13.4.3 Institutional set-up on gender equality at central level

The institutional set-up on Gender Equality is composed of a number of state structures designed to promote the advancement of gender equality and to ensure enjoyment of women's human rights. This mechanism was set-up in implementation of the CEDAW recommendation, the Beijing Platform for Action (BPA) and the GEL. Its main function is to monitor and ensure the implementation of laws, the application of the principle of non-discrimination and of equality between men and women.

Main structures and responsibilities:

- At the parliamentary level, the Parliamentary Commission on Health, Labour and Social Affairs tackles gender equality issues. This Commission examines draft laws, undertakes legal initiatives in the areas of its expertise, and establishes cooperation with the authority responsible on issues of gender equality.
- GEL specifies the former Ministry of Social Welfare and Youth as the authority responsible for issues of gender equality, had developed in consultation with representatives of civil society organizations, and national and international organizations which are working to achieve gender equality and to reduce gender-based equality in Albania, the NSGE (currently the social affairs are in the responsibility of the Ministry of Health and Social Care).
- Line Ministries and Affiliate Institutions monitor and implement the Government commitments to gender equality
- National Council on Gender Equality. National Council on Gender Equality (NCGE) was established through the Order of the Prime Minister No.3 date 8.1.2009 supervises reforms pertaining to the empowerment of women.

13.4.4 Institutional set-up on gender equality at local level

Local government units in prefectures, municipalities and communes implement the Strategy (NSGE) at the local level. Coordination happens through the GEE at the Local Government Level.

Gender-responsive local governance is also about making sure that all local governance processes, procedures and systems are developed and implemented in ways that take into account the different needs of women and men. So, it is not just about including more women in local governance processes - although achieving gender balance at all levels of local governance is an important first step. It is about making sure

[220] Males and Females in 2015, INSTAT

that in all its activities, local governments take into account gender inequalities, and address as well as reduce these through their policies, programmes and activities.

In Albania, the process of decentralization has placed Local Government Units (LGUs) in a powerful position to directly influence the wellbeing of women and men, girls and boys. LGUs play a key role in local policymaking, raising and allocating budgetary resources, and providing public services to communities. When LGUs prioritize gender equality as a policy objective, and when LGUs directly involve women and men in local governance processes, communities and citizens - both women and men - clearly benefit.

Gender Equality Mechanism is established through Gender Equality Employees (GEE) at local government unit level, who are mandated by Municipality Council to guide gender-mainstreaming efforts and are foreseen to assume the role of promoters and monitors of the implementation of the national gender policy.

Article 13/3 of the Gender Equality Law stipulates the appointment of Gender Equality Employees (GEE) in every line ministry, and Article 14 obliges the appointment of GELs in all local governing bodies. In principle, this includes municipalities, communes, prefectures and districts.

Gender Focal Points are not appointed but their role is well defined through GEEs that are envisaged to support the mainstreaming of gender equality issues into policies, programs, and plans, and to monitor the implementation of central and local government gender equality commitments. GEEs are also foreseen to play a key role in collecting and analysing data, particularly sex-disaggregated data, conducting gender analysis to inform local policy development, and developing partnerships with other gender actors and advocates.

Prior to the May 2011 local elections, only 14 municipalities had appointed GEEs (out of 65 municipalities). Given the low percentage of GEEs in place, these two positions - GEE and domestic violence expert - have often been merged and filled by the same individual - for example, in pilot municipalities supported through actors such as the "Equity in Governance" project and UN entities

13.4.5 Civil society organizations and NGOs level

Civil society organizations, especially NGOs specialized in provision of services has and is continuing to play an important role. In a considerable part of cases they do not only fulfil obligations, which belong to the state, but also forestall some of them by piloting various services or organizing informational, awareness-raising and training activities. As regards achieving gender equality, the experience of cooperating with NGOs and implementing models proposed by them has continuously facilitated state intervention, especially in the case of local government units.

Services offered by NGOs specialized in managing and treating gender-based violence and domestic violence cases, are often the only option for the victims. Shelter, counselling, free legal aid, etc. services continue to be mostly offered by these organizations. There is a very good cooperation with international donors and organizations, which are also the main source of financing for many awareness-raising activities organized not only by the NGOs but also by public institutions.

- There are NGOs, which play an important role in the implementation of the NSGE. NPOs, especially women's organization, have been in the forefront of struggles and mobilization to achieve women's rights and setting the agenda for gender equality. Some of the most relevant, are:
- "Centre for Development of Rural Women", Tirana
- The Association "Voice of the Child Calling for Us",
- The Association "For women and children", Tirana
- Counselling Line for Women and Girls in Tirana
- Albanian Centre for Population and Development (ACPD)
- Cultural Centre "New Horizons", Tirana
- ARSIS, Tirana
- The Association "Useful to Albanian Women", Tirana 49
- The Association of Women with Social Problems, Durres

- Centre of “Different and Equal”, Tirana
- Centre of “Human rights in democracy”, Tirana
- “Women’s Forum Elbasan”, Elbasan
- Children’s Human Rights Centre of Albania (CRCA)
- Some of these NGOs were part of the stakeholder engagement and consultation in the RBMP project.

13.4.6 Applying Gender in water resource management and the development of River Basin Management Plans

The process of developing the Integrated Water Resource Management Plan for Albania has been designed in such a way as to provide a framework for the comprehensive management of water resources, in which all stakeholders, including the private sector, civil society and user communities, regardless of gender, to play an active role. The UN conventions and other related documents in regard to gender equality in all areas of life, also give a great importance to the issue of water management. It is mentioned the importance of the integrated gender perspective in the management of water resources in all life situations. Over the last decades, it has been concluded that only technical solutions are not sufficient for the world population to have an equitable and safe use of water resources.

The governing and national policies on gender equality aim to activate women in all areas of social and economic life. The Integrated Water Resource Management Plan has a lot of attention to the fact that women are a major water customer group and therefore requires long-term solutions.

It has been an effort to have women inclusion on decision-making and extended participation to all sectors, to respond to the growing demand for water and managing of resources. Stakeholder Engagement and consultation gives importance on gender perspective and has intended to implement the gender equality on issues of water resources management, water projects, and analysis and statistics. However, in Albania still remains a plan to include women as men in all issues and experiences in processing, implementing monitoring and evaluation of all political, economic and social spheres, so that women and men benefit equally and not in the unequally way. We have to note though, that traditionally, women in Albania have an important decision role in the family (which from the RBMPs point of view is in particular related to the water use), but men are those who carry the decisions outside the traditional family, acting like spokesmen. It is more a separation of roles between men and women than a clear discrimination and/or exclusion of women from decision making, meaning that women need not only legal support to take a more active role in the Albanian society.

13.5 Conclusions and Recommendations

The following main conclusions may be drawn from the stakeholders’ consultation process:

- Informed on the project, all target groups felt positive that most of the water problems they are facing nowadays can be addressed. The main suggestion for the project study, mostly in every district with high flood risk, is to have specialists and engineers for water distribution and irrigation and drainage channels
- Farmers are hoping for irrigation system and politics. They trust that the project might bring a lot profit for farming.
- Families, women and elderly people are hoping they will be provided with water supply all day long.
- Although the legal and institutional ground for gender equality is set-up in Albania, women report they don’t have equity towards men in general in society, one cause being the traditional family role separation, but they have equal access to water.
- The stakeholders’ engagement process was tailored to give an overall view on the local aspects regardless the involvement of different genders or social groups, but special consideration was given to the fact that women are a major water customer group

- Gender Mainstreaming and Gender Equality is also part of the national Integrated Water Management Strategy and is tailored to the context specificity to the whole issue of water management. This has been taken into account in drafting the River Basin Management Plans as well.

According to all questionnaires and face-to-face meetings, the main questions that were raised were as follows:

- Does the plan include floodwater management?
- Does the plan minimize the lack of water supply?
- Is it expected that the plan will affect the economic growth and employment?
- Will the plan manage the misuse of water resources?
- Will the plan increase the infrastructure related to water and improve the water quality?
- Does the plan include water management for irrigation systems?

As it might be seen from Chapter 12, the proposed measures, although focused as a country priority on the fulfilment of the environmental objectives linked to Albania's EU accession, provide a "yes" answer to all the questions raised.

Regarding the RBMP process, the following recommendations can be formulated, for the following programming cycles:

- a framework for the comprehensive management of water resources, in which all stakeholders, including the private sector, civil society and user communities, regardless of gender **play an active role,** should be provided
- Empowering the importance of the integrated gender perspective in the management of water resources in all life situations, and take the active involvement of women in the decision-making process beyond the traditional gender role separation
- Make it clear (nationwide) that gender equality in institutions at all levels of society (in the family, community organizations, water use associations, local government, national civil services, etc.) matters, for the social improvement aspects in general, and for the water resources management in particular.

14 Objectives and Recommendations

This document represents the first River Basin Management Plan (RBMP) for the Drini-Buna River Basin. In order to proceed to the development of a more complete RBMP the report identifies particular areas and provides recommendations where improvements and not only necessary but deemed essential for effective River Basin planning in the future in the Drini-Buna River Basin in line with the requirements of the EU Water Framework Directive (2000/60/EC).

This section relates the strategic objectives outlined in the recent water strategy (Table 14.1), which contains specific economic, environmental, institutional and social objectives, to issues of importance for water quantity, water quality, water risks, water information and water management in the Drini-Buna River Basin (Tables 14.2 - 14.6).

The strategic objectives, which are contained within the water strategy are as follows:

- Water quantity: The provision of a fair and sustainable use of all water resources, serving all interests;
- Water quality: The quality of all water resources is secured, achieving good status by 2029;
- Water risks: Floods and droughts are contained through management and investments;
- Water information: Generally recognized trustworthy water and climate data and models are secured for all stakeholders, and adequate policy advice based on these data and models is provided to government by relevant institutional data owners;
- Water management: Water is managed in a sustainable and inclusive way, serving all interests.

Recommendations for the further development of River Basin planning, to be undertaken by the Competent Authority during the next 6 years, which are aligned to both the requirements of the RBMP and the strategic objectives for water in the Drini-Buna River Basin, are presented in Table 14.7.

Table 14.1: Strategic Water Objectives for the Drini-Buna River Basin[221]

Vision	**Until 2027, Albania will be a country with water efficiency, with a functional integrated management of water resources, including a sound monitoring system, including risks from floods and lack of water. Water use is based on the principles of equality and sustainability for equal economic, social and gender benefits and environmental justice for the current and future generations.**				
Mission	**The establishments of all necessary legal, economic, institutional, technical, and social frameworks, based on the EU environmental legislation and IWRM principles for an integrated and sincere management with a sound gender involvement in all water resources.**				
		Main Results	**Verification methods**	**Assumptions**	**Related SDGs**[222]
Strategic Objectives (1-5)	**Water Quantity**: Fair and sustainable use of all water resources is provided, serving to all interests	Efficient and equal water allotment and distribution and a considerable increase in water use efficiency in all sectors and providing sustainable withdrawal, recycling and reuse	Water Cadaster Database Reports related to the Water Sector Governmental official registers	The implementation of the EU Directives The operation of the Water Cadaster	6.1, 15.6,
	Water Quality: Quality of all water resources is secured, achieving good status by 2027	Decreasing pollution, eliminating discharges and reducing the amount of materials and dangerous chemicals that are thrown away	NEA reporting Water Cadaster The Reports of the Institute of Public Health Water Basin Management Plans (DKU)	The implementation of the EU Directives Standard based water quality monitoring and evaluation	6.3, 6.6, 14.1, 14.2, 14.5, 15.1
	Water Risks: Risks emerging from water (floods and droughts) are contained through management and investments	Reinforced resistance and capacities for adaptations to climate developments, natural risks and disasters	Disaster Management Plans Flood Management Plans Drought Management Plans Albanian communication to IPCC	The implementation of EU Directives Capacity building and the provision of funding for designing and implementing plans	3.9, 13.1, 13.2, 15.3
	Water Information: generally recognized trustworthy water and climate data and models are secured for all stakeholders, and adequate policy advice based on these data and models provided to government by relevant institutional data owners	A better knowledge of all water resources as a public knowledge base for integrated water management for policy decision-making	Water Cadaster NEA reports EU reports (EEA, DKU)	The implementation of the EU Directives Standard based water quality monitoring and evaluation	6.a, 12.8
	Water Management: Water is managed in a	Clear IWRM policies and the implementation of RBMPs	Legislation, Ministerial Orders, WNC decisions and sublegal	Implementation of EU and OECD principles; the	5.5, 5.a, 5.c, 6.4, 6.5, 16.7

[221] The strategic objectives are presented in the Albanian Water Strategy (2018)

[222] SDGs: 17 sustainable development goals: as defined by the UN: https://sustainabledevelopment.un.org/sdgs

Vision	Until 2027, Albania will be a country with water efficiency, with a functional integrated management of water resources, including a sound monitoring system, including risks from floods and lack of water. Water use is based on the principles of equality and sustainability for equal economic, social and gender benefits and environmental justice for the current and future generations.				
	sustainable and inclusive way, serving all interests, providing equal water related socio-economic benefits and involvement in decision making for future generations	which aim to have measurable objectives within the predefined timeframe and on an appropriate scale, a clear task assignment for the responsible authorities, based on a sound monitoring and evaluation	acts The legislation and regulations are harmonized	environmental principles of care, subsidiarity, proportionality and solidarity and harmonized legislation	

Table 14.2: Water Quantity

Strategy Objectives[223]	Main Results	Verification	Actors	Recommendations for River Basin Management Planning
Managing water resources on a basin level (in relation to quality also)	The design of Water Basin Integrated Management Plans and the design of PoMs which imply clear and favorable water use criteria based on the conditions of water resources in each basin	RBMP and PoM. Water related issues in PAMPs	The responsible bodies for the administration and management of water resources	Identification and technical training of key staff for the MIKE HYDRO model for use in: (i) Long term planning applications, which involve running the model for long periods (20-30 years) in order to estimate how projects or policy measures will perform in the long term. (ii) Operational applications, which involves using the model to help with system operations at seasonal or shorter time scales. Operational models run for up to one year in order to help make decisions about water use and provide information to water users.
Defining the resistance measures against climate changes (in relation to quality also)	The PoM-s are in compliance with the EU legislation for Climate Change	Internal or external designed reports[224]	Water Resources Management Agency	Technical training of key staff for the MIKE HYDRO model for use in development of future scenarios for long term planning. This will need to be developed in parallel with specific technical training in climate change modelling.
Improving water distribution (infrastructure) and taking conservative measures for an efficient and equal water allocation	Improved infrastructure Water is used efficiently The start of management based on water demand; Water use (high priority is set on drinkable water)	RBMP, project documentation, Annual internal MBU reports Water related issues in PAMPs	The responsible bodies for the administration and management of water resources, District Prefects, local authorities	Technical training of key staff for the MIKE HYDRO model under short term operational applications to determine: • Forecasting irrigation water supply availability for an upcoming growing season. • Estimating the amount of water that can be diverted to irrigation during an upcoming growing season given environmental constraints. • Scheduling hydropower operations given load forecasts, generating capacity, downstream irrigation needs, and environmental water requirements. • Seasonal forecasting of water use (June-September) Further hydrogeological investigations to determine the full and true availability of groundwater resources in terms of quantity and quality. Infrastructure development, as proposed in the PoMs, in accordance with the NPWS should be initiated.

[223] The strategic objectives are presented in the Albanian Water Strategy (2018), i.e. The provision of a fair and sustainable use of all water resources, serving all interests.

[224] “Internal” refers to internal branches, services, offices, etc. for respective state institutions, where it has a direct control over. “External” refers to organizations such as NGO-s, Financial institutions, Professional Associations etc. on which the state institution has a direct control.

Achieving equal distribution of profits	Investments are in a high priority based on social needs and economic assessments The projects are implemented in underprivileged areas Investments are prioritized based on the evaluation that shows whether there is a will to pay for F & M (separated according to gender, age and location)	Social - economic indicators of INSTAT RBMP The Reports of Sectorial Plans Basic Social Research (including gender)	Water Resources Management Agency In collaboration with the Line Ministries, NGO-s, District Prefects, Local authorities	Agreement of priority criteria for infrastructure development, as proposed in the PoMs, in accordance with the NPWS. Criteria must take into account long term policies for water use and planned sectoral development. All plans require independent technical evaluation and must undergo public consultation at the earliest stage.
Ensuring public participation and an informed debate (in the context of Water Governance)	Mechanisms, including equal gender participation in public consultations and in decision-making processes	Legislation Counselling Reporting	Water Resources Management Agency in collaboration with the District Prefects, local authorities	Undertake the proposed actions included in the RBMP dissemination plan in order to provide information to all stakeholders. Ensure public participation and feedback in all issues related to water resource management is recorded and is gender sensitive. Follow all guidelines for proposed actions in the RBMP dissemination plan.

Table 14.3: Water Quality

Strategy objectives[225]	Main Results	Verification	Main Actors	Recommendations for River Basin Management Planning
Defining the resistance measures against climate change (in relation to quantity also)	PoMs in compliance with the EU legislation for climate change	Internal or external reports	Water Resources Management Agency	Technical training of key staff for the MIKE HYDRO model for use in development of future scenarios for short and longer-term planning in all sub-basins of the River Basin. The emphasis for water quality must be on the maintenance of sufficient ecological flow and with particular emphasis on the protection of the level 1 trophic group, i.e. fish.
Defining the status of surface water and groundwaters in accordance with the EU WFD.	A practical document (legal regulation) which defines the water quality standards for chemical, biological and also defines the protocol for hydromorphological monitoring.	Respective legal regulations, which include WFD compliant methodologies for chemical analysis, biological monitoring (5 groups) and hydromorphological assessment.	Water Resources Management Agency	The following critical steps are required in order to define the status of the surface and groundwaters, which is the gateway to opening Chapter 27 negotiations, as required by the WFD • Expand on the delineation of the surface water bodies at >100km^2, i.e. for river and lakes and coastal waters according to typology system A. Determine the typology of transitional surface water bodies, according to typology system B. • Delineate and characterize all groundwater bodies according to WFD requirements • Undertake a risk and hazard assessment of all surface and groundwaters in the River Basin. • Designation of vulnerable zones in the River Basin • For surface waters emphasis of risk and hazard assessment must be focused on all point and

[225] The strategic objectives are presented in the Albanian Water Strategy (2018), i.e. The quality of all water resources is secured, achieving good status by 2027

				diffuse sources of pollution, municipal and industrial discharge licensing and surface water use, including agricultural, industrial, municipal, touristic activities, protected and sensitive areas and the effect of erosion. • For groundwaters emphasis of risk and hazard assessment must be focused on aquifer vulnerability in protected areas, point and diffuses source of pollution in sensitive areas, groundwater budget and resource assessment, actual groundwater utilization, actual groundwater monitoring. • The designation of equipment and technical training for a 'reference laboratory' with respect to sampling and chemical analysis to meet the EQS Directive requirements, including inter-laboratory exercise and procedure to gain international accreditation. • Undertake technical training for sampling, analysis and reporting of biological elements (5 groups), according to WFD guidelines and recommendations. • Define legal regulations for chemical analysis, biological monitoring (5 groups) and hydromorphological assessment • Develop a 'realistic' monitoring programme for surface and groundwaters, taking into account the current technical abilities to conduct WFD compliant monitoring with respect to technical ability, instrumentation and training requirements. • Conduct monitoring of designated water bodies (surface

				and groundwaters) according to WFD requirements[226] in order to establish i) ecological status and hydromorphological assessment of surface waters (including HMWBs and AWBs,) ii) chemical status and qualitative assessment of groundwaters. This monitoring can be prioritized taking into account vulnerable surface and groundwater bodies, the technical capacity and ability to conduct monitoring, the required instrumentation for chemical analysis and training requirements. • Develop procedures for data recording and data analysis as required by the EEA. • Further delineate all surface water bodies from 10-100km^2 and update the monitoring programme accordingly.
Designing and implementing the WFD's RBMPs and Programs of Measures (PoM)	Implementation of proposed measures in the RBMP	Implementing the PoM and RBMP measures in % and in reference to the proposed time schedule. Inclusion of related issues in PAMPs	The responsible bodies for the administration and management of water resources	Undertake the implementation of the PoMs as provided in Table 12.3. The Competent Authority will ensure the overall management of each of the 'supplementary measures', which include: include: (i) legislative instruments; (ii) administrative instruments; (iii) economic or fiscal instruments; (iv) negotiated environmental agreements; (v) emission controls; (vi) codes of good practice; (vii) recreation and restoration of wetlands areas; (viii) abstraction controls; (ix) demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought; (x) efficiency and reuse; (xi)

[226] The WFD requirement for monitoring of surface and groundwaters to determine ecological and chemical status, respectively is for an obligatory period of 6 years.

				construction projects/rehabilitation projects; (xiv) artificial recharge of aquifers; (xv) educational projects; (xvi) research, development and demonstration projects. For ‘basic measures’, the Competent Authority will either manage, where relevant, or will assume a key role on the set-up and monitoring of project progress.
Ensuring public participation and an informed debate (in the context of Water Management)	Mechanisms, including equal gender participation in public consultations an in decision-making processes	Legislation Counselling Advice	Administration Offices of Basin Water in collaboration with District Prefects, local authorities	Undertake the proposed actions included in the RBMP dissemination plan in order to provide information to all stakeholders. Ensure public participation and feedback in all issues related to water resource management is recorded and is gender sensitive. Follow all guidelines proposed in the RBMP dissemination plan.

Table 14.4: Water Risks

Strategy objectives[227]	Main results	Verification	Actors	Recommendations for River Basin Management Planning
An efficient Integrated Water management for minimization of national disaster	The implementation of an efficient disaster management national plan which reflects and gives priority to water-related disasters and diseases.	The national disaster management plan comes to force	Water Resources Management Agency, line ministries prefectures, Institutes, local authorities	Develop sufficient early warning system and integrate disaster management into IWRM. Re-establish effective hydrometeriological services
Ensuring protection against floods	Flood risk Management plans are designed and implemented including the engagement mechanism through communication including men, women, boys and girls.	Internal or external reports	Water Resources Management Agency, line ministries, prefectures, Administration Offices of Basin Water, and RBCs	• Carry out a Preliminary Flood Risk Assessment • Prepare of Food Hazard Maps • Prepare of Flood Risk Maps • Prepare Flood Management Plans • Implement flood awareness campaigns and an action plan for safety in vulnerable areas via RBCs, NGOs and CSOs with communication to all stakeholders through all possible means.
Preparation for droughts and lack of water	Designing and implementing the Drought Management Plans according to international standards, including the engagement mechanism through communication including men, women, boys and girls.	Internal or external reports	Water Resources Management Agency, line ministries, Prefects, Administration Offices of Basin Water and RBCs	Technical training of key staff for the MIKE HYDRO model under short term operational applications to determine seasonal water availability Preparation, approval and implementation of Drought Management Plans Implement drought awareness campaigns and an action plan for water use in vulnerable areas via the RBCs, NGOs and CSOs with communication to all stakeholders through all possible means.

[227] The strategic objectives are presented in the Albanian Water Strategy (2018), i.e. Floods and droughts are contained through management and investments

Effective and resistant safety. A climate resilient Program of Measures (in relation to quantity and quality)	The Management Plans are in compliance with the EU legislation on Climate Change	Internal or external reports	Water Resources Management Agency	Where relevant, ensure all basic and supplementary measures in the PoMs for the RBMP are climate resilient.

Table 14.5: Water Information

Strategy objectives[228]	Major results	Verification	Actor(s)	Recommendations for River Basin Management Planning
Ensuring water monitoring systems	Harmonized and functional monitoring plans in compliance with legislation and the definition as to where, how often and what will be monitored (included also in water quality)	The Monitoring Strategy/The Monitoring Plans, the Identification of monitoring points, frequency and indicators	Water Resources Management Agency in collaboration with Water Institutes	Develop a 'realistic' monitoring programme for surface and groundwaters, taking into account the current technical abilities to conduct WFD compliant monitoring with respect to technical ability, instrumentation and training requirements. Develop procedures for data recording into the water cadaster and data analysis and reporting as required by the EEA.
	The establishment of groundwater monitoring networks (included also in water quality)	Monitoring reports in accordance with WFD requirements	Collaboration between water institutions	Define groundwater monitoring (according to EU Water Framework Directive, Annex II, 1.2.1 EU Water Framework Directive, Annex II, 1.2.1) based on hydrogeological survey, risk assessment procedures for frequency and suitable area coverage, i.e. stations per km^2. Properly equip all groundwater monitoring stations and implement WFD compliant monitoring and data reporting. Apply regulations to waterworks and concessionaires to measure and provide data on groundwater quantity and quality.
	Functional monitoring networks for river water quality (included also in water quality)	WFD compliant procedures in national regulations	Collaboration between relevant water institutions	Define monitoring plan based on typology, delineation and prioritized point sources of pollution.

[228] The strategic objectives are presented in the Albanian Water Strategy (2018), i.e. Generally recognized trustworthy water and climate data and models are secured for all stakeholders, and adequate policy advice based on these data and models is provided to government by relevant institutional data owners

Strategy objectives[228]	Major results	Verification	Actor(s)	Recommendations for River Basin Management Planning
	The establishment of monitoring networks in lakes and reservoirs (included also in water quality) The establishment of a monitoring network in the transitory and coastal area (included also in water quality)	Monitoring reports in accordance with WFD requirements		Undertake WFD compliant monitoring for all surface water bodies (rivers, lakes, transitional and coastal) according to WFD obligations. Undertake a hydromorphological survey of the River Basin
Facilitating research systems and setting up capacities for developing basic and necessary knowledge of monitoring water resource evaluation and the formulation and implementation of measures	Planning and budgeting for improving IWRM skills and developing institutional capacities, including logistics, taking into account equal capacity building opportunities for men and women	Reporting quality is considerable improved	The ministry responsible for education in collaboration with Water Institutes, partners for development	Develop structured educational and training programmes in relation to water management for all stakeholders (Groups 1-4[229]). Increase the capacity and technical knowledge of public institutions responsible for water management in line all legislative obligations.
Improving information access and data collection	Accredited water quality tests and accredited laboratories (ecological and chemical) of analysis (included also in water quality)	Accrediting reports	The ministry responsible for health issues, in cooperation with the ministry responsible for environmental issues, the ministry responsible for water supply and sewerage infrastructure issues, the ministry responsible for civil emergency	The designation of equipment and technical training for a chemical 'reference laboratory' with respect to sampling and analysis to meet the EQS Directive requirements, including inter-laboratory exercise and procedure to gain international accreditation.
	The Water Cadaster will become functional	Reporting on the Cadaster	Water Resources Management Agency	Initiate inter-ministerial cooperation with respect to data exchange and data entry to the water cadastre.
Setting up a Water and Climate Organizational (coordinating) Structure in the existing institutional Framework.	Collaboration between research institutions is efficient	MoM for Collaboration MoM for the establishment of the (Coordinating) Water and Climate Institute	Water Resources Management Agency in collaboration with water institutes	Redefine and operate a relevant inter-ministerial committee inclusive of all water and environmental Ministries.

[229] Stakeholder groups 1-4 as defined in the dissemination plan for the RBMP

Table 14.6: Water Management

Strategy objectives[230]	Major results	Verification	Actor(s)	Recommendations for River Basin Management Planning
Define clear IWRM roles and responsibilities	Institutional responsibilities are consolidated[231] (e.g. planning, allocation, monitoring, implementation, enforcement)	Legislation, Ministerial Orders, NWC decisions and by-laws	Government of Albania	Define specific functions and relevant capacities of all water related public institutions as per the water strategy (2018)
Achieve full compliance with EU water and environmental principles of precautionary, subsidiarity, proportionality and solidarity are well-known and applied	Training guides and reports are elaborated Evaluations are carried out on application of principles	RBMPs, audits, externally-produced reports	Water Resources Management Agency, the ministry responsible for environmental issues, District Prefects, Administration Offices of Basin Water and RBCs	Ensure all relevant daughter directives of the WFD are transposed into national legislation. Of significant importance is the groundwater Directive and the Nitrates Directive. Undertake all WFD requirements and recommendations related to environmental objectives, compliant monitoring programmes and socio-economic analysis of water use and effective cost recovery.
Attain continuous on-the-job capacity development to meet the know-how needs of new roles and responsibilities	Training materials and courses are available to top-, middle- and low-level staff and equally offered to female and male staff members	Trainings cover most or all topics needed in day-to-day work	Each ministry, agency, department	Develop structured educational and training programmes for staff in all public institutions involved in water management activities as per national regulations.
Impose inter-sectoral coordination and planning	Sectorial plans are based on common understanding of agreed IWRM principles and water availability per sector	Cross-sector Plans for each river basin	Water Resources Management Agency in collaboration with Sector Responsible Ministries	
Develop economic and financial instruments for cost-recovery	The legal framework is allowing economic instruments such as tariffs, abstraction charges, pollution charges and subsidies.	Total value of different instruments related to specific subjects	Responsible ministries	Alter present pricing policies to meet the requirements of the Water Framework Directive to counter the fact that the present arrangements deliver charges by water and

[230] The strategic objectives are presented in the Albanian Water Strategy (2018), i.e. Water is managed in a sustainable and inclusive way, serving all interests

[231] As mentioned: OECD is still working on indicator set for Water Governance; it is suggested to determine the value of indicators based on interview surveys as done for the Status Report on the Application of Integrated Approaches to Water Resources Management UN 2012, which also includes the surveys used.

Strategy objectives[230]	Major results	Verification	Actor(s)	Recommendations for River Basin Management Planning
				sewerage services that do not recover the costs of these services. Take account of the principles and objectives of the Directive and the provisions of WFD Article 9 in particular. Determine the cost recovery of irrigation water services
Practise integrity and transparency across water policies, water institutions and water governance frameworks for greater accountability and trust in decision-making	IWRM policies and RBMPs are developed with clear stakeholder involvement and central authorities make transparent agreements and promises	Trust indicators Willingness to contribute	All	Implement all actions proposed in the dissemination plan for RBMPs, including monitoring and evaluation.
Engage the active participation of all stakeholders (including NGOs, local communities and women in particular) in water (resources) management activities and promote public involvement and Social Change related to culture of (integrated) water (use)	IWRM Strategy and RBMPs are developed and agreed by stakeholders Awareness campaigns on competing interests, systematic information is carried out, education curricula towards a culture of integrated water management is established	Process descriptions and agreed measures Guidelines By-laws	The responsible bodies for the administration and management of water resources	
Establish appropriate transboundary arrangements (EU and UNECE)	Transboundary Agreements are in place, mutual RBMPs are developed	Transboundary Agreements, mutual RBMPs	The ministry responsible for foreign affairs issues in collaboration with Water Resources Management Agency	Initiate transboundary monitoring of surface and groundwaters and inter-laboratory intercomparison for all monitoring criteria. Initiate data exchange between transboundary countries Initiate transboundary technical working groups for monitoring of surface and groundwaters. Initiate effective high level transboundary administrative water management forum.

Strategy objectives[230]	Major results	Verification	Actor(s)	Recommendations for River Basin Management Planning
Monitor and evaluate water governance implementation where appropriate, share the results with the public	Yearly monitoring reports and 6-year evaluations, lessons learned are developed and/or implemented	Internally or externally produced monitoring reports	Water Resources Management Agency	Prepare interim (3 year) and 6 yearly RBMPs

Table 14.7: Outline 6-Year Action Plan for the Competent Authority[232]

Strategy objectives[233]	Main Tasks	Associated Responsibility	Timeframe					
			2019	2020	2021	2022	2023	2024
Water Quantity	Identification and technical training of key staff for the MIKE HYDRO model for long term planning and short term operational procedures.	AOBW	√					
	Determination of priority criteria for infrastructure development, as proposed in the PoMs, in accordance with the NPWS	AOBW	√					
	Ensuring public participation and an informed debate (in the context of Water Governance) based on the action plan for dissemination of the RBMP	AOBW	√	√	√			
Water Quality	Provide technical training of key staff for the MIKE HYDRO model for use in development of future scenarios for short and	MARD AOBW	√					

[232] Prioritized activities are highlighted in red

[233] The strategic objectives are presented in the Albanian Water Strategy (2018), i.e. Floods and droughts are contained through management and investments

	longer-term planning in all sub-basins of the River Basin.							
	Expand on the delineation of the surface water bodies at >100km^2, i.e. for river and lakes and coastal waters according to typology systems A or B[234].	AOBW	√					
	Delineate and characterize all groundwater bodies according to WFD requirements	AGS/ AOBW	√					
	Undertake a risk and hazard assessment of all surface and groundwaters in the River Basin	AGS/ AOBW	√					
	Designate and map all vulnerable zones in the River Basin	AOBW/ Municipalities	√					
	Undertake a risk and hazard assessment for surface waters focused on all point and diffuse sources of pollution	MARD/ AOBW	√					
	Ensure all WFD compliant methodologies are		√					

[234] System A typology is recommended for rivers, lakes and coastal waters. System B is recommended for transitional waters.

	transposed into national regulations							
	Supervise the establishment and designation of equipment and technical training for a 'reference laboratory' with respect to sampling and chemical analysis to meet the EQS Directive requirements	AOBW/ Nominated reference laboratory	√	√				
	Supervise an inter-laboratory exercise and procedure to gain international accreditation for chemical and biological monitoring according to WFD requirements	Nominated reference laboratory		√				
	Supervise technical training for sampling, analysis and reporting of biological elements (5 groups), according to WFD guidelines and recommendations	AOBW/ Nominated reference laboratory	√	√				
	Develop a 'realistic' monitoring programme for surface and groundwaters, taking into account the	AOBW/ Nominated reference laboratory	√	√				

	current technical abilities to conduct WFD compliant monitoring with respect to technical ability, instrumentation and training requirements							
	Supervise monitoring of designated water bodies (surface and groundwaters) according to WFD requirements[235] in order to establish i) ecological status and hydromorphological assessment of surface waters (including HMWBs and AWBs,) ii) chemical status and qualitative assessment of groundwaters	AOBW/ Nominated reference laboratory/ AGS			√	√	√	√
	Develop procedures for data recording and data analysis as required by the EEA	AOBW/ Nominated reference laboratory/ AGS		√				
	Further delineate all surface water bodies from 10-100km^2 and update the monitoring programme	AOBW					√	

[235] The WFD requirement for monitoring of surface and groundwaters to determine ecological and chemical status, respectively is for an obligatory period of 6 years.

	Initiate the basic and supplementary PoMs[236]	All relevant institutions	√	√	√	√	√	√
	Undertake the proposed actions included in the RBMP dissemination plan in order to provide information to all stakeholders	AOBW/ NGOs/ CSOs	√	√	√			
Water Risk	Input existing hydrometeriologic al data sets into the water cadaster	AOBW	√					
	Carry out a Preliminary Flood Risk Assessment	AOBW/ relevant donor agencies	√					
	Prepare of Food Hazard Maps	AOBW/ relevant donor agencies	√					
	Prepare of Flood Risk Maps	AOBW/ relevant donor agencies		√				
	Prepare Flood Management Plans	AOBW/ relevant donor agencies		√	√			
	Implement flood awareness campaigns and an action plan for safety in vulnerable areas via RBCs, NGOs and CSOs with communication to all stakeholders	AOBW	√	√	√			

[236] According to the NPWS in relation to the area of the River Basin (Table 12.3)

	through all possible means							
	Preparation, approval and implementation of Drought Management Plans	AOBW/ All relevant institutions		√	√			
	Implement drought awareness campaigns	AOBW/ RBC/ NGOs/ CSOs						
	Initiate the basic and supplementary PoMs	All relevant institutions	√	√	√	√	√	√
	Develop procedures for data recording into the water cadaster and data analysis and reporting as required by the EEA.	AOBW/All relevant institutions		√				
Water Information	Develop structured educational and training programmes in relation to water management for all stakeholder groups[237]	AOBW/ All relevant institutions	√	√	√			
	Initiate inter-ministerial cooperation with respect to data exchange and data entry to the water cadastre	All relevant institutions	√					
	Redefine relevant	All relevant	√					

[237] Stakeholder groups 1-4 as defined in the dissemination plan for the RBMP

	inter-ministerial committee inclusive of all water and environmental Ministries	institutions						
Water Management	Ensure transposition of all relevant water Directives into national legislation with effective and implementable regulatory acts.		√					
	Define and establish specific functions and relevant capacities of all water related public institutions as per the water strategy (2018)	All relevant institutions	√					
	Develop structured educational and training programmes for staff in all public institutions involved in water management activities as per national regulations	All relevant institutions	√	√				
	Develop economic and financial instruments for cost-recovery	AOBW/ LSG	√	√	√			
	Implement all actions proposed in the dissemination plan for RBMPs, including monitoring and evaluation.		√	√	√			

	Initiate transboundary monitoring of surface and groundwaters and inter-laboratory intercomparison for all monitoring criteria.	NWC		√				
	Initiate data exchange between transboundary countries	NWC			√			
	Initiate transboundary technical working groups for monitoring of surface and groundwaters.	NWC	√					
	Initiate effective high level transboundary administrative water management forum	NWC		√				
	Prepare RBMP report updates	AOBW			√[238]			√

[238] Interim report

Annexes

Annex 1. Transposition of the Relevant EU Directives

EU Directives	The law including the requirements of these directives (if any)	Brief description on the content and what it regulates	Institutions that supervise their implementation
Directive 2000/60/EC 27.11.2000 “Water Framework Directive”	Law No. 111/2012 “On Integrated Water Resources Management” amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 “on the Integrated Water Resources Management”. Law no. 9103 of 10 July 2003 on the "Protection of Transboundary Lakes" has been partly aligned with Directive 2000/60 / EC of the European Parliament and of the Council of 23 October 2000 on the "Establishment of a legal framework for Community action in the field of water policy". Law no. 64/2012, 31.05.2012 on "Fishing" has been partially aligned with the provisions of the Directive 2000/60 / EC of the European Parliament and of the Council of 23 October 2000 on the establishment of a framework for water policy and Council Regulations Europe of this field.	Provisions of this law regulate judicial relations that derive from the use of water resources in the Republic of Albania including: internal marine waters, territorial waters, coast line, exclusive economic area, continental shelf, surface and groundwater, along with the aquifers and precipitation, transboundary waters, natural resources and lagoon waters in protected areas; curative, mineral, thermo-mineral and geothermal waters. Protection and improvement of the aquatic environment, surface water, temporary and permanent waters, internal marine waters, territorial waters, exclusive economic area, continental shelf, surface and groundwater, as well as their status; a more rational development and exploitation of water resources, as well as the establishment of legal framework, at national and local level, comprise the purposes of law and the pillars for the development and materialisation of national policies in water resources administration.	Law enforcement institutions: At central level Council of Ministers for the approval of sublegal acts Ministry of Agriculture and Rural Development National Water Council (NWC) Water Resource Management Agency At local level: River Basin Council Administration Office of Basin Water Inspection institutions: State Inspectorate of Water State Health Inspectorate National Inspectorate of Territory Protection
Directive 91/271/CEE21.05.1991 “Urban Waste Water Treatment”	Law No. 111 / 2012 “On Integrated Water Resources Management” amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 “on the Integrated Water Resources Management” Law No. 9115, dated 24.07.2003 “On	Provisions of this law regulate judicial relations that derive from the use of water resources in the Republic of Albania including: internal marine waters, territorial waters, coast line, exclusive economic area, continental shelf, surface and groundwater, along with the aquifers and precipitation, transboundary waters, natural resources and lagoon waters in protected areas; curative,	Law enforcement institutions: At central level Council of Ministers for the approval of sublegal acts Ministry of Agriculture and Rural Development National Water Council (NWC) Water Resource Management Agency At local level: River Basin Council Administration Office of Basin

EU Directives	The law including the requirements of these directives (if any)	Brief description on the content and what it regulates	Institutions that supervise their implementation
	Environmental Treatment of Waste Waters”	mineral, thermo-mineral and geothermal waters. Protection and improvement of the aquatic environment, surface water, temporary and permanent waters, internal marine waters, territorial waters, exclusive economic area, continental shelf, surface and groundwater, as well as their status; a more rational development and exploitation of water resources, as well as the establishment of legal framework, at national and local level, comprise the purposes of law and the pillars for the development and materialisation of national policies in water resources administration. Object of the implementation of this law are: a) urban waste water; b) industrial waste water, according to special industries; c) waters from agricultural land filtration; ç) waste water of any kind. Law stipulates: obligations of physical persons and legal entities, whose activities discharge waste water; duties and competences of public institutions; determines the environmental treatment of waste water; duties of people responsible for the treatment of waste water; treatment of industrial waste water.	Water Inspection institutions: State Inspectorate of Water State Health Inspectorate National Inspectorate of Territory Protection Law enforcement institutions: Ministry of Tourism and Environment National Environment Agency Regional Environment Agencies Municipalities Inspection institutions: State Inspectorate of Environment and Forestry
Directive 2000/59/EC 27.11.2000 “On port reception facilities for ship-generated waste and cargo residues”.	There is no reporting for this Directive It is not part of the NPEI.		
Directive 2008/56/EC 17.06.2008 “On establishing a framework for community action in the field of marine environmental policy”	Not transposed	A draft decision “On content, development and implementation of Marine Environment Strategy” is being drafted, which still is not part of a concrete matrix or working plan to be approved.	
Directive 98/83/EC 03.11.1998 “On quality of water intended for human consumption”	DCM No. 379, dated 25.05.2016 “On approval of the regulation “quality of water	This regulation sets the quality requirements of drinking water, in order to protect public health from the adverse effects	Law enforcement institutions: Ministry of Health and Social Care,

EU Directives	The law including the requirements of these directives (if any)	Brief description on the content and what it regulates	Institutions that supervise their implementation
	intended for human consumption**”** DCM No. 63, dated 27.1.2016 “On the reorganisation of operators that provide drinking water, collection, removal and treatment of wastewater services”	deriving from its pollution, guaranteeing that water is safe and clean. “Drinking water” is water intended for human consumption, including: a) treated or untreated waters, intended for drinking, cooking, food preparation and hygiene needs, regardless of their origin and where they are supplied from a public or private distribution network, from deposits, form water tankers, from individual or collective wells, bottled water; b) water used in food production enterprises for production, manufacturing, processing, keeping or marketing of products or substances intended for human use, as well as for cleaning surfaces, objects or materials that may be in contact with food products; c) food products of water origin; ç) water intended for human use, as part of a commercial or public activity, regardless of the average quantity of water supply per day.	Ministry of Agriculture and Rural Development, Ministry of Tourism and Environment, Ministry of Infrastructure and Energy, Institute of Public Health State Health Inspectorate, Local government units for the integrated water resources management, Any other institution, public or private, which have their system of water supply regarding the implementation of this decision.
Directive 91/676/EEC 12.12.1991 “On protection of waters against pollution caused by nitrates from agricultural sources”	Law No. 111 / 2012 “On Integrated Water Resources Management”, amended by Law No. 6/2018 on some amendments and additions to Law No. 111/2012 “on the Integrated Water Resources Management”, partly transposed. The Council Directive on "Protection of waters against pollution caused by nitrates from agricultural sources" dated 12.12.1991 is in the initial phase of approximation, where only four provisions of the Directive have been transposed into national legislation.	More concretely, a part of this Directive is transposed in Chapter I, Article 4 (33) (13) (84), Chapter IV, Section II, Article 35. 13. "Eutrophication" is the enrichment of water with chemical nutrients, typically compounds containing nitrogen, phosphorus, encouraging the growth of algae (algal bloom) and other aquatic plants, causing undesired break of the balance of water organisms and its quality. 33. "Pollution" is the direct or indirect introduction, as a result of human activity, of substances or energy, such as noise, heat or light in air, water or soil, to a quantity that may be harmful to the quality of environment or human health, which can lead to the damage of assets or deterioration, and can affect other legal services or uses of environment, as stipulated in Law No. 10 431, dated	

EU Directives	The law including the requirements of these directives (if any)	Brief description on the content and what it regulates	Institutions that supervise their implementation
		09.06.2011 "On environmental protection". 84. "Groundwater" is the water hold underground in the soil or which has a direct surface water influence in the form of natural springs. Chapter IV: Article 35 Protection of areas at risk of pollution 1. Minister drafts the respective sublegal acts for the declaration of areas at risk of pollution from harmful elements and substances, such as nitrate, phosphorus, products for plant protection, biocides and presents them for approval to the National Water Council. 2. Minister, in cooperation with the minister responsible for agriculture, minister responsible for economy and minister responsible for health draft regulations, which develop programs, measures and other respective obligations, aiming at reducing and preventing pollution of water from dangerous substances, such as those mentioned in paragraph 1 of this article, as well as those caused from other agricultural activities. 3. Combined treatment, as stipulated in Article 32 of this law, is applied for discharges in distribution points and sources to areas defined in paragraph 1 of this article.	
Directive 2006/7/EC 15.02.2006 "On management of bathing water quality"	DCM No. 797, dated 29.09.2010 "On approval of hygiene-sanitation regulation "On management of bathing water quality "	The object of this regulation is: Setting of health criteria to be met by the bathing water to ensure their quality, in order to protect public health from adverse effect of any kind of pollution. Setting of provisions for the monitoring, classification and management of bathing water quality and public awareness. This decision is applied for bathing water, which means: every element of surface water for which the competent authority expects to have a high number of	Law enforcement/inspection institutions: Ministry of Infrastructure and Energy Local government units State Health Inspectorate State Inspectorate of Environment and Forestry

EU Directives	The law including the requirements of these directives (if any)	Brief description on the content and what it regulates	Institutions that supervise their implementation
		people to bathe, and for which they have not made a permanent prohibition to bathe or a permanent recommendation to not bath. The requirements of this regulation are not applied for: a) pools and thermal water pools; b) naturally or artificially made bodies of water, which are object of treatment or use for curative purposes; c) artificially made bodies of water and divided from surface water and groundwater.	
Directive 2006/118/EC 12.12.2006 "On protection of groundwater against pollution and deterioration"	Not transposed	The transposition of this directive is foreseen in NPEI by DCM "On necessary conditions and criteria for the creation, maintenance, management and update of the National Water Resources Cadastre" within 2016.	Institution responsible for its transposition: Ministry of Agriculture and Rural Development
Directive 2013/39/EU 12.08.2013 "On priority substances in the field of water policy"	DCM No. 267, "On approval of the list of priority substances in aquatic environments"	This decision aims at making a list of 'Priority substances" that includes "priority hazardous substances", which present a considerable risk for/or through the aquatic environment, and their discharge in environment is prohibited and/or it should be controlled in order to be in line with the specified norms.	Law enforcement institutions: Ministry of Tourism and Environment, National Environment Agency, National Water Council watershed basin councils, which, following the implementation of their legal competences on protection of water quality, shall consider this list for the implementation of this decision.
Directive 2009/90/EC 31.07.2009 "On technical specifications for chemical analysis and monitoring of water status"	It is not transposed.		
Directive 2007/60/EC 23.10.2007 "On assessment and management of flood risks"	It is partly transposed by: Law No. 9860, dated 21.01.2008 amending Law No. 8518, dated 30.07.1999 "On irrigation and drainage", entered into force on 13.02.2008 DCM No. 835, dated 03.12.2004 "On National Plan of Civil Emergencies", entered into force on 28.12.2004	The purpose of this law is to set forth the institutional framework in function of the national policy on irrigation, drainage, and protection from floods and the legal framework for the establishment and/or functioning of responsible structures and their responsibilities, as well as to regulate the transferring, use and maintenance of infrastructure. The purpose of the DCM is	Law enforcement institutions: Ministry of Agriculture and Rural Development Ministry of Defence

EU Directives	The law including the requirements of these directives (if any)	Brief description on the content and what it regulates	Institutions that supervise their implementation
		the approval of the national plan of civil emergencies, which approves the work programs for the fulfilment of duties specified in matrix of primary measures for civil emergencies in Albania, which is part of the national plan of civil emergencies.	
Directive 2007/2/EC 14.3.2007 "Infrastructure for Spatial Information in the European Community (INSPIRE)"	It is partly transposed by Law No. 72, dated 28.06.2012 "On organisation and functioning of national infrastructure of geo-spatial data in the Republic of Albania", entered into force on 15.08.2012	The purpose of this law is to set the rules for the production of national infrastructure of geospatial information in the Republic of Albania; organisation and functioning of national authorities of geospatial information; setting of general conditions related to the collection, production, processing, update, interaction, access, keeping, use and archiving of geospatial information; duties and competences of public authorities on production, security, access and use of geospatial information.	State Authority for Geospatial Information (ASIG) Board of Geospatial Information (BIG)
Directive 2004/35 / EC of the European Parliament and of the Council of 21 April 2004 "On environmental liability, prevention and repair of damages over environment "	Law No. 10 431, dated 9.6.2011 on "Environmental Protection" as amended, is fully aligned with the Directive 2004/35 / EC of the European Parliament and of the Council of 21 April 2004 "On environmental liability, prevention and repair of damages over environment " Law No. 10 431, dated 9.6.2011 on "Environmental Protection" as amended, is fully aligned with Directive 2004/35 / EC of the European Parliament and of the Council.		

Source: Draft National Program of Water Sector 2017-2030

Gender

I. **The Treaty of Rome,** signed by the six founding countries of the European EconomicCommunity (EEC) in 1957, committed Member States to the right of equal pay for equal work for men and women.

II. **The Treaty of Amsterdam (1997)** stipulated that the promotion of equality between women and men was one of the EU's fundamental tasks. It also introduced the elimination of inequalities and discrimination and the promotion of equality between women and men in all activities.

III. **The Charter of Fundamental Rights of the European Union (2000)** states that equality between men and women must be ensured in all areas, including employment, work and pay (Article 23) and reaffirms the ban on discrimination on a wide number of grounds, including sex (Article 21). Article 23: Equality between women and men. Equality between women and men must be ensured in all areas, including employment, work and pay. The principle of equality shall not prevent the maintenance or adoption of measures providing for specific advantages in favour of the underrepresented sex.

IV. **The Treaty of the European Union (2009)** commits Member States to non-discrimination and equality between women and men (Article 2 and 3).

V. **The Treaty on the Functioning of the European Union** provides that the Union will aim to eliminate inequalities and promote equality between men and women (Article 8) of the Treaty on the Functioning of the European Union ('TFEU') and Article 3(3) of the Treaty on European Union. It also stipulates that the Union will aim to combat discrimination based on sex, racial or ethnic origin, religion or belief, disability, age or sexual orientation (Article 10).

VI. **The principle of equal pay** was enshrined in EU law from its origins and further developed by the Equal Pay Directive 75/117/EEC [1], which introduced the concept of equal pay for work of equal value. This principle is now embodied in Article 157 TFEU and incorporated in Article 4 of Directive 2006/54/EC on equal treatment between women and men [2]. The Directive provides that: 'for the same work or for work to which equal value is attributed, direct and indirect discrimination on grounds of sex with regard to all aspects and conditions of remuneration shall be eliminated. In particular, where a job classification system is used for determining pay, it shall be based on the same criteria for both men and women and so drawn up as to exclude any discrimination on the grounds of sex'. The gender pay gap measures the difference in average gross hourly earnings paid to men and women across the whole economy and in all establishments.[239]

VII. The dual approach of Gender Mainstreaming (Art 8 TFEU) as well as specific measures needed to achieve Gender equity (Art. 157, 4 and elsewhere) provides an effective range of tools to address gender mainstreaming

[239] http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:52013SC0512

Annex 2. Proposed surface water monitoring stations and their prioritization

Table A2.1.: River stations in surface water monitoring network

No	Water Body	Station Name	RBD_Station Code**	Station Latitude	Station Longitude	Sample type	Priority*
1	Black Drini river	Black Drini (Dr), Topojani (Peshkopi) – in Black Drini river (tributary of Drini), at the Topojani bridge Burreli-Peshkopi; (Al_RV_28)	AL10R_Dr10	41°34'49.24"N	20°26'4.13"E	WS	1
2	White Drini river / Fierza Reservoir	White Drini (Dr), Luma (Kukesi) – in White Drini river (tributary of Drini), at the Luma bridge (Kukesi-Kruma road);	AL10R_Dr20	42° 6'2.12"N	20°25'3.82"E	WS	1
3	Drini river	Drini (Dr), Bahcalleku (Shkodra) – in Drini river (Shkodra); at the Drini bridge (Lezha-Shkodra Str.) in Bahcalleku;. (Al_RV_3)	AL10R_Dr30	42°2'31.89"N	19°29'32.28"E	WS	1
4	Buna river	Buna (Bu) (Shkodra) – in Buna river at the Old Bridge (Shkodra-Shiroka Road) (Al_RV_30)	AL10R_Bu10	42° 3'3.04"N	19°29'28.67"E	W	1
5	Buna river	Buna (Bu), Murriqani (Shkodra) – in Buna river, near Murriqani village (close with the Montenegrin Boarder).	AL10R_Bu20	42° 0'33.66"N	19°24'39.83"E	W	1
6	Buna river	Buna Transitional (Bu), Franc Jozef (Velipoja, Shkodra) – in mouth of Buna River.	AL10R_Bu30	41°51'10.74"N	19°22'26.84"E	WS	1
7	Kiri river	Kiri (Ki), Shkodra downstream – in Kiri river (Drini tributary), at the railway bridge Shkodra-Mjede. (Al_RV_2)	AL10R_Ki20	42° 3'11.07"N	19°31'40.24"E	W	2
8	Thethi river	Thethi (Th) – in Thethi river (tributary of the Komani reservoir), about 1 km upstream (north) from the Nikgjonaj Cemetery.	AL10R_Th10	42°24'14.18"N	19°46'0.77"E	W	2
9	Valbona river	Valbona (Va), Bujani (BC Downstream) – in Valbona river (tributary of the Komani reservoir over Drini); at Bujani bridge (Bajram Curri-Kosovo Border.	AL10R_Va30	42°19'39.25"N	20° 4'50.18"E	W	2
10	Vermoshi river	Vermoshi (Vr) – in Vermoshi river (Donau tributary), at the Bashkimi village near the Montenegrin border.	AL10R_Vr10	42°34'59.18"N	19°44'48.13"E	W	3

No	Water Body	Station Name	RBD_Station Code**	Station Latitude	Station Longitude	Sample type	Priority*
11	Cemi river	Cemi (Vr) – in Cemi river (Moraca tributary, Montenegro), at the bridge in **Tamare village**.	AL10R_Vr20	42°27'55.90"N	19°33'49.29"E	W	3
12	Shegani river	Shegani Eye, **Kopliku** (Vr) – in the river springing at the Shegani Eye (Shkodra lake tributary).	AL10R_Vr30	42°16'21.88"N	19°23'42.15"E		3
13	Kiri river	Kiri (Ki), Shkodra upstream – in Kiri river (Drini tributari), at the **Hoti i Ri village**. (Al_RV_1)	AL10R_Ki10	42°5'56.40"N	19°33'10.80"E	W	3
14	Thethi river	**Thethi** (Th) (Thethi NP) – in Thethi river (tributary of the Komani resevoir); near Nikgjonaj Cemetery.	AL10R_Th20	42°24'34.32"N	19°45'49.70"E	W	3
15	Valbona river	Valbona (Va), Bajram Curri – in **Valbona** river (tributary of the Komani reservoir over Drini); at **Valbona village**.	AL10R_Va10	42°27'16.52"N	19°53'34.85"E	W	3
16	Valbona river	Valbona (Va), **Shoshani** (BC Upstream) – in Valbona river (tributary of the Komani reservoir over Drini); at Shoshani bridge (Bajram Curri-Valbona road).	AL10R_Va20	42°23'18.01"N	20° 4'22.17"E	W	3
17	Driloni river	Driloni (Pg) (Pogradeci) - in Driloni river (Drini watershed in **Gurrasi** village near the Makedonian border - Pogradeci).	AL10R_Pg10	40°53'23.17"N	20°42'47.20"E	W	3
18	Driloni river	Driloni (Pg) (Pogradeci) - in Driloni river (Drini watershed in **Tushemishti** village near the Makedonian border - Pogradeci).	AL10R_Pg20	40°54'6.27"N	20°42'48.45"E	WS	3
19	Buna river	Buna (Bu), **Pentari** (Shkodra) – in Buna River, about 2.5 km east of Pentari village.	AL10R_Bu30	41°57'25.41"N	19°21'8.37"E	WS	1
20	Murtema channel	Murtema (Mu), **Gomsiqe** (Velipoja, Shkodra) – in Murtema drainage channel, at the bridge near Gomsiqe village.	AL10R_Bu40	41°54'46.32"N	19°24'56.05"E	W	3
21	Murtema channel	**Murtema** transitional (Mu), Velipoja (Shkodra) – in Murtema channel, at the Pumping station.	AL10R_Bu40	41°51'49.82"N	19°26'31.76"E	WS	3
22	Buna river	Buna (Bu), **Zuesi** (Shkodra) - in Buna river, near Zuesi village, just after the confluence of Buna with Drini river. (Al_RV_3)	AL10R_Bu20	42°01'44.68"N	19°28'26.67"E	W	2

Source: CEMSA Project

Notes:

*Colour of the priorities level is used in the tables of stations to target the importance of them and where they should be part of the water-monitoring network

**The RBD Station Code is explained as follows:

AL = Albania (letters 1 & 2) – see table 10.3

10 = Drini-Buna RB number code (digits 3 & 4)

R = River (type of water Body) (digit 5)

The following 2 letters denote the first 2 letters of the river and include Buna, Drini, White Drini, Black Drini, Valbona, Kiri, Shala and their small tributaries

The final 2 digits of the code signify the number of the sampling station from source to mouth in the case of rivers and streams, from inflow to outflow in the case of lakes and from north to south in the case of lagoons and coastal water bodies

Table A2.2. : Lake stations in surface water monitoring network

No	Lakes	Station Name	RBD_Station Code	Station Latitude	Station Longitude	Sample type	Priority
1	Ohrid Lake	Ohrid, Pogradeci - in Ohrid lake (Drini watershed); about 200 m far from the lakeshore.	AL10LK_Oh40	40°54'18.39"N	20°39'26.71"E	WS	1
2	Ohrid Lake	Ohrid, Guri i Kuq (Pogradeci) – about 500 m far from the lakeshore, in front of the Guri i Kuq mine damp.	AL10LK_Oh50	40°55'56.03"N	20°39'1.26"E	WS	1
3	Ohrid Lake	Ohrid, Centre (Pogradeci) - in Ohrid lake (Drini watershed); at the centre of the lake (background station).	AL10LK_Oh60	40°57'43.69"N	20°42'20.58"E	W	1
4	Ohrid Lake	Ohrid, Lini (Pogradeci) – in Ohrid lake (Drini watershed); littoral, about 200 m from the lakeshore, at the northwest of the Lini village.	AL10LK_Oh70	41° 4'7.95"N	20°38'35.63"E	WS	1

No	Lakes	Station Name	RBD_Station Code	Station Latitude	Station Longitude	Sample type	Priority
5	Dhoksi/Lopa lake	Dhoksi/Lopa, Black Lake (Dibra) – in the Black lake (Liqeni i Zi i Valikardhes), Lopa mountain (Dibra). The station is at the centre of the lake.	AL10LK_Dh80	41°27'18.04"N	20°18'5.13"E	W	3
6	Balgjaj lake	Balgjaj, Black Lake (Dibra) – in the Black lake, Balgjaj (Dibra); the lake is about 800 m at the right side of the rural road from Klosi.	AL10LK_Ba90	41°34'7.22"N	20°13'55.84"E	WS	3
7	Lura Lakes	Lura, Big Lake (Dibra) – in the Big Lake (Lura, Dibra, Drini watershed), situated at the left side of the rural road from Fushe Lura village.	AL10LK_Lu10	41°47'25.00"N	20°11'35.00"E	WS	1
8	Fierza Reservoir	Fierza Reservoir, Kukesi – in Fierza reservoir over Drini (Kukesi); at the centre of the reservoir.	AL10LK_Fi10	42° 5'37.20"N	20°22'54.00"E	WS	1
9	Fierza Reservoir	Fierza Reservoir, **Dardha** (Puka) – in Fierza reservoir over Drini; near to Dardha village (Puka); at the centre of the reservoir.	AL10LK_Fi20	42°12'14.98"N	20°11'20.54"E	W	3
10	Shkodra Lake	**Shkodra** Lake, **Kalldruni** (Kopliku) – in Shkodra lake; near the Kalldruni village (Kopliku); littoral, about 200 m from the lakeshore.	AL10LK_Sh10	42°11'34.86"N	19°23'38.73"E	WS	1
11	Shkodra Lake	Shkodra Lake, **Zogaj** (Shkodra) – in the Shkodra lake; littoral in Zogaj, 200 m far from the lakeshore.	AL10LK_Sh20	42° 4'22.92"N	19°24'2.42"E	WS	1
12	Shkodra Lake	Shkodra Lake, **Shiroke** (Shkodra) – in the Shkodra lake; littoral in Zogaj, 200 m far from the lakeshore.	AL10LK_Sh30	42° 3'44.03"N	19°27'16.03"E	WS	1
13	Lake Prespa	Gollomboc (littoral) – GIZ station	TBD	Exact Location to be agreed		WS	1

No	Lakes	Station Name	RBD_Station Code	Station Latitude	Station Longitude	Sample type	Priority
14	Lake Prespa	Centre (pelagic) – GIZ station	TBD	Exact Location to be agreed		WS	1
15	Lake Prespa	Pustec (littoral) – GIZ station	TBD	Exact Location to be agreed		WS	1

Source: CEMSA Project and GIZ studies (2013-2014)

Table A2.3.: Lagoon stations in surface water monitoring network

No	Lagoons name	Station Name	RBD_Station Code	Station Latitude	Station Longitude	Sample type	Priority
1	Viluni Lagoon	Viluni Lagoon northwest (Shkodra) – in northwest part of the lagoon.	AL10LG_Vl10	41°52'41.33"N	19°26'17.61"E	WS	3
2	Viluni Lagoon	Viluni Lagoon centre (Shkodra) – in central part of the lagoon.	AL10LG_Vl20	41°52'26.78"N	19°26'49.39"E	WS	2
3	Viluni Lagoon	Viluni Lagoon southeast (Shkodra) – in southeast part of the lagoon.	AL10LG_Vl30	41°51'59.90"N	19°27'21.04"E	WS	3

Source: CEMSA Project
*Climate change impact indicators should be monitored at these stations (as proposed by DMRD project from UNDP CC Programme)

Table A2.4.: Transitional and coastal stations in surface water monitoring network

No	Coastal station name	Station Name	RBD_Station Code	Station Latitude	Station Longitude	Sample type	Priority
1	Adriatic Sea	Velipoja (Shkodra) – at the Adriatic Sea in Velipoja beach, littoral about 500 m from the seashore.	AL10C_Ve10	41°51'25.81"N	19°25'19.11"E	WS	1
2*	Adriatic Sea	Shengjini beach – at the Adriatic Sea, 500 m from the shoreline.	AL20C_Sh10	41°48'03.14"N	19°35'33.92"E	WS	1
3*	Adriatic Sea	Shengjini Harbor – at the center of the harbor basin	AL20C_Sh10	41°48'38.16"N	19°35'15.00"E	WS	1
4*	Adriatic Sea	Tale beach (Kurbini) – at the Adriatic Sea, about 600 m from the shoreline.	AL10C_Ta10	41°41'21.94"N	19°34'20.17"E	WS	1

Source: CEMSA Project

***** Climate change impact indicators should be monitored at these stations (as proposed by DMRD project from UNDP CC Programme)

Table A2.5.: Prioritisation of ground and surface water parameters

Legend:
R -> WFD-required parameters
M -> NEA/MoHSC/AGS-monitored parameters

Colour coded system used to prioritize water quality parameters

1st priority | 2nd priority | 3d priority | 4th priority

No.	Parameters	Surface water bodies				Groundwater bodies	Drinking water	Priority Parameters
		Rivers	Lakes & Lagoons	Transitional waters	Seas & sea coast			
	Hydro-morphologic parameters							
1	Quantity and dynamics of water flow							1
2	Connection to groundwater bodies							1
3	Residence time							1
4	River continuity							1
5	Depth and width variation							1
6	Structure (substrate) and substrate of the bed							1
7	Structure of the riparian zone/lake shore/intertidal zone							1
8	Freshwater flow							1
9	Wave exposure							1
10	Direction of dominant currents							1
	Biological parameters							
11	Composition and abundance of aquatic flora							1
12	Composition and abundance of benthic invertebrate fauna							1
13	Composition, abundance and age structure of fish fauna							1
14	Composition, abundance and biomass of phytoplankton							1
Core physico-chemical parameters								
	Field parameters							
15	Water temperature (°C)	R/M	R/M	R	R			1
16	Colour				R			1
17	Odour							1
18	Taste							1
19	pH (standard units)	R/M	R/M		R			1
20	Secchi Disk Transparency (meters)		R/M		R			1
21	Electrical Conductivity (µS/cm @20°C)	R/M	R/M				R	1
22	Dissolved oxygen (DO)	R/M	R/M	R	R			1
23	Waste or other material floating on surface				R			1
	Conventional parameters							

Legend:
R -> WFD-required parameters
M -> NEA/MoHSC/AGS-monitored parameters

Colour coded system used to prioritize water quality parameters

1st priority | 2nd priority | 3d priority | 4th priority

No.	Parameters	Surface water bodies: Rivers	Surface water bodies: Lakes & Lagoons	Surface water bodies: Transitional waters	Surface water bodies: Seas & sea coast	Groundwater bodies	Drinking water	Priority Parameters
23	Alkalinity (mg/L as CaCO3)							1
24	Salinity (ppt or ppm)							1
25	Total Suspended Solids (mg/L)							**1**
26	Total Dissolved Solids (mg/L)							**1**
27	Chlorides (mg/L as Cl)							1
28	Sulphate (mg/L as SO4)							1
29	Total Organic Carbon (mg/L as C)							1
30	Chemical oxygen demand (COD)							1
31	Biological oxygen demand (BOD5)							1
32	Hardness (mg/L as CaCO3)							1
	Nutrients							
32	Nitrite (mg/L as N)							1
33	Nitrate (mg/L as N)							1
34	Ammonia-Nitrogen (mg/L as N)							1
35	Kjeldahl Nitrogen							1
36	Orthophosphates (mg/L as P)							1
37	Total phosphorus (mg/L as P)							1
38	Chlorophyll a (µg/L)							1
	Bacteria							
39	Escherichia Coli (cfu/100 mL)							1
40	Enteroccocci (cfu/100 mL)							1
41	Clostridium perfringens (including spores) (Number/100 mL)							1
42	Pseudomonas aeruginosa (number/250ml), Colony counts at 22ºC and 37ºC are also included for water offered for sale in bottles or containers							1
	Core Metals in water (dissolved, µg/L)							
43	Aluminium (Al)							
44	Arsenic (As)							
45	Cadmium (Cd)							
46	Chromium (Cr)							
47	Cobalt (Co)							
48	Copper (Cu)							

Legend:
R -> WFD-required parameters
M -> NEA/MoHSC/AGS-monitored parameters

Colour coded system used to prioritize water quality parameters

1st priority | 2nd priority | 3d priority | 4th priority

No.	Parameters	Surface water bodies				Groundwater bodies	Drinking water	Priority Parameters
		Rivers	Lakes & Lagoons	Transitional waters	Seas & sea coast			
49	Lead (Pb)							
50	Nickel (Ni)							
51	Manganese (Mn)							
52	Zink (Zn)							
53	Silver (As)							
54	Barium (Ba)							
55	Mercury (Hg)							
56	Selenium (Se)							
	Others							
57	Phenols							
58	Sodium laureth sulphate							
59	Man-made synthetic substances (Trichloroethylene, Tetrachloroethylene)							
	Core Metals in Sediment (mg/Kg-dry weight)							
1	Aluminium (Al)							
2	Arsenic (As)							
3	Barium (Ba)							
4	Cadmium (Cd)							
5	Chromium (Cr)							
6	Copper (Cu)							
7	Lead (Pb)							
8	Manganese (Mn)							
9	Mercury (Hg)							
10	Nickel (Ni)							
11	Selenium (Se)							
12	Silver (As)							
13	Zink (Zn)							

Source: CEMSA Project

Table A2.6.: Site-specific parameters

Site Specific Parameters			
3a. Pesticides and herbicides (Including pesticides, herbicides, insecticides, biocides, acaricides, slimicides, algicides, fungicides, etc.)			
97	Methylchlorophenoxypropionic acid (Mecoprop)	µg/l	4th priority
98	2-methyl-4-chlorophenoxyacetic acid (MCPA)	µg/l	4th priority
99	Oxydemeton-methyl	µg/l	4th priority
100	Chloridazon (Pyrazon)	µg/l	4th priority
101	Trichlorfon	µg/l	4th priority
102	Malathion	µg/l	4th priority
103	Benzatone	µg/l	4th priority
104	Linuron	µg/l	4th priority
105	Monolinuron	µg/l	4th priority
106	Dimethoate	µg/l	4th priority
107	Dichlorprop	µg/l	4th priority
108	Azoxystrobin	µg/l	4th priority
109	Carbofuran	µg/l	4th priority
110	Captan	µg/l	4th priority
111	Carbendazim	µg/l	4th priority
112	Chlormequat	µg/l	4th priority
113	Cypermethrin	µg/l	4th priority
114	Deltamethrin	µg/l	4th priority
115	Epoxiconazole	µg/l	4th priority
116	Ethoprophos	µg/l	4th priority
117	Fenpropimorph	µg/l	4th priority
118	Ferrous sulphate	µg/l	4th priority
119	Kresoxim methyl	µg/l	4th priority
120	Mancozeb	µg/l	4th priority
121	Maneb	µg/l	4th priority
122	Metazachlor	µg/l	4th priority
123	Oxamyl	µg/l	4th priority
124	Paraquat	µg/l	4th priority
125	Pirimicarb	µg/l	4th priority
126	Propachlor	µg/l	4th priority
127	Thiram	µg/l	4th priority
128	Tolclofos-methyl	µg/l	4th priority
129	Tri-allate	µg/l	4th priority
130	Bromoxynil	µg/l	4th priority
131	Chlorpropham	µg/l	4th priority
132	Chlorotoluron	µg/l	4th priority

Site Specific Parameters			
133	Cyfluthrin	µg/l	4th priority
134	Diflubenzuron	µg/l	4th priority
135	Ethofumesate	µg/l	4th priority
136	Flusilazole	µg/l	4th priority
137	Ioxynil	µg/l	4th priority
138	Methiocarb	µg/l	4th priority
139	Pendimethalin	µg/l	4th priority
140	Pirimiphos-methyl	µg/l	4th priority
141	Prochloraz	µg/l	4th priority
142	Propyzamide	µg/l	4th priority
143	Thiabendazole	µg/l	4th priority
144	Tribenuron-methyl	µg/l	4th priority
145	Zineb	µg/l	4th priority
146	Methamitron	µg/l	4th priority
147	Metam-sodium	µg/l	4th priority
148	Fenitrothion	µg/l	4th priority
149	Permethrin	µg/l	4th priority
150	Amitrole = Aminotriazol	µg/l	4th priority
151	Emamectin benzoate	µg/l	4th priority
152	2,2-bis(4-(2,3-epoxypropoxy)phenyl) propane	µg/l	4th priority
153	2-Methyl-4-chlorophenoxyacetic acid (MCPA)	µg/l	4th priority
154	2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/l	4th priority
155	Chlorotoluron	µg/l	4th priority
156	Glyphosate (Roundup)	µg/l	4th priority
157	Glyphosate trimesium	µg/l	4th priority
158	Bentazone	µg/l	4th priority
159	Cypermethrin	µg/l	4th priority
160	Other pesticides, herbicides, insecticides, biocides, acaricides, slimicides, algicides, fungicides, biocides, etc., which CIS screening has shown are, or may be, present in Albanian waters and which are not included in this list or the Priority Substances list	µg/l	4th priority
3b. Halogenated/Chlorinated HVOCs (CVOCs)			
161	cis-1,2-Dichloroethene (cis-1,2-DCE)	µg/l	4th priority
162	trans-1,2-Dichloroethene (trans-1,2-DCE)	µg/l	4th priority
163	Vinyl Chloride (Chloroethylene)	µg/l	4th priority
164	Acrylamide	µg/l	4th priority
165	Epichlorohydrin	µg/l	4th priority
166	1,1,1,2-Tetrachloroethane (1,1,1,2-PCA)	µg/l	4th priority
167	1,1,2,2-Tetrachloroethane (1,1,2,2-PCA)	µg/l	4th priority
168	1,1,1-Trichloroethane (1,1,1-TCA)	µg/l	4th priority
169	1,1,2-Trichloroethane (1,1,2-TCA)	µg/l	4th priority
170	1,1-Dichloroethane (1,1-DCA)	µg/l	4th priority

Site Specific Parameters			
171	Bromoform	µg/l	4th priority
172	Iodoform	µg/l	4th priority
173	Dibromochloromethane	µg/l	4th priority
174	Bromodichloromethane	µg/l	4th priority
175	Total Trihalomethanes (THMs)	µg/l	4th priority
176	Chloral hydrate	µg/l	4th priority
177	Chloroacetic acid	µg/l	4th priority
178	2-Chloroethanol	µg/l	4th priority
179	Methybromide (bromomethane)	µg/l	4th priority
180	1,2-Dibromethane	µg/l	4th priority
181	1,2-Dichloropropane	µg/l	4th priority
182	1,3-Dichloropropan-2-ol	µg/l	4th priority
183	1,3-Dichloropropene	µg/l	4th priority
184	2,3-Dichloropropene	µg/l	4th priority
185	1,1-Dichloroethylene (Vinylidene chloride)	µg/l	4th priority
186	1,2-Dichloroethylene	µg/l	4th priority
187	1,1,2-Tri-chloro-tri-fluoro-ethane	µg/l	4th priority
188	Hexachloroethane	µg/l	4th priority
189	Dichloro-di-isopropyl ether	µg/l	4th priority
190	Polychlorinated Biphenyls PCBs (including Polychlorinated terphenyls PCTs)	µg/l	4th priority
191	Chloronitrobenzene(s)	µg/l	4th priority
192	1-Chloro-2-nitrobenzene	µg/l	4th priority
193	1-Chloro-3-nitrobenzene	µg/l	4th priority
194	1-Chloro-4-nitrobenzene	µg/l	4th priority
195	4-Chloro-2-nitrotoluene	µg/l	4th priority
196	Chloronitrotoluenes (other than 4-Chloro-2-nitrotoluene)	µg/l	4th priority
197	Mono-Chlorophenol	µg/l	4th priority
198	Chloroprene (2-Chloro-1,3-butadiene)	µg/l	4th priority
199	3-Chloropropene (Ally chloride)	µg/l	4th priority
200	Chlorotoluene(s)	µg/l	4th priority
201	2-Chlorotoluene	µg/l	4th priority
202	3-Chlorotoluene	µg/l	4th priority
203	4-Chlorotoluene	µg/l	4th priority
204	Mono-Chlorotoluidines	µg/l	4th priority
205	Cyanuric chloride (2,4,6-Trichloro-1,3,5-triazine)	µg/l	4th priority
206	2-Amino-4-chlorophenol	µg/l	4th priority
207	Benzylchloride (Alpha-chlorotoluene)	µg/l	4th priority
208	Benzylidenechloride (Alpha, alpha-dichlorotoluene)	µg/l	4th priority
209	2-Chloroaniline	µg/l	4th priority
210	4-Chloro-2-nitroaniline	µg/l	4th priority

Site Specific Parameters			
211	Dichloroanilines	µg/l	4th priority
212	Dichlorobenzene	µg/l	4th priority
213	Dichlorobenzidines	µg/l	4th priority
214	Mono-Chlorobenzene	µg/l	4th priority
215	1-Chloro-2,4-dinitrobenzene	µg/l	4th priority
216	4-Chloro-3-methylphenol	µg/l	4th priority
217	Chloronaphthalenes (technical mixture)	µg/l	4th priority
218	1-Chloronaphthalene	µg/l	4th priority
219	Cyanuric chloride (2,4,6-Trichloro-1,3,5-triazine)	µg/l	4th priority
220	Dichloronitrobenzenes	µg/l	4th priority
221	2,4-Dichlorophenol	µg/l	4th priority
222	Trichlorophenols	µg/l	4th priority
223	1,2,4,5-Tetrachlorobenzene	µg/l	4th priority
224	Tetrabromobisphenol A (TBBP-A)	µg/l	4th priority
225	Hexabromocyclododecane (HBCD)	µg/l	4th priority
226	Dichlobenil	µg/l	4th priority
227	Tributyl phosphate	µg/l	4th priority
228	Polychlorinated dibenzodioxins (PCDD)	µg/l	4th priority
229	Polychlorinated dibenzofurans (PCDF)	µg/l	4th priority
230	Other VOCs and/or CVOCs which CIS screening has shown are, or may be, present in Albanian waters and which are not included in this list or the Priority Substances list	µg/l	4th priority
3c. Petroleum Hydrocarbons (PHCs)			
231	Toluene	µg/l	4th priority
232	Ethylbenzene	µg/l	4th priority
233	Xylenes	µg/l	4th priority
234	Methyl tert-butyl ether (MTBE)	µg/l	4th priority
235	Other PHCs which CIS screening has shown are, or may be, present in Albanian waters and which are not included in this list or the Priority Substances list	µg/l	4th priority
236	Total Petroleum Hydrocarbons (TPH)	µg/l	4th priority
3d. Volatile & Semi-volatile organic chemicals (VOC & SVOCs)			
237	Phenols	µg/l	4th priority
238	Creosote	µg/l	4th priority
239	Coal tars and degradation products	µg/l	4th priority
240	Isopropyl benzene	µg/l	4th priority
241	Diethylamine	µg/l	4th priority
242	Dimethylamine	µg/l	4th priority
243	Other SVOCs which CIS screening has shown are, or may be, present in Albanian waters and which are not included in this list or the Priority Substances list	µg/l	4th priority
3e. Polycyclic aromatic hydrocarbons (PAHs)			
244	Pyrene	µg/l	4th priority

Site Specific Parameters			
245	Benzidine	µg/l	4th priority
246	Biphenyl	µg/l	4th priority
247	Benzodifuran	µg/l	4th priority
248	Other PAHs which CIS screening has shown are, or may be, present in Albanian waters and which are not included in this list or the Priority Substances list	µg/l	4th priority
3f. Organotin compounds & other organic compounds			
249	Triphenyltin	µg/l	4th priority
250	Dibuthyltin (DBT)	µg/l	4th priority
251	Tri-n-propyltin (TPrT)	µg/l	4th priority
252	Tetra-n-butyltin (TTBT)	µg/l	4th priority
253	Tri-n-propyltin (TPrT)	µg/l	4th priority
254	4-tert-Octylphenol=1,1,3,3-Tetramethyl-4-butylphenol	µg/l	4th priority
255	Nonyl-Phenol Ethoxylate	µg/l	4th priority
256	Nitrobenzene	µg/l	4th priority
257	Carbon Disulphide	µg/l	4th priority
258	Diisononyl phthalate=1,2-Benzene dicarboxylic acid, Diisononyl ester (DINP)	µg/l	4th priority
259	Butylbenzylphthalate (BBP orBBzP)	µg/l	4th priority
260	Di-n-butylphthalate (DBP)	µg/l	4th priority
261	Styrene	µg/l	4th priority
262	Oestrone	µg/l	4th priority
263	Progesterone	µg/l	4th priority
264	Oestradiol	µg/l	4th priority
265	Ethinylestradiol	µg/l	4th priority
266	Resorcinol	µg/l	4th priority
267	Arsenic and its mineral compounds	µg/l	4th priority
268	4-Nitrotoluene	µg/l	4th priority
269	2,2-Bis(4-hydroxyphenyl)propan=4,4'-isopropylidenediphenol=Bisphenol A	µg/l	4th priority

Source: CEMSA Project

Annex 3. Methodology for assessment of ecological status / potential of surface waters

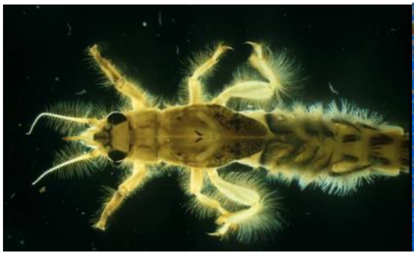
A contribution to river basin management planning of the Drini-Buna River Basin in Albania is presented below. It is the first attempt to make initial steps in ecological status/potential assessment based on analyses of benthic macroinvertebrates communities in running waters (rivers) in Albania. The adapted method for Rapid Biological Assessment (RBioA) can be used for risk assessment of rivers as well (in compliance with the requirements of WFD).

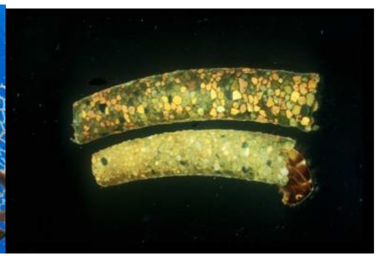
3.1 Introduction

Integrated Water Resources Management (IWRM) principles and Water Framework Directive (WFD) 2000/60/EC in Europe require an ecosystem approach for surface water management based on so-called ecological status/potential assessment (or biological integrity) of rivers, lakes or transitional waters.

A Rapid Bioassessment (RBioA) method/index based on analysis of benthic macroinvertebrate communities (macrozoobenthos) has been established for the needs of the Drini-Buna River Basin in Albania. The method ensures the following provisions:

- Cost-effective, scientifically valid procedures for biological surveys, risk assessment and integrated monitoring & assessment in compliance with WFD principles;
- Provisions for multiple site investigations in a field season (June - November);
- Quick turn-around of results for management decisions; and
- Monitoring & survey reports easily translated to decision-makers/water managers and the public.





The main features of the RBioA can be summarized as follows:

- 5 indicator groups (A, B, C, D, E) sensitive – tolerant taxa;
- 5 abundance groups (approx. 1 sq. m sampling area): Few (1-5), Present (6-20), Common (21-50), Plentiful (51-100), Dominant (100+);
- Special algorithm (Assessment Key) + assessment table (Flanagan, P.J. and Toner, P.F., 1972; modified Clabby & Bowman, 1979; Clabby, 1982; Metcalfe. 1989, Ghetti, 1986; Chandler, 1970; Armitage et al., 1983; De Pauw & Vanhooren, 1983, etc.);

3.2 Criteria used to establish assessment method

In adopting or developing a rapid assessment method for use in River Basin monitoring and assessment programs, the following four considerations are important:

1) The method can be used **to measure ecological status** or **risk assessment** (benthic macroinvertebrate communities) based on the principles of WFD 2000/60/EC. Ecological status can be defined as the ability of a system to support and maintain a balanced integrated, adaptive community of macroinvertebrates having a taxonomic composition (diversity), abundance and functional organization comparable to the natural reference conditions of the surface water type.

2) The method should be **rapid and cost-effective**. A rapid method must be able to provide an accurate assessment of condition in a relatively short time period. For this reason, we define “rapid” as taking no more than two people, 40 minutes ÷ one hour field work per sampling site, 5-8 sampling site per working day (depends on the travelling distances), and requiring no more than 30 minutes of office preparation and data analysis.

3) The method must be an **on-site assessment**. All the calculations/scoring and the ecological status assessment as a whole should be preliminary provided in the field. An accurate evaluation using a rapid method requires an *in situ* procedure to ensure that the assessment captures the current ecological conditions of the river water body and does not infer condition based solely on laboratory/office breakdown or the potential of a river to perform certain ecological functions.

4) The method can be **verified**.

5) Verification may be achieved based on information gathered through empirical studies using anthropogenic pressure data and results from more intensive integrated monitoring & assessment including deviations of biological type-specific reference conditions and benchmark conditions. In this way, the assumptions behind the assessment can be tested using intercalibration procedures and QC/QA mechanisms.

3.3 Biological assessment

For the purposes of the RBioA procedure, benthic macroinvertebrates have been divided into five arbitrary ‘Indicator Groups’ as follows: Group A (the sensitive forms), Group B (the less sensitive forms), Group C (the tolerant forms), Group D (the very tolerant forms), and Group E (the most tolerant forms). These groups and their relationships with the Rapid Biological Assessment (RBioA) are set out below.

Biological material for examination is obtained by sampling in the shallower, faster-flowing areas (e.g. riffles) and the assessment of ecological status is made on site. Having determined the relative proportions of the various organisms in the sample, ecological status is inferred by a comparison of this data with that which might be expected from reference conditions of the river type under investigation. Other relevant factors such as the intensity of algal and/or weed development, water turbidity, bottom siltation, substratum type, current speed (velocity), water depth, DO saturation, electrical conductivity and pH, are also taken into account in the assessment procedure.

Table A3.1.: Biological Indicator Groups and Taxa Used for RBioA in the Drini-Buna River Basin

Indicator Group	No. Of Taxa In the Indicator Group	Total Number of Taxa				
		0 - 1	2 - 3	4 - 7	8 - 10	11+
		Value of RBioA Index (%)				
A	4+	N/A	N/A	80	90	100
	2/3	N/A	60	75	80	95
	1	5	40	60	75	85
B	3+	N/A	40	60	75	80
	1 - 3	5	25	50	55	70
C	All above indicator groups absent	5	25	35	45	65
D	All above indicator groups absent	0	20	25	30	N/A
E	All above indicator groups absent	0	10	15	N/A	N/A

3.4 Ecological assessment of main river types

The EU Water Framework Directive (EC 2000) requires the establishment of methods to quantify the ecological status of water bodies. Biological indicators play a key role in the assessment of ecological status. Biological assessment results need to be expressed using a numerical scale between zero and one, the ‘Ecological Quality Ratio’ (EQR). The EQR value one represents (type-specific) reference conditions and values close to zero bad ecological status. Ecological status assessment and biological reference conditions are estimated using the type-specific classification systems including Ecological Quality Ratios (EQRs) shown in the Table below.

Table A3.2.: Ecological Quality Ratios and the Relationship to RBioA

EQR	Rapid Biological Assessment (%)
0.85 - 1	85 - 100
0.70 – 0.80	70 - 80
0.50 – 0.65	50 - 65
0.30 – 0.45	30 - 45
0.00 – 0.25	0 - 25

The general characteristics of 5 ecological classes, as based on the RBioA, are presented in the Table below.

It is important to note that the Table below is intended for use by decision-makers, water managers and experts from other water disciplines (e.g. hydro-engineers, chemical engineers, etc.) as well as by specialists from other sectors (fishery, tourism & eco-tourism, landscape management, natural resources and nature protected areas, etc.).

Table A3.3.: General Characteristics of the 5 Ecological Classes Based on the RBioA with Benthic Macroinvertebrates

Ecological Status	**High Status**	**High Status**	**Good Status**	**Moderate Status**	**Poor Status**	**Bad Status**
RBioA Ratings	90 – 100%	80 – 85%	70-80%	50-65%	30-45%	<30%
Ref. Conditions	Ref. conditions	Near to ref. conditions	Benchmark conditions	Benchmark conditions	Benchmark conditions	Benchmark conditions
Organic Waste Load	None	None	Light	Considerable	Heavy	Excessive
Maximum BOD5	Low (< 3 mg/l)	Low (< 3 mg/l)	Often elevated (but usually < 5 mg/l)	High at times (usually < 10 mg/l)	Usually high (10 – 20 mg/l or more)	Usually very high (> 25 mg/l)
Dissolved Oxygen Regime	Close to 100% or typical for ref. cond.	80% - 120%	<80% to >120% (e.g. 60% - 140%)	Very unstable (but > 40%)	Low (but >20%)	Very low, sometimes zero
Annual Median Ortho-Phosphate	≈ 0.015 mg P/l	< 0.030 mg P/l	Usually < 0.050 mg P/l	Usually < 0.075 mg P/l	Usually > 0.1 mg P/l	Usually > 0.1 mg P/l
Total Phosphorus (TP) Annual Average (AA)	Always < 0.025 mg P/l or Trace	Always < 0.055 mg P/l or Trace	Usually < 0.075 mg P/l	Usually < 0.1 mg P/l Risk for eutrophication of receiving 'lake' WBs	Usually < 0.2 mg P/l Serious risk for eutrophication of receiving 'lakes'/Sea	Sometimes > 0.2 mg P/l Great risk for eutrophication of receiving 'lakes'/Sea
Ammonia & Nitrites (N-NH4 and N-NO2)	None or close to zero	None or close to zero	Trace to None	Variable, Sometimes N-NH4 <1 mg N/l, and N-NO2 <0.09 mg N/l	Variable, Sometimes N-NH4 <1.5 mg N/l, and N-NO2 <0.09 mg N/l	Variable, Sometimes N-NH4 >1.5 mg N/l, and N-NO2 >0.09 mg N/l
Nitrates (N-NO3) Annual Average (AA)	Always < 1 mg N/l or Trace	Always < 1 mg N/l or Trace	Usually < 2.5 mg N/l	Usually < 5 mg N/l	Usually < 12 mg N/l	Sometimes > 12 mg N/l

Ecological Status	High Status	High Status	Good Status	Moderate Status	Poor Status	Bad Status
Total Nitrogen (TN) Annual Average (AA)	Always < 1 mg N/l or Trace	Always < 1 mg N/l or Trace	Usually < 2.5 mg N/l	Usually < 5 mg N/l Risk for eutrophication of receiving 'lake' WBs	Usually < 12 mg N/l Serious risk for eutrophication of receiving 'lakes'/Sea	Sometimes > 12 mg N/l Great risk for eutrophication of receiving 'lakes'/Sea
Organic Siltation	None	May be light	May be light	May be considerable	Usually heavy	Usually very heavy and anaerobic
Filamentous Bacteria complexes	Never	Never	Trace to None	May be Some or Abundant	May be Very Abundant	None (or Abundant)
Filamentous algae	Limited development	Diverse communities (if present)	Cladophora may be Abundant	Cladophora may be Excessive	Few, Absent (rarely Abundant)	Usually None
Macrophytes (typical abundance if present)	Good diversity Limited growths (normal for the river type)	Considerable growths	Reduced diversity Luxuriant growths	Limited diversity Excessive growths	Tolerant species only May be Abundant	Usually None or tolerant species only
Macroinvertebrates	Diverse communities compared to ref. cond. Normal density. Sensitive taxa usually numerous.	High diversity. Increased density. Sensitive taxa scare or common.	Very high diversity. Very high density. Sensitive taxa scarce.	Sensitive taxa absent. Tolerant taxa common. Low diversity.	Tolerant taxa only. Very low diversity.	Most tolerant taxa. Minimal diversity.
Water Quality / Pollution Status	Pristine, Unpolluted	Unpolluted	Slight Pollution	Moderate Pollution	Heavy Pollution	Gross Pollution

Ecological Status	High Status	High Status	Good Status	Moderate Status	Poor Status	Bad Status
Abstraction Potential	Suitable for all	Suitable for all	Potential problems for drinking water supply (after treatment); Good for irrigation & industrial water supply	Advanced treatment	Low grade abstractions (mostly some industrial purposes)	Extremely limited
Fishery Potential	Game fisheries	Good game fisheries	Game fish at risk in Trout rivers	Coarse fisheries Potential fish-kills	Fish usually absent Fish kill events	Fish absent
Amenity & Tourist Value	Very high Ecotourism	High Ecotourism	Considerable but good for tourism	Reduced Usually not good for tourist activities	Low No tourist potential	Zero No tourist potential
Ecosystem & Water Resource conditions	Satisfactory	Satisfactory	Satisfactory	Transitional	Unsatisfactory	Unsatisfactory

Annex 4. Economic data

Table A4.1: Area of field crop, Drini Buna RB, 2015, ha

Prefecture (county)	Cereals	Vegetables	Potatoes	White bean	Tobacco	Sunflower	Soya	Forage	Other
Dibër	8,757	1,506	925	496	1	0	0	17,231	49
Korçë	7,984	970	751	786	25	0	0	5,433	52
Kukës	4,927	599	602	185	8	0	0	6,155	79
Lezhë	6,640	1,613	491	713	0	0	149	13,404	15
Shkodër	7,932	3,580	1,058	821	408	0	0	16,491	3,771

INSTAT: Agriculture Statistical Yearbook 2015

Table A4.2: Production of field crops, Drini Buna RB, 2015, tons

Prefecture (county)	Cereals	Vegetables	Potatoes	White bean	Tobacco	Sunflower	Soya	Medicinal crops	Forage
Dibër	47,208	46,759	30,939	1,010	1	0	0	776	444,986
Korçë	86,189	78,663	65,439	3,315	120	0	0	303	397,488
Kukës	22,932	13,477	11,805	1,287	0	0	0	120	92,975
Lezhë	39,179	39,717	9,499	1,551	0	0	292	70	402,718
Shkodër	48,543	76,530	22,076	1,191	626	0	0	6,320	432,503

INSTAT: Agriculture Statistical Yearbook 2015

Table A4.3: Livestock, Drini Buna RB, 2015, (000) heads

Prefecture (county)	Cattle	Cows	Sheep	Milked sheep	Goats	Milked goats	Pigs	Equidae	Poultry
Dibër	45	30	126	105	66	54	3	9	318
Korçë	15	12	87	70	33	25	3	6	323

Kukës	43	29	72	56	34	26	2	4	122
Lezhë	34	23	34	24	61	43	64	1	256
Shkodër	50	37	70	54	67	50	49	5	551

INSTAT: Agriculture Statistical Yearbook 2015

Table A4.4: Livestock production, Drini Buna RB, 2015

Prefecture (county)	Milk production (000 to)				Production of meat live weight (000 to)						Eggs (000,000)	Wool (to)
	Total	Cows	Sheep	Goats	Total	Cattle	Sheep	Goats	Pigs	Poultry		
Dibër	74	64	5	5	10	5	2	1	0	2	33	195
Korçë	35	29	4	3	6	3	2	1	0	0	13	98
Kukës	59	53	3	3	8	5	2	1	0	0	13	104
Lezhë	60	54	1	5	10	3	1	1	6	0	18	63
Shkodër	93	83	5	6	13	5	1	1	5	1	102	122

INSTAT: Agriculture Statistical Yearbook 2015

Table A4.5: Census 2011 population data in Drini Buna RB

County	Locality	Urban/ Rural	Population (Census 2011)
		u/ r	no of inhabitants
Shkodër	Pukë, Gjegjan, Rrape, Qelez, Qerret	U	5,359
		R	12,000
Shkodër	Fushë Arrëz, Fierze, Blerim, Qafe Mali, Iballe	U	3,800
		R	1,000
Kukës	Has, Krume, Fajza, Gjinaj, Golaj	U	4,175
		R	9,304
Shkodër	Vau i Dejës, Bushat, Vig Mnele, Hajmel, Temal, Shllak	U	5,624
		R	6,894
Kukës	Kukes, Malzi, Bicaj, Ujmisht, Terthore, Shtiqen, Zapod, Shishtavec, Topojan, Bushtrice, Gryk Caje, Kalis, Surroj, Arren, Kolsh	U	25,000
		R	15,000
Dibër	Peshkopi / Dibër, Tomin, Melan, Kastriot, Lure, Maqellare, Muhurr, Luzni, Selishte, Sllove, Kala e Dodes, Zall Dardhë, Zall Rec, Fushe Cidhen, Arras	U	14,500
		R	16,500
Lezhë	Lezhë, Shënkoll, Shëngjin, Zejmen, Balldren, Kallmet, Blinisht, Dajc, Ungrej, Kolsh	U	30,750
		R	4,250
Dibër	Bulqize, Martanesh, Fushe Bulqize, Zerqan, Shupenze, Gjorice, Ostren, Trebisht	U	11,348
		R	4,547
		R	2,473
Korçë	Pogradec, Udenisht, Bucimas, Cerrave, Dardhas, Trebinje, Proptisht, Velcan	U	44,441
		R	15,239
Shkodër	Koplik, Gruemire, Kastrat, Kelmend, Qender, Shkrel	U	11,001
		R	70,930
Kukës	Tropojë, Bajram Curri, Fierze, Lekbibaj, Margegaj, Llugaj, Bujan, Bytyc,	U	8,704
		R	1,155
Shkodër	Shkodër, Ana e Malit, Berdice, Dajc, Guri I Zi, Postribe, Pult, Rrethinat, Shale, Shosh, Velipoje	U/R	121,088

Table A4.6: ICI water consumption in the Drini Buna RB

Enterprise Name:	Total Water Volume Sold – Industrial, Commercial ($000m^3$)	Total Water Volume Sold - institutional ($000m^3$)	Total ICI ($000m^3$)
Bashkia Pukë UK	9	18	27
Vau i Dejës U Sh.A	6	14	20
Tropojë U Sh.A	24	32	56
Lezhë UK Sh.A	143	75	218
Pogradec UK Sh.A	122	32	154
Shkodër UK Sh.A	187	335	522
Pukë fshat	2	5	7
Shkodër (F) U Sh.A	19	20	40
Fushë Arrëz UK Sh.A	7	9	16
Librazhd UK Sh.A	55	39	94
Peshkopi U Sh.A	47	74	121
Bulqizë U Sh.A	26	90	115
Has U Sh.A	17	23	40
Kukës UK Sh.A	40	77	117
Total Drini - Buna RB	705	842	1,547

Table A4.7: Domestic water consumption from centralised sources in the Drini Buna River Basin

County	Locality	Urban / Rural	Population (Census 2011)	Water cons.	Water coverage	Water cons.
		u/ r	no of inhabitants	l/c/d	%	cm/year
Shkodër	Pukë, Gjegjan, Rrapë, Qelez, Qerret	U	5,359	142.02	54.3	150,843
		R	12,000	146.86	19.58	125,948
Shkodër	Fushë Arrëz, Fierze, Blerim, Qafe Mali, Iballe	U+R	4,800	167.05	38.92	113,908
Kukës	Has, Krume, Fajza, Gjinaj, Golaj	U+R	13,479	88.51	61.98	269,895
Shkodër	Vau i Dejës, Bushat, Vig Mnele, Hajmel, Temal, Shllak	U+R	12,518	88.89	44.93	182,481
Kukës	Kukës, Malzi, Bicaj, Ujmisht, Terthore, Shtiqen, Zapod, Shishtavec, Topojan, Bushtrice, Gryk Caje, Kalis, Surroj, Arren, Kolsh	U+R	40,000	53.29	100	778,034
Dibër	Peshkopi/Dibër, Tomin, Melan, Kastriot, Lure, Maqellare, Muhurr, Luzni, Selishte, Sllove, Kala e Dodes, Zall Dardhe, Zall Rec, Fushe Cidhen, Arras	U+R	31,000	63.74	100	721,218
Lezhë	Lezhë, Shënkoll, Shengjin, Zejmen, Balldren, Kallmet, Blinisht, Dajc, Ungrej, Kolsh	U+R	35,000	95.86	95.07	1,164,238
Dibër	Bulqize, Martanesh, Fushe Bulqize, Zerqan, Shupenze, Gjorice, Ostren, Trebisht	U+R	15,895	153.55	75.67	674,104
Elbasan	Librazhd, Qender Librazhd, Hotolisht, Lunik, Stebleve, Polis, Orenje	U+R	19,112	76.5	96.24	513,589
Korçë	Pogradec, Udenisht, Bucimas, Cerrave, Dardhas, Trebinje, Proptisht, Velcan	U+R	59,680	57.41	97.8	1,223,061
Shkodër	Malësi e Madhe (Koplik, Gruemire, Kastrat, Kelmend, Qender, Shkrel)	U+R	81,931	128.6	91.72	3,527,330

County	Locality	Urban / Rural	Population (Census 2011)	Water cons.	Water coverage	Water cons.
Kukës	Tropojë, Bajram Curri, Fierze, Lekbibaj, Margegaj, Llugaj, Bujan, Bytyc,	U+R	9,859	145.91	74.75	392,484
Shkodër	Shkodër, Ana e Malit, Berdicë, Dajc, Guri I Zi, Postribe, Pult, Rrethinat, Shale, Shosh, Velipoje	U/R	121,088	116.09	73.21	3,756,291

Table A4.8: Domestic water consumption from own sources in the Drini Buna River Basin - Average water consumption in the RBD: 96.65 l/c/d

County	Locality	Urban/ Rural	Population self-service - water	Water cons. Self-service
		u/ r	no of inhabitants	cm/year
Shkodër	Pukë, Gjegjan, Rrape, Qelez, Qerret	U	2,449	86,396
		R	9,650	340,437
Shkodër	Fushë Arrëz, Fierzë, Blerim, Qafë Mali, Iballë	U+R	2,932	103,426
Kukës	Has, Krume, Fajza, Gjinaj, Golaj	U+R	5,125	180,784
Shkodër	Vau i Dejës, Bushat, Vig Mnele, Hajmel, Temal, Shllak	U+R	6,894	243,188
Kukës	Kukës, Malzi, Bicaj, Ujmisht, Terthorë, Shtiqen, Zapod, Shishtavec, Topojan, Bushtricë, Gryk Caje, Kalis, Surroj, Arren, Kolsh	U+R	0	0
Dibër	Peshkopi/Dibër, Tomin, Melan, Kastriot, Lurë, Maqellarë, Muhurr, Luzni, Selishtë, Sllove, Kala e Dodës, Zall Dardhë, Zall Rec, Fushë Cidhen, Arras	U+R	0	0
Lezhë	Lezhë, Shënkoll, Shëngjin, Zejmen, Balldren, Kallmet, Blinisht, Dajc, Ungrej, Kolsh	U+R	1,726	60,870
Dibër	Bulqizë, Martanesh, Fushë Bulqizë, Zerqan, Shupenze, Gjorice, Ostren, Trebisht	U+R	3,867	136,425
Korçë	Pogradec, Udenisht, Bucimas, Cerrave, Dardhas, Trebinje, Proptisht, Velcan	U+R	1,313	46,317
Shkodër	Malësi e Madhe (Koplik, Gruemire, Kastrat, Kelmend, Qender, Shkrel)	U+R	6,784	239,315
Kukës	Tropojë, Bajram Curri, Fierze, Lekbibaj, Margegaj, Llugaj, Bujan, Bytyc,	U+R	2,489	87,818
Shkodër	Shkodër, Ana e Malit, Berdicë, Dajc, Guri i Zi, Postribe, Pult, Rrethinat, Shale, Shosh, Velipoje	U/R	32,439	1,144,366

Table A4.9: The value of water for domestic use in the Drini Buna River Basin

County	Locality	Urban / Rural	Water consumtion	Domestic tariff	Domestic water value	Domestic water value
		u/ r	cm/year	lek/cm	lek/year	euro/year
Shkodër	Puke, Gjegjan, Rrape, Qelez, Qerret	U	150,843	35	5,279,515	38,541
		R	125,948	15	1,889,216	13,791
Shkodër	Fushe Arrez, Fierze, Blerim, Qafe Mali, Iballe	U+R	113,908	20	2,278,156	16,631
Kukës	Has, Krume, Fajza, Gjinaj, Golaj	U+R	269,895	25	6,747,369	49,256
Shkodër	Vau Dejes, Bushat, Vig Mnele, Hajmel, Temal, Shllak	U+R	182,481	20	3,649,616	26,642
Kukës	Kukes, Malzi, Bicaj, Ujmisht, Terthore, Shtiqen, Zapod, Shishtavec, Topojan, Bushtrice, Gryk Caje, Kalis, Surroj, Arren, Kolsh	U+R	778,034	25	19,450,850	141,993
Dibër	Peshkopi/Diber, Tomin, Melan, Kastriot, Lure, Maqellare, Muhurr, Luzni, Selishte, Sllove, Kala e Dodes, Zall Dardhe, Zall Rec, Fushe Cidhen, Arras	U+R	721,218	27	19,472,889	142,153
Lezhë	Lezhe, Shenkoll, Shengjin, Zejmen, Balldren, Kallmet, Blinisht, Dajc, Ungrej, Kolsh	U+R	1,164,238	58	67,525,813	492,943
Dibër	Bulqize, Martanesh, Fushe Bulqize, Zerqan, Shupenze, Gjorice, Ostren, Trebisht	U+R	674,104	17	11,459,769	83,657
Korçë	Pogradec, Udenisht, Bucimas, Cerrave, Dardhas, Trebinje, Proptisht, Velcan	U+R	1,223,061	62	75,829,775	553,563
Shkodër	Malesi e Madhe (Koplik, Gruemire, Kastrat, Kelmend, Qender, Shkrel)	U+R	3,527,330	50	176,366,517	1,287,488
Kukës	Tropoje, Bajram Curri, Fierze, Lekbibaj, Margegaj, Llugaj, Bujan, Bytyc,	U+R	392,484	19	7,457,196	54,438
Shkodër	Shkoder, Ana e Malit, Berdice, Dajc, Guri I Zi, Postribe, Pult, Rrethinat, Shale, Shosh, Velipoje	U/R	3,756,291	40	150,251,626	1,096,847

Table A4.10: Demographic projections in Drini Buna River Basin

	2011	2016	2017	2018	2019	2020	2021	2022
National	2,907,361	2,906,871	2,911,407	2,917,409	2,924,807	2,933,530	2,943,520	2,955,010
Shkodër	237,696	237,656	238,027	238,517	239,122	239,835	240,652	241,592
Kukës	63,338	63,327	63,426	63,557	63,718	63,908	64,126	64,376
Dibër	46,895	46,887	46,960	47,057	47,176	47,317	47,478	47,664
Lezhë	35,000	34,994	35,049	35,121	35,210	35,315	35,435	35,574
Korçë	59,680	59,670	59,763	59,886	60,038	60,217	60,422	60,658

	2023	2024	2025	2026	2027	2028	2029	2030
National	2,966,197	2,976,953	2,987,173	2,996,766	3,005,655	3,013,768	3,021,054	3,027,473
Shkodër	242,506	243,386	244,221	245,005	245,732	246,395	246,991	247,516
Kukës	64,620	64,854	65,077	65,286	65,479	65,656	65,815	65,955
Dibër	47,844	48,018	48,182	48,337	48,480	48,611	48,729	48,832
Lezhë	35,708	35,838	35,961	36,076	36,183	36,281	36,369	36,446
Korçë	60,888	61,109	61,318	61,515	61,698	61,864	62,014	62,146

Table A4.11: Water consumption projections - Drini Buna River Basin

		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Domestic water consumption																	
Bashkia Pukë UK	Population served	2,942	3,108	3,276	3,447	3,619	3,795	3,973	4,153	4,333	4,513	4,694	4,874	5,054	5,234	5,413	5,591
	Annual water cons. (m^3)	118	124	130	136	142	148	154	160	166	172	177	183	188	194	199	204
Vau i Dejës U Sh.A	Population served	6,081	6,520	6,964	7,414	7,869	8,330	8,798	9,269	9,742	10,217	10,692	11,167	11,642	12,116	12,588	13,059
	Annual water cons. (m^3)	155	171	188	206	224	243	263	284	306	328	351	375	399	425	450	477
Tropojë U Sh.A	Population served	7,493	7,662	7,836	8,015	8,198	8,385	8,578	8,772	8,965	9,158	9,350	9,540	9,730	9,917	10,102	10,285
	Annual water cons. (m^3)	386	387	388	389	390	390	391	391	390	389	388	387	384	382	379	375
Lezhë UK Sh.A	Population served	34,020	34,138	34,274	34,426	34,594	34,778	34,979	35,178	35,372	35,560	35,742	35,915	36,079	36,234	36,378	36,513
	Annual water cons. (m^3)	904	930	956	983	1,011	1,039	1,068	1,098	1,127	1,157	1,186	1,216	1,245	1,275	1,304	1,333
Pogradec UK Sh.A	Population served	58,773	58,924	59,106	59,316	59,553	59,817	60,111	60,400	60,680	60,950	61,207	61,450	61,678	61,889	62,083	62,259
	Annual water cons. (m^3)	1,160	1,229	1,298	1,369	1,441	1,515	1,589	1,664	1,740	1,816	1,892	1,968	2,044	2,121	2,197	2,272
Shkodër UK Sh.A	Population served	91,342	93,469	95,651	97,887	100,179	102,527	104,942	107,361	109,780	112,193	114,597	116,986	119,356	121,704	124,027	126,321
	Annual water cons. (m^3)	3,240	3,322	3,406	3,492	3,581	3,672	3,766	3,860	3,954	4,049	4,144	4,238	4,332	4,426	4,518	4,611
Pukë fshat	Population served	2,953	3,561	4,174	4,791	5,414	6,043	6,680	7,320	7,964	8,611	9,261	9,912	10,564	11,216	11,868	12,519
	Annual water cons. (m^3)	148	175	202	227	252	276	299	321	342	361	380	398	414	430	444	457
Shkodër (F) U Sh.A	Population served	27,047	30,753	34,487	38,255	42,061	45,909	49,806	53,728	57,669	61,626	65,595	69,572	73,552	77,532	81,506	85,472
	Annual water cons. (m^3)	1,357	1,515	1,668	1,815	1,957	2,095	2,227	2,353	2,473	2,587	2,693	2,793	2,886	2,971	3,049	3,120
Fushë Arrëz UK Sh.A	Population served	2,066	2,252	2,439	2,629	2,820	3,015	3,212	3,410	3,609	3,808	4,008	4,209	4,409	4,609	4,809	5,007
	Annual water cons. (m^3)	106	113	120	127	133	140	146	151	156	161	166	170	174	177	180	183
Librazhd UK Sh.A	Population served	18,434	18,508	18,592	18,684	18,785	18,894	19,014	19,132	19,247	19,359	19,468	19,572	19,672	19,766	19,855	19,938
	Annual water cons. (m^3)	471	486	502	518	535	552	569	587	604	622	640	657	675	693	710	728
Peshkopi U Sh.A	Population served	30,995	31,043	31,107	31,186	31,279	31,386	31,508	31,627	31,742	31,851	31,953	32,048	32,135	32,212	32,281	32,340
	Annual water cons. (m^3)	569	608	646	686	726	766	807	848	890	932	973	1,015	1,056	1,098	1,139	1,180
Bulqizë U Sh.A	Population served	12,352	12,608	12,871	13,141	13,418	13,703	13,996	14,290	14,584	14,876	15,167	15,456	15,743	16,026	16,306	16,582
	Annual water cons. (m^3)	497	504	512	519	527	535	542	550	558	565	573	580	586	593	599	605
Has U Sh.A	Population served	8,919	9,237	9,561	9,891	10,227	10,570	10,920	11,271	11,623	11,975	12,327	12,678	13,027	13,374	13,719	14,062
	Annual water cons.	249	263	278	293	309	326	343	360	378	396	415	434	453	473	493	513

		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
	(m^3)																
Kukës UK Sh.A	Population served	39,993	40,056	40,138	40,240	40,360	40,497	40,656	40,809	40,957	41,098	41,230	41,352	41,464	41,564	41,653	41,729
	Annual water cons. (m^3)	789	835	882	929	977	1,025	1,075	1,125	1,174	1,224	1,274	1,324	1,374	1,424	1,474	1,523
Population served		**343,410**	**351,840**	**360,476**	**369,321**	**378,377**	**387,647**	**397,173**	**406,720**	**416,267**	**425,796**	**435,290**	**444,731**	**454,103**	**463,393**	**472,587**	**481,677**
Annual water cons. (m3)		**10,152**	**10,665**	**11,178**	**11,691**	**12,205**	**12,721**	**13,239**	**13,752**	**14,259**	**14,760**	**15,253**	**15,738**	**16,214**	**16,680**	**17,136**	**17,581**
Institutional & Industrial (ICI) water consumption																	
Bashkia Pukë UK	Total (000m^3)	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Vau i Dejës U Sh.A	Total (000m^3)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Tropojë U Sh.A	Total (000m^3)	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Lezhë UK Sh.A	Total (000m^3)	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218
Pogradec UK Sh.A	Total (000m^3)	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154
Shkodër UK Sh.A	Total (000m^3)	522	522	522	522	522	522	522	522	522	522	522	522	522	522	522	522
Pukë fshat	Total (000m^3)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Shkodër (F) U Sh.A	Total (000m^3)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Fushë Arrëz UK Sh.A	Total (000m^3)	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Librazhd UK Sh.A	Total (000m^3)	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94
Peshkopi U Sh.A	Total (000m^3)	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121
Bulqizë U Sh.A	Total (000m^3)	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
Has U Sh.A	Total (000m^3)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Kukës UK Sh.A	Total (000m^3)	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117

Table A4.12: Projections of future NRW – Drini Buna RB

		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Bashkia Pukë UK	($000m^3$)	204	198	193	188	182	177	172	167	161	156	151	145	140	135	130	124
Vau i Dejës U Sh.A	($000m^3$)	517	500	484	467	450	434	417	400	384	367	350	334	317	301	284	267
Tropojë U Sh.A	($000m^3$)	1,015	963	910	858	806	754	702	650	597	545	493	441	389	337	284	232
Lezhë UK Sh.A	($000m^3$)	979	970	960	950	941	931	922	912	902	893	883	873	864	854	845	835
Pogradec UK Sh.A	($000m^3$)	1,142	1,153	1,164	1,175	1,186	1,197	1,208	1,219	1,230	1,241	1,252	1,263	1,274	1,285	1,296	1,306
Shkodër UK Sh.A	($000m^3$)	9,001	8,585	8,169	7,754	7,338	6,922	6,506	6,090	5,674	5,259	4,843	4,427	4,011	3,595	3,180	2,764
Pukë fshat	($000m^3$)	290	288	285	282	279	277	274	271	269	266	263	261	258	255	253	250
Shkodër (F) U Sh.A	($000m^3$)	633	704	775	847	918	989	1,060	1,131	1,203	1,274	1,345	1,416	1,488	1,559	1,630	1,701
Fushë Arrëz UK Sh.A	($000m^3$)	331	316	301	286	271	257	242	227	212	197	182	167	152	137	122	107
Librazhd UK Sh.A	($000m^3$)	184	201	218	236	253	270	287	305	322	339	356	374	391	408	425	443
Peshkopi U Sh.A	($000m^3$)	1,110	1,082	1,055	1,028	1,001	973	946	919	892	864	837	810	783	755	728	701
Bulqizë U Sh.A	($000m^3$)	949	912	874	837	799	762	725	687	650	612	575	538	500	463	425	388
Has U Sh.A	($000m^3$)	349	346	343	339	336	332	329	325	322	319	315	312	308	305	301	298
Kukës UK Sh.A	($000m^3$)	177	224	271	318	365	412	459	506	554	601	648	695	742	789	836	883

Table A4.13: Financial costs Drini Buna River Basin

Enterprise Name:	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pogradec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazhd UK Sh.A	Peshkopi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
Financial costs															
Water services															
Operating and maintenance costs															
Labor cost- Water (000 Lek)	7,912	4,687	10,427	28,594	27,885	54,971	5,784	43,303	4,534	19,593	15,136	10,443	11,988	28,207	**273,464**
Material costs (incl. Chemicals)- Water (000 Lek)	0.0	260	153	1,250	160	3,074	210	3,240	136	165	475	297	0.0	2,043	**11,464**
Energy Costs- Water (000 Lek)	15	10,665	4,489	61,890	18,320	105,902	380.	34,079	0.0	902	86	677	8,455	234	**246,095**
Cost of Repair and Maintenance- Water (000 Lek)	926	839	225	5,508	638	4,756	369	9,213	447	2,167	3,464	1,126	132	5,189	**35,000**

Enterprise Name:	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pogradec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazhd UK Sh.A	Peshkopi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
Cost of Contracted Services- Water (000 Lek)	0.0	0.0	89	0.0	9,087	9,147	0.0	0.0	0.0	3,116	3,995	7,676	0.0	0.0	**33,110**
Other costs- Water (000 Lek)	845	353	143	4,790	3,060	1,141	496	2,998	125	3,987	708	2,175	1,308	543	**22,673**
Direct Operating Cost (DOC)- Water (000 Lek)	**9,698**	**16,804**	**15,526**	**102,032**	**59,151**	**178,992**	**7,239**	**92,833**	**5,241**	**29,930**	**23,863**	**22,394**	**21,883**	**36,215**	**621,807**
Capital costs															
Depreciation- Water (000 Lek)	1,068.0	960.0	7,021.5	42,348.0	22,800.0	46,639.9	2,520.0	37,680.0	1,797.9	4,473.0	6,600.0	3,900.0	4,524.0	16,620.0	**198,952**
Repayment of Debt (Principal)	0.0	0.0	0.0	0.0	2,470.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	**2,520**
Administrative costs															
Interest- Water (000 Lek)	0.0	0.0	0.0	0.0	3,251.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	**3,264**
Other financial expenses- Water (000 Lek)	112.0	0.0	0.0	0.0	4,002.8	3,950.9	0.0	463.0	0.0	0.0	104.0	1,516.0	0.0	2,047.0	**12,196**
Taxes & subsidies															
Taxes and duties- Water (000 Lek)	0.0	0.0	0.0	0.0	1,302.7	0.0	0.0	0.0	0.0	0.0	10.0	265.0	0.0	482.6	**2,060**
Total Financial costs - Water (000 Lek)	**10,878**	**17,764**	**22,547**	**144,380**	**92,978**	**229,583**	**9,759**	**130,976**	**7,039**	**34,403**	**30,577**	**28,125**	**26,407**	**55,378**	**840,799**
WasteWater services															
Operating and maintenance costs															
Labor cost- S (000 Lek)	1,039	0.0	0.0	9,406	11,184	48,656	1,416	1,660	2,570	4,719	1,288	0.0	0.0	2,080	**84,019**
Material costs (incl. Chemicals)- S (000 Lek)	0.0	0.0	0.0	230	0.0	6.6	28	0.0	100	445	797	0.0	0.0	875	**2,482**
Energy Costs- S (000 Lek)	0.0	0.0	0.0	3,150	7,107	1,648	0.0	163	0.0	0.0	0.0	0.0	0.0	0.0	**12,069**
Cost of Repair and Maintenance- S (000 Lek)	292	0.0	0.0	1,287	499	4,712	214	733	130	55	1,002	0.0	0.0	757	**9,682**
Contracted Services- S (000 Lek)	0.0	0.0	0.0	0.0	2,434	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2,435**
Other costs- S (000 Lek)	0.0	0.0	0.0	787	3,322	1,084	0.0	170	10	279	207	0.0	0.0	76	**5,937**
Direct Operating Cost (DOC)- WasteWater (000 Lek)	**1,331**	**0.0**	**0.0**	**14,860**	**24,549**	**56,108**	**1,658**	**2,726**	**2,810**	**5,498**	**3,294**	**0.0**	**0.0**	**3,788**	**116,624**
Capital costs															

Enterprise Name:	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pogradec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazhd UK Sh.A	Peshkopi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
Depreciation- S (000 Lek)	876	0.0	0.0	24,648	18,000	41,360	720.0	0.0	90	1,077	0.0	0.0	0.0	510	**87,281**
Administrative costs															
Interests -S (000 Lek)	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4**
Other financial expenses- S (000 Lek)	92.0	0.0	0.0	0.0	1,234	3,501	0.0	0.0	120	0.0	0.0	0.0	0.0	383	**5,332**
Taxes & subsidies															
Taxes and duties- S (000 Lek)	0.0	0.0	0.0	0.0	830.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	84.0	**914**
Total Financial costs - WasteWater (000 Lek)	**2,299**	**0.0**	**0.0**	**39,508**	**44,618**	**100,969**	**2,378**	**2,726**	**3,020**	**6,575**	**3,294**	**0.0**	**0.0**	**4,765**	**210,155**
Total Financial costs - Water&WasteWater (000 Lek)	**13,177**	**17,764**	**22,547**	**183,888**	**137,596**	**330,553**	**12,137**	**133,702**	**10,059**	**40,978**	**33,871**	**28,125**	**26,407**	**60,144**	**1,050,954**

Table A4.14: Financial Revenues from water/ wastewater services, Drini Buna River Basin, 2015

Water utility	Revenue from water services (000 Lek)	Revenue from waste water services (000 Lek)	Total operational revenue (000 Lek)	Subsidies (000 Lek)	Total financial revenues (000 Lek)	Total financial revenues (000 euro)
Bashkia Pukë UK	8,713	1,320	10,034	1,500	11,534	84
Vau i Dejës U Sh.A	4,420	0	4,420	5,200	9,620	70
Tropojë U Sh.A	14,280	0	14,280	0	14,280	104
Lezhë UK Sh.A	106,957	22,209	129,166	9,000	138,166	1,009
Pogradec UK Sh.A	79,678	25,402	105,080	9,200	114,280	834
Shkodër UK Sh.A	203,289	50,750	254,039	0	254,039	1,855
Pukë fshat	2,269	231	2,500	3,300	5,800	42
Shkodër (F) U Sh.A	48,519	0	48,519	23,000	71,519	522
Fushë Arrëz UK Sh.A	3,151	643	3,794	2,500	6,294	46
Librazhd UK Sh.A	26,941	7,624	34,565	1,500	36,065	263

Water utility	Revenue from water services (000 Lek)	Revenue from waste water services (000 Lek)	Total operational revenue (000 Lek)	Subsidies (000 Lek)	Total financial revenues (000 Lek)	Total financial revenues (000 euro)
Peshkopi U Sh.A	25,004	6,030	31,034	0	31,034	227
Bulqizë U Sh.A	22,714	0	22,714	5,190	27,904	204
Has U Sh.A	9,085	0	9,085	10,820	19,905	145
Kukës UK Sh.A	26,702	5,769	32,471	10,500	42,971	314
Total	**581,721**	**119,979**	**701,700**	**81,710**	**783,410**	**5,719**

Table A4.15: Financial cost recovery Drini Buna River Basin, 2015

	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pogradec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazhd UK Sh.A	Peshkopi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
Financial costs															
Water services															
Total Financial costs - Water (000 Lek)	10,878.8	17,764.7	22,547.5	144,380.0	92,978.0	229,583.3	9,759.1	130,976.0	7,039.7	34,403.3	30,577.7	28,125.6	26,407.0	55,378.4	840,799
WasteWater services															
Total Financial costs - WasteWater (000 Lek)	2,299	0.0	0.0	39,508	44,618	100,969	2,378	2,726	3,020	6,575	3,294	0.0	0.0	4,765	210,155
Total Financial costs - Water&WasteWater (000 Lek)	**13,177**	**17,764**	**22,547**	**183,888**	**137,596**	**330,553**	**12,137**	**133,702**	**10,059**	**40,978**	**33,871**	**28,125**	**26,407**	**60,144**	**1,050,954**
Financial Revenues															
Water services															
Total Amount of Water Bills- Total (000 Lek)	8,713	4,420	14,280	106,957	79,678	203,288	2,268	48,519	3,151	26,941	25,003	22,714	9,084	26,702	**581,721**
WasteWater services															
Total Amount of Sewer Bills- Total (000 Lek)	1,320	0.0	0.0	22,209	25,401	50,750	231	0.0	643	7,624	6,030	0.0	0.0	5,768	**119,979**
Subsidy for Operation	1,500	5,200	0.0	9,000	9,200	0.0	3,300	23,000	2,500	1,500	0.0	5,190	10,820	10,500	**81,710**

	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pogradec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazhd UK Sh.A	Peshkopi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
(000 Lek)															
Total Financial revenues - Water&WasteWater (000 Lek)	**11,533**	**9,620**	**14,280**	**138,166**	**114,280**	**254,039**	**5,799**	**71,519**	**6,294**	**36,065**	**31,034**	**27,904**	**19,904**	**42,970**	**783,410**

Table A4.16: Economic cost recovery Drini Buna River Basin, 2015

Economic costs															
Water services	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pogradec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazhd UK Sh.A	Peshkopi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
Operating and maintenance costs															
Labor cost- Water (000 Lek)	6,020	3,566	7,934	21,758	21,218	41,829	4,401	32,950	3,450	14,909	11,517	7,946	9,122	21,463	**208,086**
Material costs - Water (000 Lek)	0	217	128	1,042	133	2,562	175	2,700	113	138	396	248	0	1,703	**9,553**
Energy Costs- Water (000 Lek)	13	8,888	3,741	51,575	15,267	88,252	317	28,399	0	752	71	564	7,046	195	**205,079**
Cost of Repair and Maintenance- Water (000 Lek)	926	840	225	5,508	638	4,756	369	9,213	447	2,167	3,464	1,127	132	5,189	**35,000**
Cost of Contracted Services- Water (000 Lek)	0	0	89	0	9,087	9,147	0	0	0	3,116	3,995	7,676	0	0	**33,110**
Other costs- Water (000 Lek)	845	353	143	4,790	3,061	1,142	496	2,998	125	3,987	708	2,175	1,308	543	**22,673**
Direct Operating Cost - Water (000 Lek)	7,805	13,863	12,260	84,673	49,404	147,687	5,758	76,261	4,135	25,068	20,152	19,736	17,608	29,093	**513,502**
Capital costs															
Depreciation- Water (000 Lek)	1,068	960	7,022	42,348	22,800	46,640	2,520	37,680	1,798	4,473	6,600	3,900	4,524	16,620	**198,952**
Repayment of Debt (Principal)	0	0	0	0	2,470	0	0	0	0	0	0	50	0	0	**2,520**
Administrative costs															
Interest- Water (000 Lek)	0	0	0	0	3,251	0	0	0	0	0	0	0	0	13	**3,264**
Other financial expenses- Water (000 Lek)	112	0	0	0	4,003	3,951	0	463	0	0	104	1,516	0	2,047	**12,196**
Resource costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Environmental costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Economic costs - Water (000 Lek)	**8,985**	**14,823**	**19,281**	**127,021**	**81,929**	**198,278**	**8,278**	**114,404**	**5,933**	**29,541**	**26,856**	**25,202**	**22,132**	**47,773**	**730,434**
WasteWater services															

Economic costs															
Water services	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pogradec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazhd UK Sh.A	Peshkopi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
Operating and maintenance costs															
Labor cost- S (000 Lek)	791	0	0	7,157	8,511	37,024	1,077	1,264	1,956	3,591	980	0	0	1,583	**63,932**
Material costs - S (000 Lek)	0	0	0	192	0	6	24	0	83	371	664	0	0	729	**2,068**
Energy Costs- S (000 Lek)	0	0	0	2,625	5,923	1,374	0	136	0	0	0	0	0	0	**10,058**
Cost of Repair and Maintenance- S (000 Lek)	292	0	0	1,287	500	4,712	214	733	130	55	1,002	0	0	757	**9,682**
Cost of Contracted Services- S (000 Lek)	0	0	0	0	2,435	0	0	0	0	0	0	0	0	0	**2,435**
Other costs- S (000 Lek)	0	0	0	787	3,323	1,085	0	170	10	279	207	0	0	77	**5,937**
Direct Operating Cost - WasteWater (000 Lek)	**1,083**	**0**	**0**	**12,048**	**20,691**	**44,200**	**1,315**	**2,303**	**2,179**	**4,296**	**2,853**	**0**	**0**	**3,146**	**94,112**
Capital costs															
Depreciation- S (000 Lek)	876	0	0	24,648	18,000	41,360	720	0	90	1,077	0	0	0	510	**87,281**
Administrative costs															
Interests -S (000 Lek)	0	0	0	0	4	0	0	0	0	0	0	0	0	0	**4**
Other financial expenses- S (000 Lek)	92	0	0	0	1,235	3,502	0	0	120	0	0	0	0	383	**5,332**
Resource costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Environmental costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Economic costs - WasteWater (000 Lek)	**2,051**	**0**	**0**	**36,696**	**39,930**	**89,062**	**2,035**	**2,303**	**2,389**	**5,373**	**2,853**	**0**	**0**	**4,039**	**186,729**
Economic revenues															
Water services															
Total Amount of Water Bills- Total (000 Lek)	**7,261**	**3,683**	**11,900**	**89,131**	**66,398**	**169,407**	**1,891**	**40,433**	**2,626**	**22,451**	**20,837**	**18,928**	**7,571**	**22,252**	**484,768**
WasteWater services															
Total Amount of Sewer Bills- Total (000 Lek)	**1,100**	**0**	**0**	**18,508**	**21,168**	**42,292**	**193**	**0**	**536**	**6,353**	**5,025**	**0**	**0**	**4,807**	**99,982**
Economic Cost	**81%**	**25%**	**62%**	**70%**	**81%**	**85%**	**23%**	**35%**	**44%**	**76%**	**78%**	**75%**	**34%**	**47%**	**66%**

Economic costs															
Water services	Bashkia Pukë UK	Vau i Dejës U Sh.A	Tropojë U Sh.A	Lezhë UK Sh.A	Pograd ec UK Sh.A	Shkodër UK Sh.A	Pukë fshat	Shkodër (F) U Sh.A	Fushë Arrëz UK Sh.A	Librazh d UK Sh.A	Peshko pi U Sh.A	Bulqizë U Sh.A	Has U Sh.A	Kukës UK Sh.A	River Basin
recovery rate – water (%)															
Economic Cost recovery rate – wastewater (%)	**54%**			**50%**	**53%**	**47%**	**9%**	**0%**	**22%**	**118%**	**176%**			**119%**	**54%**
Economic Cost recovery rate - water&wastewater (%)	**76%**	**25%**	**62%**	**66%**	**72%**	**74%**	**20%**	**35%**	**38%**	**83%**	**87%**	**75%**	**34%**	**52%**	**64%**

Annex 5. Stakeholders Engagement Action Plan

5.1 Introduction

The Preparation of a River Basin Management Plan (RBMP) for the Drini-Buna River Basin is part of the Institutional Support for Integrated Water Resources Management component of the Albania Water Resources and Irrigation Project (WRIP).

Effective implementation of the WFD, as required under European law, would not currently be fully possible in any of the 6 River Basins in Albania. Effective implementation of the WFD requires further development of the central and regional capacities to carry out the specific WFD requirements, and, although detailed in the national laws and reflected in the institutional structure, which equates to a serious intent to implement the WFD in the future, Albania does not currently have the technical capacity to carry out the specific requirements of the WFD.

As a first stage, the implementation of the WFD in Albania requires a major advance in the investment of capacity development, i.e. human resources and training, at both the central and regional levels. In order to positively improve the situation, a capacity assessment will be undertaken during Phase 2 of the project, which will link roles and responsibilities at central and local levels with specific training needs and human resources that are required to meet the legal obligations of each entity involved in the management of water in the Drin - Buna River Basin.

In Drini-Buna River Basin, there are historically 43 water supply and sanitation services. However, after the reform only 12 water supply and sanitation services will be licensed, i.e. Shkodër, M. Madhe, V. Dejës, Pukë, Kukës, Has, Tropojë, Lezhë, Peshkopi, Bulqizë (partially), Librazhd (partially) and Pogradec (partially).

The locations of the main water supply points in the Drini-Buna River Basin is provided in Figure 1. An inventory of the known springs is shown in Figure 2.

With respect to the water treatment plants (WTP) in the Drini-Buna River Basin, four Water Treatment Plants (WTP) are currently in operation, i.e. in Lezhe (Shengjin), Pogradec, Velipoje and in Shiroke Commune close to Shkoder Lake. In city of Shkoder there is in feasibility study undergoing concerning the building of a WTP of the Shkoder City

Figure 1: Location of the Main Water Supply

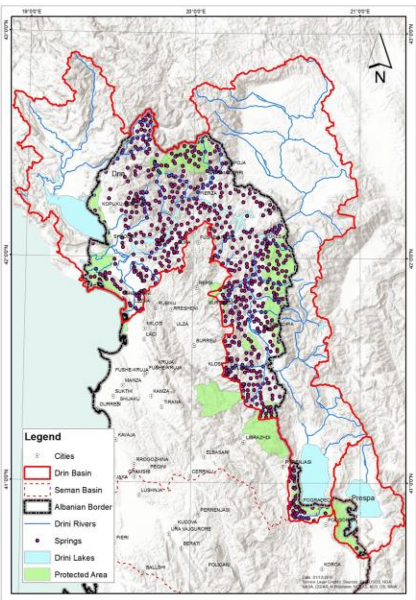
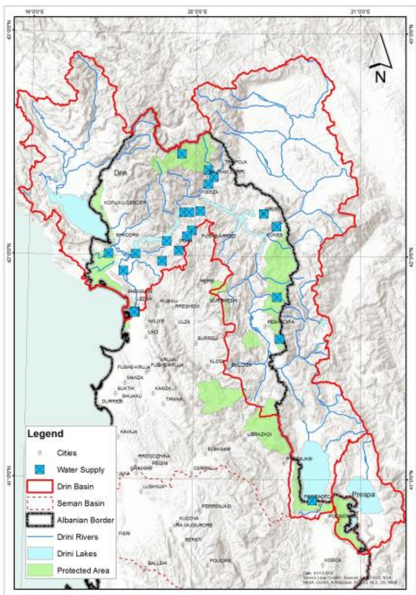


Figure 2: Location of the Known Springs



The stakeholder consultation process will be led by the project team, with focus on two major actions:

- Trainings
- Management

River Basin management planning will require the engagement in the level of national and local authorities, civil society (NGOs) and communities through key informants and focus groups representing the vulnerable groups (e.g. women, elderly, minorities and/or ethnic groups)

- National Level
- Regional Level
- Key informants
- Focus Group

5.2 Scope of Work

Stakeholder consultation plan will ensure stakeholder engagements in the level of national and local authorities, civil society (NGOs) and communities through key informants and focus groups representing the vulnerable groups (e.g. women, elderly, minorities and/or ethnic groups). These engagements will be held during the planned timeframe in purpose of the preparation of a RBMP.

This engagement will take into accounts opinions comments from different levels of stakeholders' groups that will be used for finalizing the Management Plan

The following phases of engagement are included in this action plan:

- National Level Stakeholder Engagement: stakeholders at central state level will be informed of the results achieved in the alternatives assessment in face to face meetings;
- Regional and Local Level Stakeholder Engagement: one plenary stakeholder meeting will be organized in each of the regions
- KI Interviewers
- Focus Group organized with vulnerable groups (women, elderly, Roma (if any) and other groups)

For each phase, the following tasks will be completed:

- Preparation Activities
  - Notification to stakeholders
  - Information Materials (Presentations)
- Disclosure Meetings
  - Organization of 'note taking' and registration during disclosure activities
- Registration of participants
  - Team: indicates representatives from the project team
  - Reporting and deliverables

Consultation Phase which will start in January 2017, and will comprise of the following:

- Based on the identified water resources management issues and water-related constraints, the river basin planning process will begin with structured stakeholder consultations on identifying the issues that need to be addressed, development needs and opportunities and stakeholders' vision of the future of the basin. The objectives will reflect gendered needs and priorities, and the indicators will be disaggregated according to gender, age and other relevant parameters

The consultation process was led by ABKONS with support of MMD. Both organizations provided technical assistance in the preparation of the engagement activities as follows:

- Identification of stakeholder lists and engagement strategy (national/regional)

- Assisting with the organization of the national and regional meetings (e.g. notification to authorities, letters of invitation, and liaison with regional and communal authorities);
- Organizing of 'note taking' during consultation meetings;
- Preparing the 'Engagement Outcome Report 'presenting the outcome of the consultations and participation of vulnerable groups; and
- This document will be reference for the Final Stakeholder Report

An activity plan is shown in the table below:

Table 1: Project Planning including Stakeholder's engagement scheme

Week no.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Week starting on:	**Before**	**23-Jan**	**30-Jan**	**6-Feb**	**13-Feb**	**20-Feb**	**27-Feb**	**6-Mar**	**13-Mar**	**20-Mar**	**27-Mar**	**3-Apr**	**10-Apr**	**17-Apr**	**24-Apr**	**1-May**	**8-May**	**15-May**	**22-May**	**29-May**	**5-Jun**	**12-Jun**	**19-Jun**	**26-Jun**	**3-Jul**	**10-Jul**	**17-Jul**	**24-Jul**	**31-Jul**
Develop RBPMs and other documents																													
develop RBs models																													
analyze flood info & develop flood action/mgmt plan																													
fieldwork ecological rapid assessment, develop report & map																													
assess and develop capacity building plan																													
assess monitoring and develop roadmap																													
develop RBMPs objectives and indicators + discussion paper																													
assess infrastructure and develop investment needs long list																													
setup intervention priorities and list of measures + discussion papers																													
perform stakeholders' consultation, analyze and report																													
prepare RBMPs implementation plan																													
assess and analyze RBPMs implementation issues																													
Edit and finalize the Draft RBMPs English version																													
Translate Draft RBMPs in Albanian																													
Develop dissemination plan																													
Develop Brief process report																													
Receive all comments on Draft RBMPs																													
Address comments and develop Final RBMPs English																													
Translate Final RBMPs in Albanian																													
Finalize brief process report																													
Consultations																													
WG meeting - consultation on interims RBMPs	*																												
WG meeting - comments to interims RBMPs					*																								
Technical Secretariat (currently WRMA) meetings each two week		*		*		*		*		*						*		*											
RBCs meetings - views gathering on measures											**																		
WG meeting – objectives									*																				
WG meeting – measures											*																		
WG meeting - comments on Draft RBMPs																				*									
Workshops/Trainings																													
Workshop: Economics of Water Use: Drini/Shkoder	*																												
Workshop: Introduction to RB modelling (national Tirana)	*																												
Workshop: Modelling of the Drini RB / Schoder											*																		
Workshop: Monitoring and roadmap (national Tirana)													*																
Deliverables																													
Draft RBMPs English version ready														15															
Draft RBMPs Albanian version ready																15													

Week no.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Week starting on:	Before	23-Jan	30-Jan	6-Feb	13-Feb	20-Feb	27-Feb	6-Mar	13-Mar	20-Mar	27-Mar	3-Apr	10-Apr	17-Apr	24-Apr	1-May	8-May	15-May	22-May	29-May	5-Jun	12-Jun	19-Jun	26-Jun	3-Jul	10-Jul	17-Jul	24-Jul	31-Jul
WS Report Economics of Water Use: Drini/Schoder									15																				
WS Report Introduction to RB modelling (national Tirana)			31																										
WS Report: Modelling of the Drini RB / Schoder														15															
WS Report: Monitoring and roadmap (national Tirana)																15													
Final RBMPs English Version ready (4 weeks after receiving comments)																					comments received			30					
Final RBMPs Albanian version ready																										14			
Dissemination Plan																		15											
Brief Process Report																												25	

LEGEND

- Activities
- Consultations
- Workshops/Trainings
- Deliverables
- Stakeholders' comments

5.3 Approach for Stakeholder Engagement Plan

The consultation of stakeholders is a key element in management planning of River Basin. The purpose of the stakeholder consultations is to allow interaction of stakeholders in the decision- making process, expressing their views and alleviate risk through technical solutions based on concerns raised during the process.

Stakeholder consultation is a process of comprehensive and culturally appropriate, including the exchange of information and knowledge, are able to understand the concerns of others and to build relations based on cooperation. This allows interested parties to understand the risks, impacts and opportunities of the project to achieve positive results.

The main objectives of the stakeholder involvement are:

- to ensure the provision of appropriate information in a timely manner to those affected or whom have a stake on the project,
- to ensure that these groups be given an opportunity necessary to express opinions and concerns
- ensure that the comments made in time so that it can be considered in project decisions.
- to get valuable input to the RBMP

Field visits and stakeholder engagement process were designed to treat several different targets. Fieldwork is designed to use this existing knowledge to assess the relevant issues in order to plan for the management plan and ensure that the proposed project will address effectively the main requirements of task assigned in coordination with the stakeholders. Fieldwork should ensure that all issues have been addressed and all stakeholders were consulted including all directly affected communities (the and stakeholders were consulted including all affected communities and settlements, special groups such as farmers (which includes women) and key informants as regional offices, women and directly involved stakeholders.

The methodologies described below are adapted to the requirements described above and particular attention is given to the more vulnerable members of society.

These engagement activities were undertaken as referred in the Table 1

Table 2 - Phase of the Stakeholder Engagement Plan Albania and Progress to Date

Phase	Completed /Planned
Phase 1: High level Consultation with National Authorities	Planned
Phase 2: Consultation with Regional Authorities	Planned
Phase 3: Key Informant Interviewers	Planned
Phase 4: Focus Group with Vulnerable People	Planned

All relevant stakeholders, i.e. those who were already involved in previous consultation during project workshops and new ones identified, were invited to participate in meetings to get informed about the findings and recommendations of the study team. The detailed stakeholders list is provided in Table 3 as reference of the Interim Draft Report

Table 3 - List of Stakeholders at the National Level and Regional Level in Drini-Buna River Basin

Institutions and Stakeholders at National Level		
• Ministry of Agriculture Rural Development and Water Administration (currently Ministry of Agriculture and Rural Development) • Technical Secretariat of the National Water Council (name at the time of planning, currently Water Resource Management Agency) • Ministry of Environment (currently Ministry of Tourism and Environment) • Ministry of Health (currently Ministry of Health and Social Care) • Ministry of Internal Affairs (currently Ministry of Interior) • Ministry of Defence	• Ministry of Transport and Infrastructure (currently Ministry of Infrastructure and Energy) • Ministry of Finance (currently Ministry of Finance and Economy), • Directorate of social inclusion and gender equality under the (currently within Ministry of Health and Social Care) • Water Regulatory Authority • The Albanian Institute of Geo-Sciences, Environment, Water and Energy • The Drin Core Group • The National Agency of Natural Resources	• Albanian Geological Services • General Directory of Water Supply and Sewerage, Public Health Institute • National Environmental Agency
Institutions and Stakeholders in Drini-Buna River Basin		
• River Basin Agency (name at the time of planning, currently Administration Office of Basin Water) of Drini-Buna • Drainage and Irrigation Board of Korça and Lezhë • Regional Environmental Agency(s) of Lezhë and Shkodër	• Municipalities of Dibër, Fushë Arrëz, Has, Kukës, Lezhë, Librazhd, Malësi e Madhe, Pogradec, Pukë, Pustec, Shkoder, Tropojë, Vau i Dejës • Hydro Energy Corporate • State Inspectorate of Environmental, Forest and water, Qark(s) of Dibër, Kukës, Lezhë and Shkodër	• Health State Inspectorate (for all Municipalities) • Water and Sewerage Enterprises

5.4 Stakeholders' Identification

Based on the objectives of the Public Activities, were organized that all relevant stakeholders (those who were already involved in the previous consultation and notification encounters and new ones identified during this phase) were invited to participate to a set of meetings in the aim to informe them regarding the findings and recommendations of the study team.

The detailed stakeholders list is provided in the end of this annex. The paragraphs below provide an overview of the stakeholders identified.

Stakeholder Consultation Plan ensures involvement of SE parts in national and regional level (through key Informants and focus group representing vulnerable group)

Focus Group and KI meeting, did include agricultural association, Water Use groups, farmers and participants from civil society

- National Government
- Regional and Local Government
- KI and Focus Groups

The organization of water (resources) monitoring in Albania is complex, with over 20 different government institutions currently involved in data collection for a limited number of parameters with a partial geographical coverage. Water management is organized at the River Basins level in Albania through six River Basin Councils (RBC), each of which having a River Basin Agency (RBA name at the time of the planning, current name Administration Office of Basin Water - AOBW).

5.5 Consultation Meetings and Training Sessions

a. Consultation Meetings

According to the planned activities, these engagements were held during the drafting of RBMP to take into accounts opinions comments from different levels of stakeholder groups that were used for finalizing the RBMP and at the draft RBMP to disclose the plan to all stakeholders and collect their opinions and comments

The following consultations will be organized:

- Face to face consultation with stakeholders at national level. Different representative departments of the institutions were invited to attend at the same meeting;
- Plenary meetings at regional/ district level: meetings were organized at regional/district level in the study area of the alternatives assessment;
- Interviews with key informants;
- Focus Groups with vulnerable people in order to see the impact of this project in their daily life and activities

b. Training Sessions

Trainings were held in order to create a common understanding among water management Stakeholders regarding the required steps in developing River Basin Management Plan. These trainings helped to strengthen the Government's capacity to manage water resources at both the national level and in the Drini - Buna River Basin and to sustainably improve the performance of irrigation systems in the project area. These activities were carried out with a gender balance and our target was to involve women at least 50% in participating in these trainings.

The trainings were also addressed to regional and local water administration public entities. In order to create a gender balance participation in these meetings, these entities were requested to submit the list of all members, positions and gender of each targeted departments. The trainings participation was set up to have at least 50% women participation. If certain departments cannot meet this, participation of other women experts from other entities and civil society were sought. The project team invited stakeholders to the training sessions officially by letter and also by phone.

The most important aspects that trainings had to clarify for the stakeholders, was as follows:

- What is integrated water resource management plan
- What are Water Framework Directive, Floods Directive, etc.
- Institutional cooperation, keeping, monitoring and sharing data
- What is modelling of surface and ground waters
- What is cost efficiency planning investment
- What does it mean "User Pays"

Stakeholders that were part of these training were from the institutions below:

- RBA (River Basin Agency - name at the time of the planning, current name Administration Office of Basin Water - AOBW)
- RBC

- Municipalities
- Water Supply Utilities
- Drainage Board
- WUO
- Main Water Use Industries
- Regional Environmental Agency
- Health Regional Authority
- Water Policy Department
- Water Secretariat
- Civil Society

Table 4 - Preparation Activities

Activities	Comments	Timing	Responsible
1. Preparation of Stakeholders Lists			
1.1 Preparation of the list of relevant national stakeholders			Project team
1.2 Preparation of the list of relevant regional/local stakeholders			Project team
1.3 Preparation of the list of relevant KI and Focus Groups			Project team
2. Preparation of face to face meetings with National/Regional Governmental Authorities			
2.1 Delivery of letter to all stakeholders	Preparing Invitation Letters to explain the purpose of the venue of the meetings		Client/Project team
2.2 Delivery of meeting request letters to national stakeholders.			Client/Project team
2.3 Delivery of meeting request letters to regional Stakeholders			Client/Project team
3.Preparation Consultations with KI and Focus Groups			
3.1 Prepare questionnaires for KI			Project team
3.2 Prepare questionnaires for Focus Groups			Project team
3.3 Analyse questionnaires			Project team
3.4 Prepare the report and feedback from the meetings			Project team

5.6 Organisation of Meetings

The venue for each of the meetings and trainings were selected in collaboration with main attendees and the final invitation list were agreed with the concerned regional and local representatives.

All the distribution of consultation meetings were administered by MARD.

Meetings were held between 10:00 a.m. and asted for about two hours. Presentations did not exceed one hour in length.

In addition to the Q&A session forms were distributed to participants to collect the evaluation of the consultation activities carried out record any observations or concerns.

Registration: All participants were registered with a format of signing sheet. There were all necessary information as position, contact number, email and their signature.

Team: The team composition is shown in the following table.

Table 5: Team Composition for Regional and Local Meetings

Position / expertise	Name	Company
Environmental and Social	Redion Biba	The Consultant
Stakeholder Participation	Arta Gurabardhi	The Consultant
Gender Analysis and Gender	Nereda Kola	The Consultant
Communication / Training Coordination	Eneida Shuli/Adri Erebara	The Consultant
Technical Expert	Halit Kamberi	The Consultant

Minutes of meetings were prepared by the Note keeper within a week from the end of the communication activity. The Consultant did produce a report with summary findings from the Activities and the report contained the following attachments:

- Invitation materials (Letters templates, media adverts) & Presentation Materials
- Minutes of Meetings and photographic material

Consultations were conducted in every municipality with relevant members of the community in the project area in order to provide all project affected communities are involved in the engagement process.

It was anticipated that each meeting to last between one and two hours depending on the size of the community. Team members were present at each affected municipality and village information on project impacts and mitigation measures proposed. Technical consultants did manage the consultation process on the ground together with the minutes of the meeting process and address or answer questions.

Participants were required to register their name and sign in the registration list to record that had participated in every meeting.

Participants were provided with the information of the project in the Albanian language in a presentation and a project address for those who required additional information and whether or need to contact the team in a date later.

5.7 Focus Groups

A series of focus groups were organized with the aim of targeting different audiences in different areas of the project. Various focus groups were selected based on their level of interest position, marginalization, information specialists or ability to influence the planning process of the project.

Marginalized groups in need are individuals or communities who are particularly susceptible to marginalization due to gender, age, gender, race, religion, disability of living, or location. Focus groups provided a forum for members of society need to be heard and allowed open discussion about the project, its aimed and suggested plans. In every municipality of the study area all marginalized groups such as women, elderly, manufacturers, seniors and subsidized agricultural groups were targeted through a series of focus group meetings. Discussions in focus groups with women and the elderly were carried out in each municipality, and other vulnerable groups like agricultural producers were carried out in certain places in the village where specific marginalized groups had been identified.

Focus group meetings were held with members of the respective groups of industry or specific parts of the project. This included agricultural associations, water user associations, fruit tree growers and owners and representation of civil society as part of these groups.

Focus group meetings were organized with the help of the team who was responsible for contexts with municipalities and village elders and asking for help in individuals who had decided to participate in the focus group meetings. Once identified, each participant was informed of the date and time of the meeting two weeks before the meeting.

The team guided participants to open a series of questions dealing with the subject. All information was entered into the appropriate format, which reported on key findings.

5.8 Key informants

The purpose of key informant interviews is to gather qualitative information from an individual who has deep knowledge of a particular subject or area in question. Interviews with key informant were be carried out in each municipality; however, specific issues facing different areas of the project dictated the exact location and number of interviews. Key informant interviews were conducted mainly at regional and local level to achieve the best information.

5.9 Other Stakeholders

Part of public consultations were NGOs and some energy associations. The meetings were held at the end of all the consultations in order that all comments were reflected and they had the opportunity to discuss about the RBMP.

Some of the new NGOs and energy associations, identified lately are listed as below:

- Albanian Renewable Energy Association (AREA)
- Albanian Energy Association
- Today for Future
- Streheza per Grate dhe Vajzat e dhunuara - Agritra, Peshkopi (forestry, agriculture)
- Unë Gruaja - Me, the women, Pogradec (environmental services)
- Forumi Gruas Elbasan - Women's Forum Elbasan (environmental services)
- Together for Life, Tirana
- National Center for Community Services

Planned Meetings in River Basins Consultations

Local Meetings, Focus Group and Key Informants										
Drini Buna _ River Basin										
Nr	Region	Municipality	Representatives		Institution	Position	Contact Information	Date of Meeting	Time	Location
	Shkodër	Malësi e Madhe Shkodër Vau i Dejës Pukë Fushë-Arrëz	Team	Halit Kamberi	Abkons	Engineer Expert	hkamberi@abkons.com			
				Eneida Shuli Adri Erebara	Abkons	Stakeholder	-			
				Nereda Kola	Abkons	Social Expert	nkola@abkons.com			
				Redion Biba	Abkons	Engineer Expert	rbiba@abkons.com			
			Regional Meeting	Shkoder Region						
			Focus Groups	Elderly People						tbc
				Roma People						tbc
			KI	Farmers						tbc
				Helath Workers						tbc
	Lezhë	Mirditë Lezhë	Team	Halit Kamberi	Abkons	Engineer Expert	hkamberi@abkons.com			
				Eneida Shuli Adri Erebara	Abkons	Stakeholder	-			
				Nereda Kola	Abkons	Social Expert	nkola@abkons.com			
				Redion Biba	Abkons	Engineer Expert	rbiba@abkons.com			
			Regional Meeting	Lezhe Region						
			Focus Groups	Elderly People						tbc
				Roma People						tbc
			KI	Farmers						tbc
				Helath Workers						tbc
	Kukës	Tropje	Team	Halit Kamberi	Abkons	Engineer Expert	hkamberi@abkons.com			

Local Meetings, Focus Group and Key Informants										
Drini Buna _ River Basin										
Nr	**Region**	**Municipality**	**Representatives**		**Institution**	**Position**	**Contact Information**	**Date of Meeting**	**Time**	**Location**
		Has **Kukës**		Eneida Shuli Adri Erebara	Abkons	Stakeholder	-			
				Nereda Kola	Abkons	Social Expert	nkola@abkons.com			
				Redion Biba	Abkons	Engineer Expert	rbiba@abkons.com			
			Regional Meeting	Kukes Region						
			Focus Groups	Elderly People						tbc
				Roma People						tbc
			KI	Farmers						tbc
				Helath Workers						tbc
	Dibër	**Dibër** **Mat** **Klos** **Bulqizë**	**Team**	Halit Kamberi	Abkons	Engineer Expert	hkamberi@abkons.com			
				Eneida Shuli Adri Erebara	Abkons	Stakeholder	-			
				Nereda Kola	Abkons	Social Expert	nkola@abkons.com			
				Redion Biba	Abkons	Engineer Expert	rbiba@abkons.com			
			Regional Meeting	Diber Region						
			Focus Groups	Elderly People						tbc
				Roma People						tbc
			KI	Farmers						tbc
				Helath Workers						tbc
	Korçë	**Pogradec** **Devoll** **Pustec**	**Team**	Halit Kamberi	Abkons	Engineer Expert	hkamberi@abkons.com			
				Eneida Shuli Adri Erebara	Abkons	Stakeholder	-			
				Nereda Kola	Abkons	Social Expert	nkola@abkons.com			

Local Meetings, Focus Group and Key Informants										
Drini Buna _ River Basin										
Nr	Region	Municipality	Representatives		Institution	Position	Contact Information	Date of Meeting	Time	Location
				Redion Biba	Abkons	Engineer Expert	rbiba@abkons.com			
			Regional Meeting	Korce Region						
			Focus Groups	Elderly People						tbc
				Roma People						tbc
			KI	Farmers						tbc
				Helath Workers						tbc
	Elbasan	Dibër Pogradec	Team	Halit Kamberi	Abkons	Engineer Expert	hkamberi@abkons.com			
				Eneida Shuli Adri Erebara	Abkons	Stakeholder	-			
				Nereda Kola	Abkons	Social Expert	nkola@abkons.com			
				Redion Biba	Abkons	Engineer Expert	rbiba@abkons.com			
			Regional Meeting	Elbasan Region						
			Focus Groups	Elderly People						tbc
				Roma People						tbc
			KI	Farmers						tbc
				Helath Workers						tbc
5	Tirana		NGOs and Association					tbc		tbc

5.10 Stakeholders engagement aids

Participants Questionnaire

Place of meeting: ……………………………………………
Date of meeting: ……………………………………………

• In general, was the process of collecting comments from your side at this stage of the project adequate?	YES		NO
In a special way:			
• Was the information that was given to you before and during the meeting enough for you to give your comments?	Largely complete	Complete	Not Complete
• Was the information that was given to you before and during the meeting presented in a clear and understandable way?	YES		NO
• Did you have the opportunity to give feedback during the meeting and in general?	YES		NO
• Was the meeting organized in order to had the opportunity to participate and make your comments more easily?	YES		NO
• Are you frightened or coerced by some form during the consultation process?	YES		NO

Other Comments:

Evaluation of the Training

Date:________________________________ **Training Title:**

Place: ________________________________ ____

Please rate your satisfaction with the training you received today, by checking the appropriate number		**1**	**2**	**3**	**4**	**5**	**Do not know**	
How would you rate the overall quality of the training?	Very low							Excellent
How would you rate the usefulness of the topics for your future working context?	Not at all							Very applicable
Were the objectives of the training clearly defined?	Not at all							Very well
Were the training objectives achieved?	Not at all							Totally
Was the training carried out according to the agenda?	Not at all							Exactly
Were the training materials provided, helpful?	Not at all							Very helpful
Was the training well structured?	Not at all							Very well
Did you have the opportunity to ask the questions you want?	Not at all							All the time
Was enough time allowed for questions and discussions?	Not at all							Enough
What is your overall rating of the presentation?	Very poor							Excellent
Please score your knowledge on the training themes objectives **before** the training	Very low							Very high
Please score your knowledge on the training themes objectives **after** the training	Very low							Very high

What is the most interesting/helpful thing you learned in the training?

Please give us recommendations of what could be improved next time the training is held.

Gender

Woman			Man	

Attendance Sheet

RIVER BASIN MANAGEMENT PLAN

Ministry/ Municipality:

Date:

Time: **Venue:**

No.	Name	Surname	Municipality/Prefecture	Job title	Mobile	Email	Signature
1							
2							
3							
4							
5							
6							
7							
8							

** Accept to take photos/videos during the meetings*

**Comments can be submitted within 5 working days*

Annex 6. Stakeholders' Consultation Report

6.1 Introduction

The present Stakeholder Engagement Report describes in detail the stakeholder consultation process that was implemented for the development of the Drini-Buna Final RBMP. The consultation process was implemented by the project team, who planned, prepared and implemented the following engagement activities:

- Development of the Stakeholders' Engagement Activities Plans
- Finalizing the stakeholder lists and engagement strategy (national/regional);
- Organizing the national and regional meetings (e.g. notification to authorities, letters of invitation, and liaison with regional and communal authorities);
- Organizing of "note taking" during consultation meetings;
- Preparing the present report including sign sheets, pictures, feedback questionnaires and MoM

The stakeholder consultation plan insured a structured approach towards the stakeholders' participation and engagements at the level of national and local authorities, civil society (NGOs) and communities through key informants and focus groups representing vulnerable groups (e.g. women, elderly, minorities and/or ethnic groups). The following phases of consultations were completed based of the stakeholder plan:

- National-level stakeholder consultation;
- Regional and local-level stakeholder consultation:
- Focus group organized with vulnerable groups (women, elderly, Roma - if any, and other groups)
- Key Informants interviews

Being comprehensive and culturally appropriate process, Stakeholders' consultation included the exchange of information and knowledge, to understand the concerns of others and to build relations based on cooperation. This allowed interested parties to understand the risks, impacts and opportunities of the project to achieve positive results.

The main objectives of the stakeholder involvement as defined in the Stakeholders' Engagement Activities Plans (see Annex 5 to both reports) were:

- i) to ensure the provision of appropriate information in a timely manner to those affected or whom have a stake on the project,
- ii) to ensure that these groups be given an opportunity necessary to express opinions and concerns
- iii) ensure that the comments made in time so that it can be considered in project decisions.

The current report includes is structured as follows:

- Chapter 2 Communication Package
- Chapter 3 Regional Meetings
- Chapter 4 Focus Group and Key Informants
- Chapter 5 NGOs

6.2 General Approach

Based on the objectives of the public disclosure activities, all relevant stakeholders were invited to participate to a set of meetings to be informed about the findings and recommendations of the project team.

The following stakeholders were identified and were classified as below:

- National Government
- Regional and Local Governments
- Key Informants and Focus Groups

Based on the stakeholder groups identified above, consultations at the national level and public meetings at the regional level were organized. Different representative departments of the institutions were invited to attend the plenary meetings with all the level of stakeholders. Regarding the regional meetings, the venue for each of the meetings/training was selected in collaboration with the main attendees and the final invitation list was finalized with the concerned regional and local representatives. The notifications were made via invitation package and information to the participants about the meeting. Some communication materials were prepared and used during the meetings to give a short presentation about the project. All participants are registered with a sign-in sheet, as defined in the SE Activity Plans.

Interviews with key informants and focus groups (including vulnerable groups in order to see the impact of this project on their daily life and activities) were held. Focus group and Key Informants meetings were held with members of the respective groups, who included agricultural associations, water-user associations, fruit tree growers and owners, and representation of civil society.

Twelve workshops trainings session were organized to regional and local water administration public entities, in co-operation with DWRP. More details regarding the workshops delivery may be found in the separate training reports (twelve workshop reports) which were prepared and submitted to MARD, available upon request. The main topics covered by the workshop trainings were as identified in the SE Activity Plan, as follows:

- What is integrated water resource management plan
- What are Water Framework Directive, Floods Directive, etc.
- Institutional cooperation, keeping, monitoring and sharing data
- What is modelling of surface and ground waters
- What is cost efficiency planning investment
- What does it mean “User Pays”

6.3 Regional Meetings

6.3.1 Meeting in Shkodra Prefecture for Drini-Buna River Basin

The meeting was held on 13 February 2017 in the premises of Shkodra Prefecture. During this meeting, a presentation of the project, of the RBMP concept, and of the Drini-Buna Interim River Basin Management Plan was done. The participants' signed list and some photos, are available as below:

dt. 13.02.2017 ora 12:00

KËSHILLI I BASENIT UJOR DRIN-BUNË

Emër Mbiemër	Institucioni	Detyra	Profesioni	Adresa e postës elektronike	Nr. telefoni	Firma
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Emër Mbiemër	Institucioni	Detyra	Profesioni	Adresa e postës elektronike	Nr. telefoni	Firma
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SAIMIR SKURA	ST KKU	Specialist	Ing. Hidroteknik	[illegible]@stkku.gov.al	0682153952	

During the meeting the following questions were raised by the participants:

Question/Suggestions	Answer
Where the plan for Water Management will be finalized?	According to the plan schedule and the statistical data collection the plan is due to be issued to the Ministry by July 2017
During the preparation phase for the RBMP draft, is there any road map of businesses and private/local activities alongside River Basins? Flooding is a serious problem and the measurements that we need to take are very important for the city.	The management plan is based on: 1. Consideration of the environmental hotspots of active or non-active private enterprises and activities; including industrial and urban area 2. Measurement of these activities has been taken into consideration with an outcome of the urban pollution. 3. Indication of private business which use the natural water resources that ends with environmental pollution (livestock, leather processing, etc)

6.4 Focus Groups and Key Informants

The stakeholder engagement process included interviewing a number of focus groups and key informants on water issues, with a special focus on women, as this is a group that is directly impacted from water management. Other groups that were in the focus of this stakeholder engagement process are minorities such as Roma or Egyptian minorities, elderly people and other key informants such as farmers, who are using and managing water, and health workers, who as well have crucial water-use needs in their daily work process. Besides the interviews, the filled in questionnaires are available upon request.

6.4.1 Number of Contacts

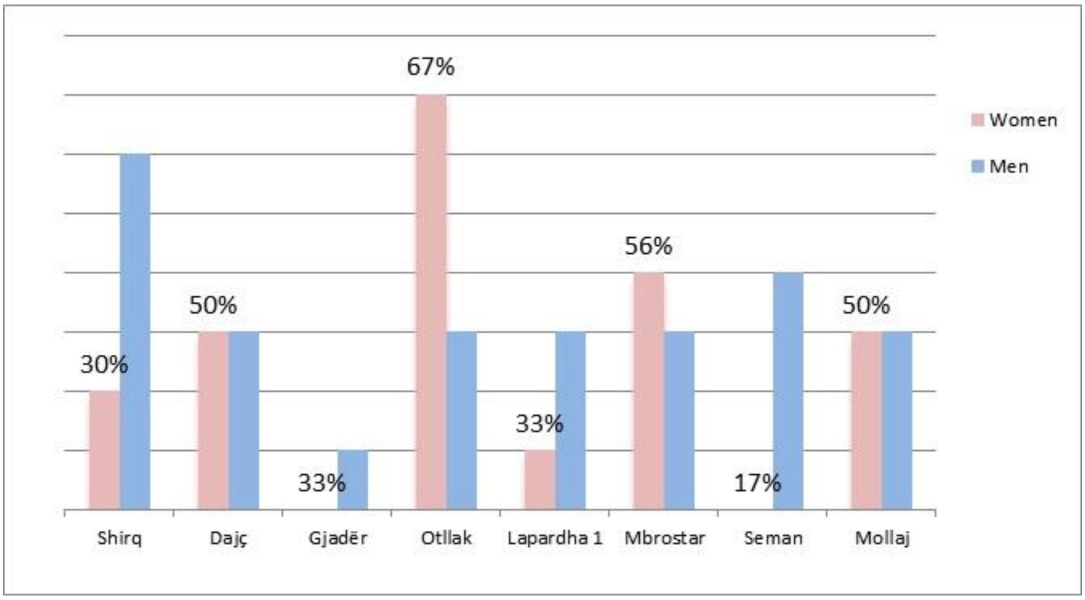
The total number of contacted people was 67, out of which 30 were women. The total number of interviews is broken down in the below table:

Table 1: Focus Groups and Key Informants

Basin	City	Administrative Unit	Focus group or key informants	Number of interviewees
Drini-Buna	Shkodër	Shirq	Roma	
			Elderly	3
			Woman	3
			Farmers	2

Basin	City	Administrative Unit	Focus group or key informants	Number of interviewees
			Health workers	2 (2 women)
		Dajç	Roma	1
			Elderly	2
			Woman	3
			Farmers	3 (1 women)
			Health workers	1 (1 women)
	Lezhë	Gjadër	Roma	
			Elderly	1
			Woman	2
			Farmers	1
			Health workers	

The distribution of women within the number of interviews made is 45% of the total, with a good representation in each basin. As shown in the graph below, women have participated in this process not only to discuss gender issues, but also as health workers,



6.4.2 Main Results and Issues

In general, most of the cities contacted in this stakeholder process have limited access to water. Water supply hours in houses vary from 2-12 hours a day, and it is even more limited during the summer period, which is a dry season in Albania.

Table 2: Access to water supply

Basin	City	Administrative Unit	Water supply in houses (mean hours)	Problems with water supply
Drini-Buna	Shkodër	Shirq	0 hours	The lack of water supply is personally resolved by the inhabitants through the use of wells, the

Basin	City	Administrative Unit	Water supply in houses (mean hours)	Problems with water supply
				water of which, however, is not drinkable.
		Dajç	0 hours	There is not water supply service. The population has taken steps to this problem by opening personal wells in their home. From the analyzes carried out this water is not drinkable because is rich in nitrates. From an experimental study conducted by the health center on the inhabitants, the use of this water is directly related to various health problems.
	Lezhë	Gjadër	6 hours	The water supply occurs twice a day, for about 3 hours each. This lack is a serious concern for local farmers, which have personally invested with the opening of private wells in their land. At the same time they also mention the lack of operation of irrigation channels.

6.4.3 Main Issues of Specific Groups

In the table below are identified the main issues of the specific groups, with a special focus on women and farmers, but also with other groups.

Table 3: Main issues of the focus groups

Basin	City	Administrative Unit	Focus group or key informants	Main issues
Drini-Buna	Shkodër	Shirq	Elderly	The number of elderly people in recent years had changed, because their children want elderly to live with them. They receive retirement pensions from the government, which are not sufficient to sustain the necessary expenses. Some of them are economically helped by children working in other countries. Problem is the healthcare service until 2 pm, rather than 24 hours.
			Woman	The role of women is considered to be the same as that of the men, even that women do more housekeeping activities. The social position of women has improved in recent years, having more right to speak, education and more freedom. Usually working opportunities are fair, as they generally deal with agriculture. Both women and men reach high school. Women have some control in the family's economic decision but they have fewer roles in decision making in the family and community.
			Farmers	Farmers are working for more than 15 years. There are problems with irrigation water, but they have solved it with private wells. Existing irrigation channels are broken. They use pesticides and consult specialists on that.

Basin	City	Administrative Unit	Focus group or key informants	Main issues
			Health workers	Health issues that are treated in this health centre are of different types. They differ due to age, geographic areas, etc. but not due to different communities. The health centre has some hygiene problems and suffers of lack of water. The infant and maternal mortality rate is zero. A few people still use some popular medications such as tea, etc.
		Dajç	Elderly	The number of elderly people in this city has grown recently because of the immigration of several families arriving from mountainous zones. Elderly people who have worked when were young, obtain retirement pension. The main problems of the society are unemployment and economic problems.
			Woman	Women in the zone are mainly housewives if not working in the administration unit, education or health centres. They would work seasonally in the hotel industry by letting their houses for rent for summer vacation tourists. Depending on the family, women may bring most of the family income or less than 20% if they are not working. They usually feel almost equal with their husbands and they cooperate in decision making, but others feel they are less powerful than men and have a lesser voice in decision making of the family or community. Nevertheless, women go through higher levels of education. The main problems that women are facing are economic problems, unemployment, domestic violence in some cases and divorce, as well as rigid mentality.
			Farmers	Farmers in the zone are working for a long time. There is a big problem with irrigation due to the lack of channels. Other problems related to water are the water quality, which is not filtered but comes directly from the pumps and sometimes no water supply depending on the geographical zone. Agriculture is the main economic activity in the zone for most families. Women are also helping in farming works in the major part of tasks. Pesticides are being used and consulted with a specialist.
			Health workers	Health issues that are treated in this health centre are of different types. They differ due to age, geographic areas, etc. but not different communities. The health centre has some hygienic problems and suffers lack of water. The infant and maternal mortality rate is zero. A few people still use some popular medications such as tea, etc.
	Lezhë	Gjadër	Elderly	There is a big problem with irrigation due to the lack of channels. Other problems related to water are the water quality, which is not filtered but comes directly from the pumps and sometimes no water supply depending on the geographical zone.
			Woman	Women in the area are mostly housewives. Not much has changed in the past years. Some women feel they have the same role in a household while others feel that men are more favoured. Only a few of the families' incomes are generated by women. They do not have a bank account and they have access in the family's financial decisions only if they're working. Women go through a higher education level than men. Most problems women are facing nowadays are unemployment and poor economy
			Farmers	For a number of families farming is the main income-generating activity. Women are involved in almost every farming activity same as men.
			Farmers	The farmers are facing problem with irrigation and lack of water. The village has two different water supplies which of them divide the village into two sections. The orchard and fruit tree they owned are being maintained by them individually. They require more local investment to improve the water supplies

Basin	City	Administrative Unit	Focus group or key informants	Main issues
				including the quality of water coming to their households
			Health workers	Water supply is frequent due to connection with private houses, but the water authority would take measures for chlorinating the water. Health problems are almost the same in all communities. Nevertheless, children, elderly and Roma people seem more vulnerable. The infant and maternal mortality rate is zero. The health centre organizes community meetings to inform the community for several issues. No other NGO or private organizations provide health services.

6.4.4 Conclusions and Opinions on the Project

Informed on the project, all target groups felt positive that most of the water problems they are facing nowadays can be addressed. The main suggestion for the project study, mostly in every district with high flood risk, is to have specialists and engineers for water distribution and irrigation and drainage channels.

Farmers are hoping for irrigation systems and political support. They trust that the project might bring a lot profit for farming.

Families, women and elderly people are hoping they will be provided with water supply all day long.

Women report they don’t have equity towards men in general in society, but they have equal access to water.

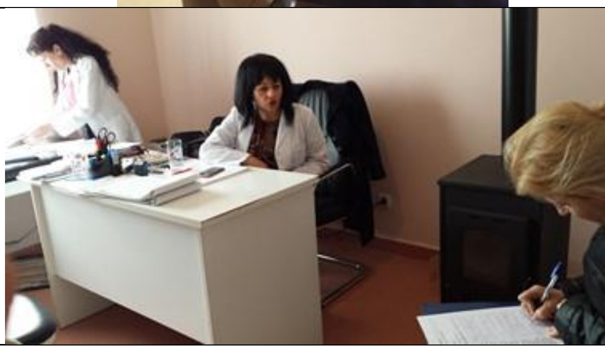
Collecting all the data the, group concerns and it is important to state:

- The assessments aimed to give an overall local data regardless the involvement of different gender or social group level, but with a special focus on the fact that women are a major water customer group and therefore require long-term solutions
- It should be mentioned that the importance of the gender mainstreaming is given to the social aspects and to the environmental impact of the project, in the framework of the improvement of life through the natural water resources
- Mainstreaming Gender Equality is specified in the Stakeholder Report through activities held on site (local engagement level) – questionnaires
- Gender Mainstreaming and Gender Equality is also included in the national Water Management Strategy, and is tailored to the context specificity to the whole issue of water management. This has been taken into account in drafting also the development of the River Basin Management Plans.

Basin	City	Administrative Unit	Focus group or key informants	Photos
Drini-Buna	Shkodër	Shirq	Elderly	
			Woman	
			Farmers	
			Health workers	

Basin	City	Administrative Unit	Focus group or key informants	Photos
		Dajç	Elderly	
			Woman	
			Farmers	
			Health workers	

Basin	City	Administrative Unit	Focus group or key informants	Photos
			Elderly	
	Lezhë	Gjadër	Woman	
			Farmers	
			Roma	

Basin	City	Administrative Unit	Focus group or key informants	Photos
			Woman	
			Farmers	
			Health workers	

6.5 NGO Engagement

Before the meetings with the NGOs were organized a list with all the relevant NGOs with different background that might be helpful for the RBMPs was prepared and requests for meetings were launched. Some of the NGOs have answered the request for arranging the meetings.

The meetings were organized on the 20th and 24th of March 2017 in the NGOs offices.

The project team had conducted a short presentation of the river basin management plans with a main focus on the objective and the purpose of the project. In general, the NGOs support the water management plans development and the programme of measures implementation, and agree with the approach, but they also made some suggestions, as shown in the table below:

Questions/Suggestions	Answer
As water is an irreplaceable asset, can it be exported? This may increase the income and also may help other places that are in need of water.	This is an issue that water management plan cannot give an exact answer to because first we need to define if the water is a product or a resource. This is a decision to be taken by the government and the community of Albania.
The question raised is that before we define the objectives is the actual and real status of the basins evaluated?	It was made a general overview of the river basins and the river basin management plans were then drafted, in line with the relevant national strategy
How will water be managed?	It was developed a strategy for the management of waters based on four principles: - Water for People - Water for Food - Water for the Environment - Water for Industry The individual problems that every river basin faces are part of the management plan of the river basin.
Besides the study, it is needed also a demonstration in practice and monitoring.	
As a priority should be drinkable water for people, as shown in your strategy.	
Irrigation system is overused.	
Suggestion	
There is a lack of drinking water in many areas.	Water should be seen as a natural resource and in the same time as a community service.

Economic and environmental points of view seem somewhat conflicting. Environment concerns from NGOs' point of view relates mostly to the protection of ecosystems, which in a way depend and affect in the same time the water resources.

6.6 Graphs and Main Questions

According to all questionnaires and face to face meetings main questions are raised and displayed in the below graphic:

Each disaggregated data is collected by structured questioned survey with key informants and focus groups.

Recommendations:

Providing a framework for the comprehensive management of water resources, in which all stakeholders, including the private sector, civil society and user communities, regardless of gender, play an active role.

Empowering the importance of the integrated gender perspective in the management of water resources in all life situations

Make it clear (nationwide) that gender equality in institutions at all levels of society (in the family, community organizations, water use associations, local government, national civil services, etc.).