Ministria e Mjedisit, Planifikimit Hapësinor dhe Infrastrukturës
Ministarstvo životne sredine, prostornog planiranja i infrastrukture
Ministry of Envrionment, Spatial Planning and Infrastructure

AGJENCIONI PËR MBROJTJEN E MJEDISIT TË KOSOVËS

KOSOVSKA AGENCIJA ZA ZAŠTITU SREDINE

KOSOVO ENVIRONMENTAL PROTECTION AGENCY

AMMK

REPORT
THE STATE OF WATER IN KOSOVO
2020

Status report of water in Kosovo 2020

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Clarification

The reference to the name of the Ministry in the Report was used according to the respective reporting period before the entry into force of Regulation (NRC) - No. 02/2021 on Areas of Administrative Responsibility of the Office of the Prime Minister and Ministries was approved at the 2nd meeting of the Government of Kosovo, with Decision no. 01/02, dated 26.03.2021.

1. INTRODUCTION

1.1. Introduction

The Report on the State of Water in Kosovo presents the state of water for the period 2015-2019. The report includes the state of surface water, groundwater, Laws and AIs on water, water strategic documents, distribution, hydrographic network, accumulations, exploitation for different sectors, investments, etc. Data for the preparation of the report have been collected from institutions that monitor water quality, water management companies and other governmental and non-governmental institutions which have certain responsibilities in the water sector. Data were also obtained from various sources, such as publications and references of various sources. In the report, the data are presented in textual, tabular form, through figures divided by respective fields and sectors. The report is divided into chapters which are presented in its content. In a separate chapter, the report draws conclusions and provides recommendations for taking appropriate measures to improve the situation.

1.2. General characteristics of Kosovo

Kosovo has a convenient geographical position in the Balkans. It has an area of 10.908 km^2. Latitude and longitude range from 41° 51' 21- 43° 16' and 19° 59'- 21° 47'. It has a population of 1,771,604 inhabitants, with 38 municipalities and 1,469 settlements.

The total boarder length is 743.5 km, and is bordered by 4 countries in the region. The relief is hilly mountainous with an average altitude of 810 m (lowest point 270 m and highest 2,656 m). There are two climates that dominate in Kosovo; middle continental (Kosovo Plain) and with Adriatic influence (Dukagjini Plain).

1.2.1. Hydrography

Kosovo hydrography presents a natural resource that includes surface water and groundwater. The geological composition of the soil and geographical structure determine the natural distribution of the hydrographical network. Kosovo has a diversified network of large and small rivers, artificial and natural water accumulations. In general, water resources in the country have an unequal geographical distribution from one region to another. According to various studies, the Dukagjini Plain is richer in water resources compared to other regions of Kosovo.

1.2.2. Precipitation

Atmospheric precipitation varies from year to year. For the period 2015-2019, as years with the highest precipitation in the country were the years 2016 and 2018, while in terms of regions, the highest precipitation was recorded in the region of Dukagjini (Junik), Tab.1.

Table 1. Total amount of precipitation for the period 2015-2020

	Total amount of precipitation (mm or L / m2) on an annual basis, period 2015-2019					
r.	Data/station	*2015*	*2016*	*2017*	*2018*	*201*
1	Mitrovica	-	759.2	657.6	535.7	554
2	Peja	844.6	972.5	758.2	999.8	901
3	Prishtina	659.5	890.0	703.5	667.5	607
4	Prizren-Automatic	599.1	720.8	621.5	566.4	413
5	Ferizaj	672.6	834.8	752.8	980.3	572
6	Junik	1076.7	1417.5	1137.4	1265.3	102
7	Gjakova-Radoniq	496.7	1020.2	723.6	985.5	912
8	Gjakova-Rakovina	469.2	897.0	731.8	750.8	573
9	Gjilan - Verbica e Zhegovcit	738.2	984.8	629.4	767.2	701
10	Gjilan-Bilinica	721.5	724.8	681.8	680.2	448
11	Gjilan-Prelepnica	679.3	817.9	572.6	577.4	494
12	Kamenica-Desivojce	856.6	917.3	776.6	788.6	626
13	Kameminca-Rogoqic	666.9	757.9	612.9	608.2	521
14	Leposavic	-	-	-	590.2	701
15	Lipjan	-	812.3	608.9	673.7	530
16	Novoberda	634.7	832.0	629.4	543.0	485
17	Peja-Ramun	673.1	978.2	698.7	911.0	825
18	Podujeva-Shajkovc	704.0	575.4	472.7	746.3	601
19	Podujeva-Batllava	-	575.3	601.6	555.6	390
20	Podujeva-Zakut	628.7	813.0	723.6	630.4	511
21	Prizren-Gryka Prizrenit	-	683.4	885.5	855.0	756
22	Suhareka	-	826.2	707.6	885.7	635
23	Suhareka-Budakova	621.7	944	862.8	858.4	700
24	Kotline	702.1	881.9	784.9	1019.2	709
25	Malisheva-Kijev	663.8	811.8	640.9	695.5	547
26	Malisheva	710.5	898.8	710.2	609.3	709

Note:
Automatic station in Prizren - Data is missing for the months 11-12/2018 and 01-02-03-04-05/2019.
Station in Gjakova/Radoniq – Data is missing for the months 07-08-09-10-11-12/2015;
Station in Shajkovc – Data is missing for the months 09-10-11-12/2016 and 01-02-03-04/2017.

1.2.3. Hydrogeology

In terms of hydrogeology, the territory of Kosovo is relatively rich in surface waters (lakes, rivers, streams, etc.), and groundwater, thermal and thermo-mineral waters. However, based on the hydrogeological fact, the waters in Kosovo are still a puzzle and have not

been studied in terms of quantity or any water balance. What is known about the waters of Kosovo is their quality.

Geology and hydrogeology of the "Drini i Bardhë" river basin

In terms of geology, the "Drini i Bardhë" river basin is created by geological formations of different ages, such as:

- Palaeozoic Formations (Pz), Triassic Formations (T), Jurassic Formations (J), Cretaceous Formations (K), Miocene Formations (M), Pliocene Formations (Pl), Quaternary Formations (Q), see Figure 1.

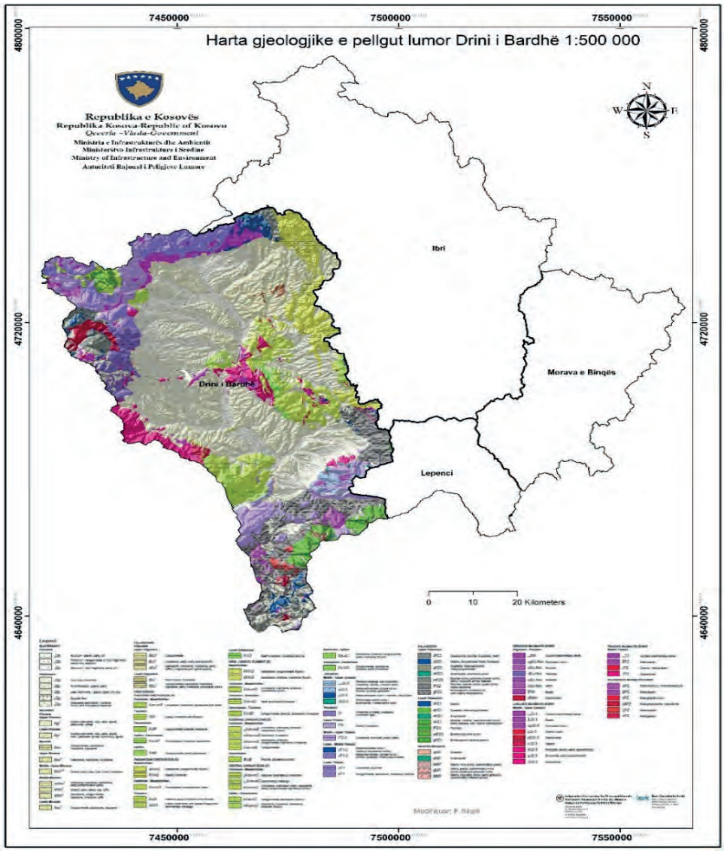

Figure 1. Geological map of the Drini i Bardhë river basin

Based on geological formations and lithological, structural and tectonic features, the "Drini i Bardhë" river basin is distinguished by three main types of aquifers:

- Quaternary alluvial aquifer;
- Miocene and Pliocene aquifer; and
- Carbonate aquifer (see Figure. 2).

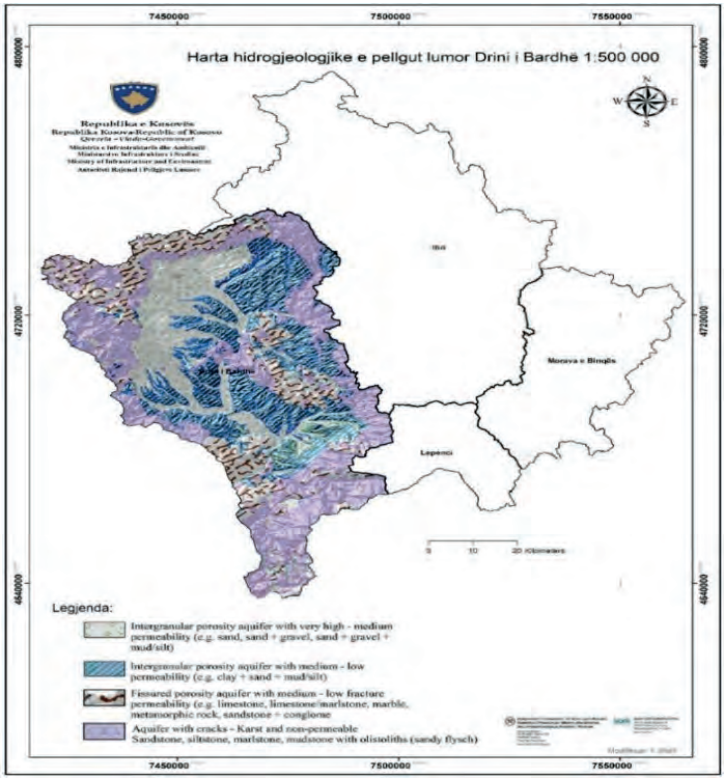

Figure 2. Hydrogeological map of the Drini i Bardhë river basin

Geology and hydrogeology of the Ibër-Sitnica river basin

In terms of geology, the Ibër-Sitnica river basin is created by different geological formations (see Figure. 3).

The Ibër-Sitnica river basin is created by the following rock formations:

- Trepça series formations (sandstone, quartz shale with low degree of metamorphism, quartz and limestone conglomerates);
- Ultrabasic and basic rock formations (serpentine, amphibole, diabase, gabbro);
- Tertiary Formations (Sediments) (Conglomerates and sandstones, clusters, pyroxene andesite);
- Tertiary volcanic rock floor with limestone, serpentines, gabbro, amphibolite, etc. This contact occurs in cracks or wrinkles (El 376 - 1989);
- Contact of shale with limestone, (El- 376, 1989);
- Jurassic Sediments (serpentine, gabbro-amphibolite, breccia and limestone); and
- Lake-river sediments (which extend along valleys and river beds).

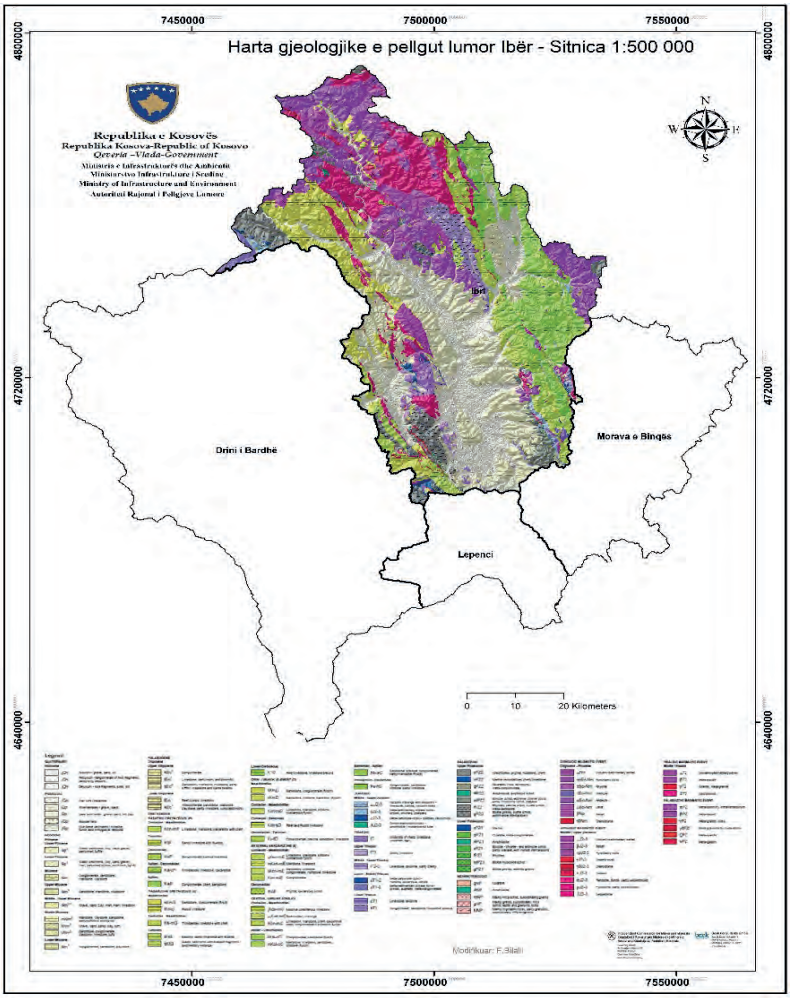

Figure 3. Geological map of the Ibër-Sitnica river basin

Hydrogeological characteristics of the Ibër-Sitnica river basin – this river is known for its rich water resources and is crossed by four rivers: Ibër, Sitnica, Lushta and Trepça. In this river basin is also located the artificial lake Ujman, with a capacity of 395 million m^3, and other water sources which are located in the region of Shala e Bajgores.

The catchment area of the Ibër River basin with its tributaries in Sitnica, Lushta, Trepça and Bistrica rivers has a catchment area of 4,035 km^2. The length of the Ibër River in the territory of Kosovo is only 42 km (only 15 km in the territory of the Municipality) and with an average inflow of 32.6 m^3/sec.

The average annual amount of water in the Ibër River catchment area is 1,146.33 million

m^3. The depth of the catchment varies, because Ibër River has formed its river bed in different geological layers (see Figure. 4). In the hilly area, in order to improve the flow regime of the Ibër River and the rational and highly functional use of water, a dam has been built, creating Lake Ujmani (Gazivoda), water volume of which is 390,000,000 m^3. Water of this reservoir is used for drinking, industry, irrigation and power generation.

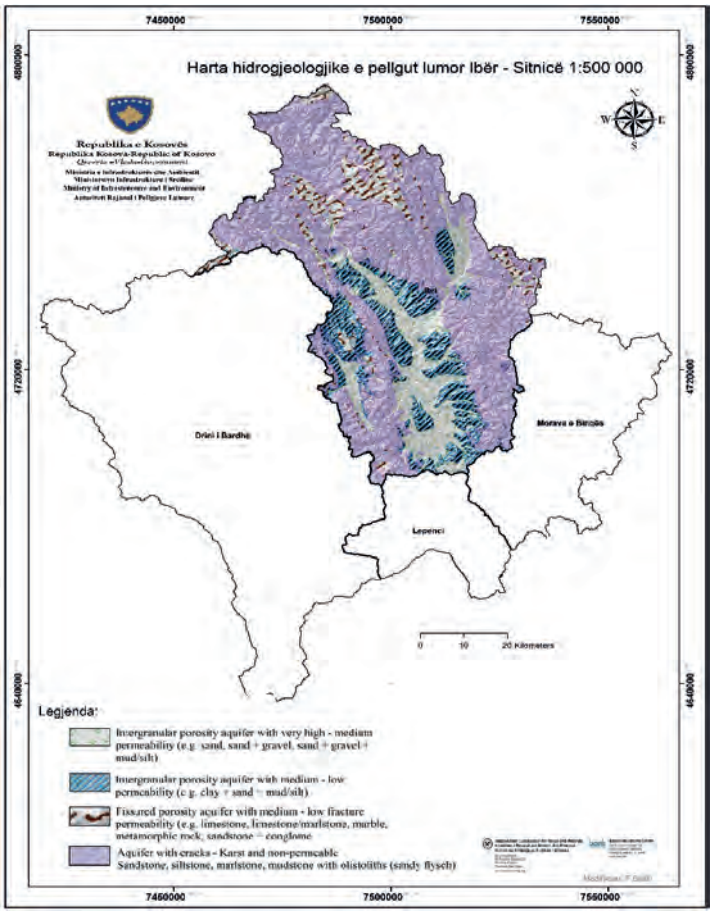

Figure 4. Hydrogeological map of the Ibër-Sitnica river basin

Geology and hydrogeology of the Morava e Binçës river basin

The Morava e Binçës river basin is distinguished by new Cenozoic formations. The conglomerate, gravel and sand sediments of the Neogene age dominate, making this area more homogeneous in lithological terms (see Figure. 5).

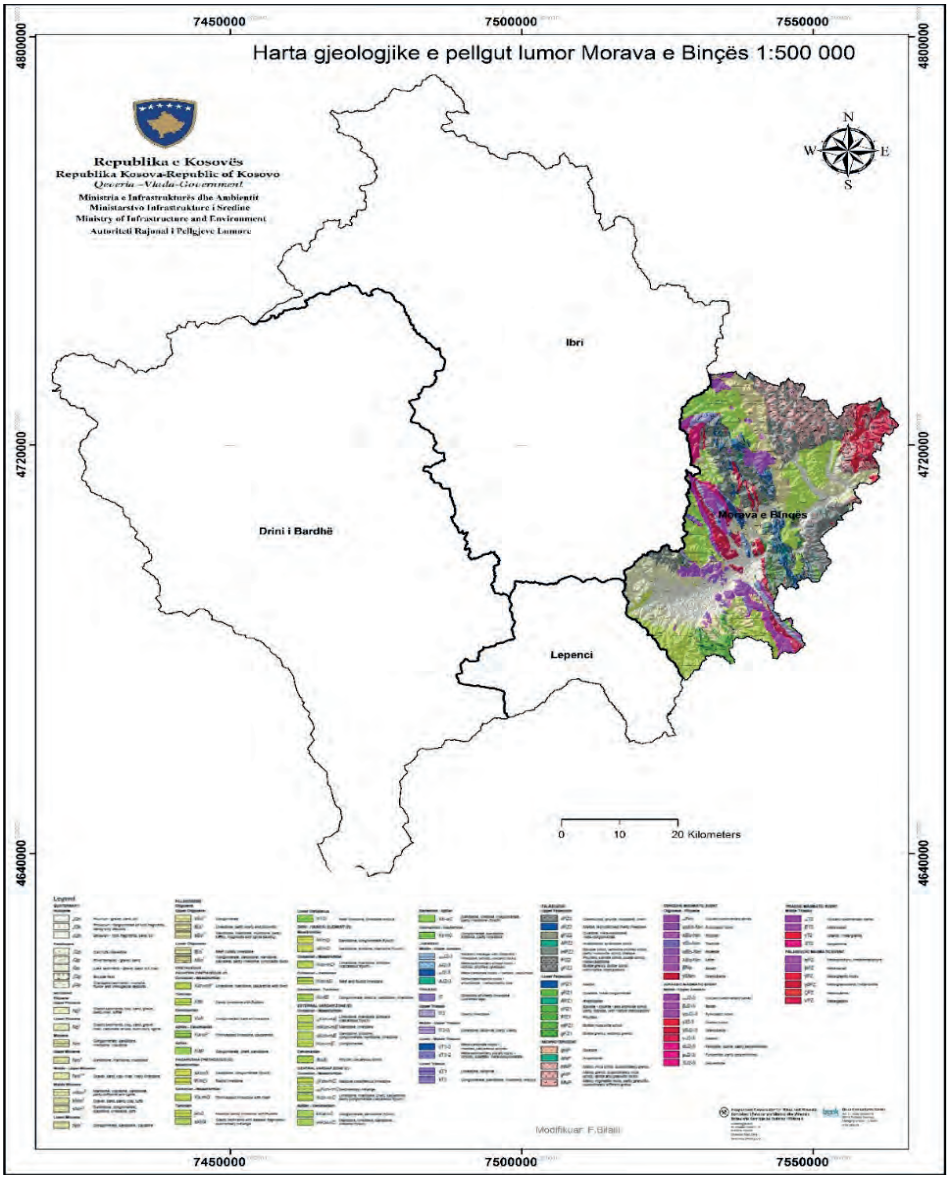

Figure 5. Geological map of the Morava e Binçës river basin

Hydrogeological characteristics of the Morava e Binçës river basin - new sediments are especially important in terms of hydrogeology, especially those of the Neogene and Quaternary Period. Rocks of this period are characterized by sands, gravels and clays, which play the role of groundwater collectors (see Figure. 6). The Morava e Binçes River flows through the Anamorava Plain with its tributaries, such as: Karadak, Llapushë, Livoq, Stanishor, Përlepnica and Krivareka rivers.

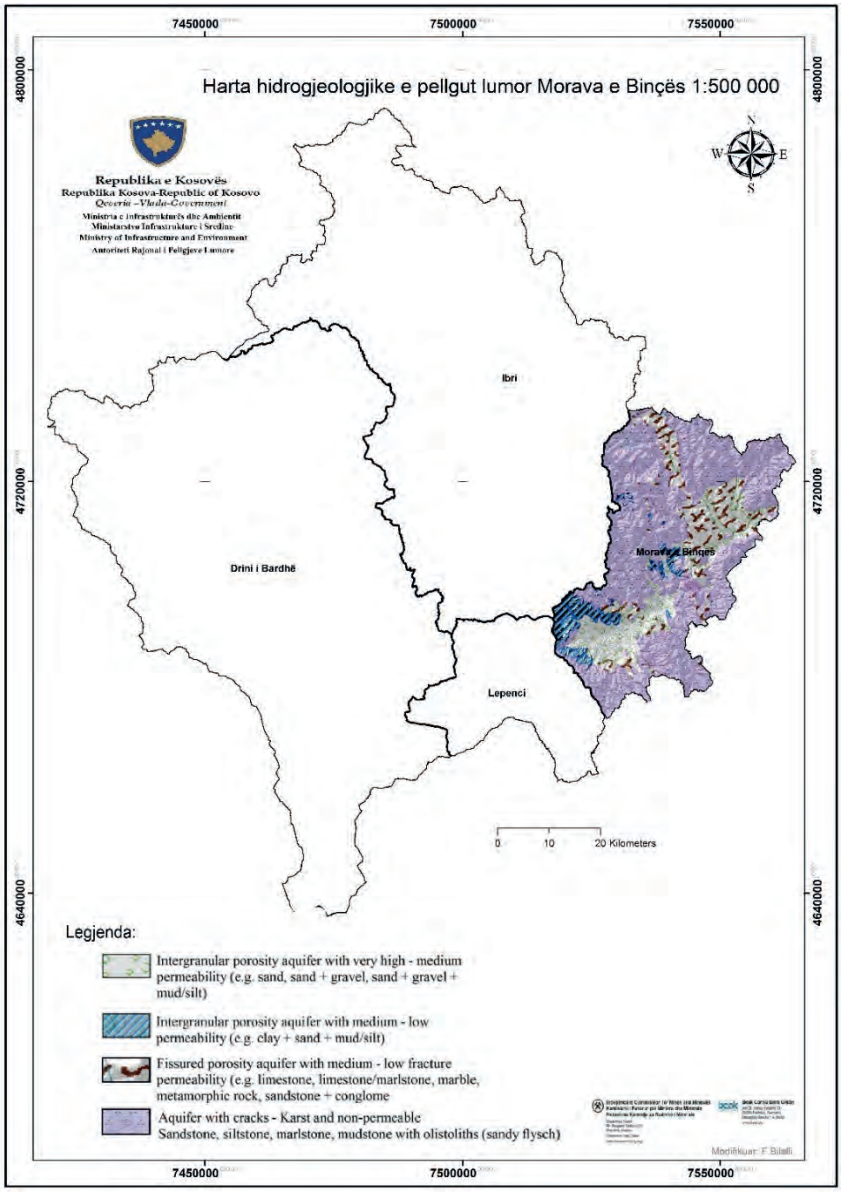

Figure 6. Hydrogeological map of the Morava e Binçës river basin

Geology and hydrogeology of the Lepenc river basin

In terms of geology, the Lepenc river basin is created of different lithostratigraphic units. The oldest series is the Paleozoic - biotitic shale, gneisses, marbles and amphibolies. Between them lie diabase formations - clayey, sandstone and ultrabasic sediments. Upper Cretaceous limestone and fissures form part of the Jurassic deposits. Sedimentary deposits belong to Neogene period.

In the Lepenc river valley there are alluvial deposits, while sinter lenses appear in the southern part of the basin (calcareous from Calcium and Magnesium) (see Figure. 7).

The Lepenc River Basin is created by the following geological components: Palaeozoic Deposits (Pz), Jurassic Deposits (J), Cretaceous Deposits (CR23), Pliocene Deposits (N2), Quaternary Deposits (Q1), alluvial sediments, River Sediments.

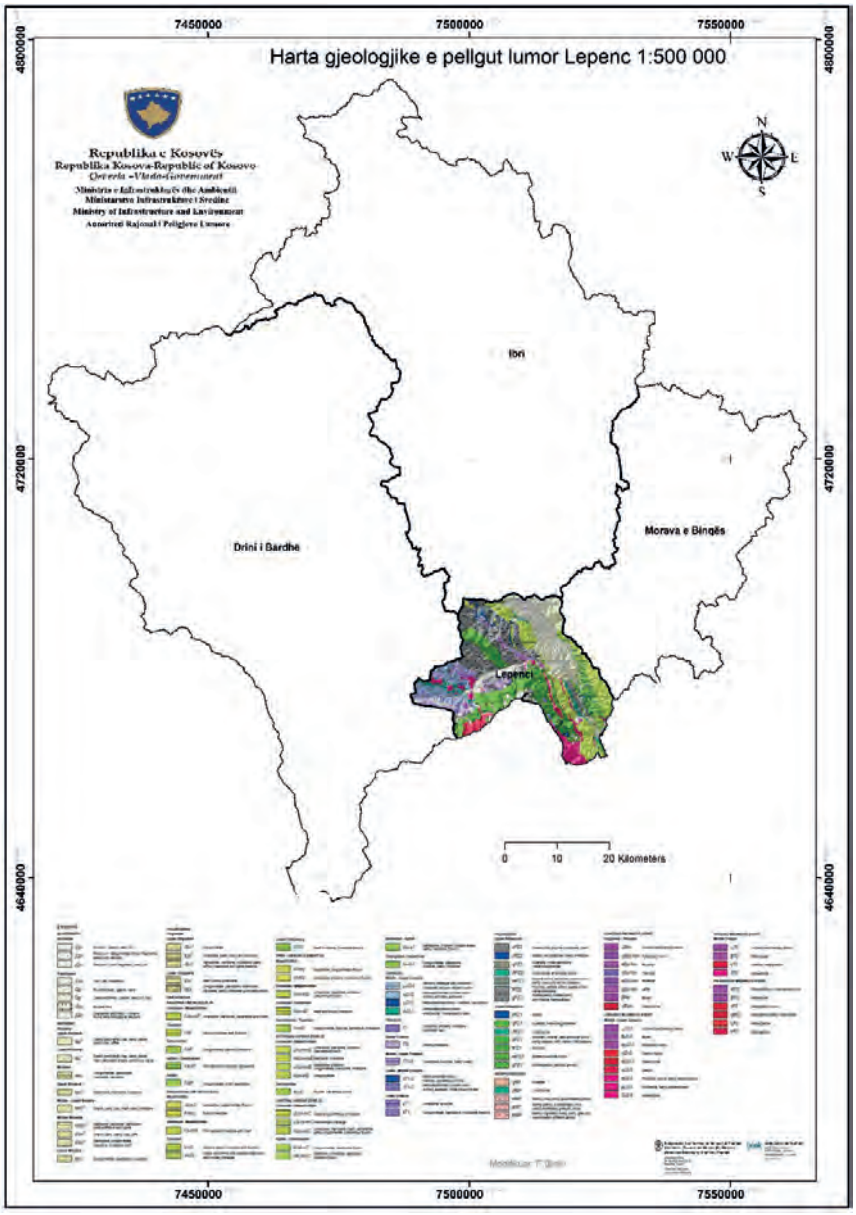

Figure 7. Geological map of the Lepenc river basin

Hydrogeological characteristics of the Lepenc river basin – it is very rich in surface water and groundwater. In the Lepenc river basin we find almost all aquifers, which we have classified into four categories (see Figure. 8).

- Intergranular porosity aquifer with very high permeability;
- Intergranular porosity aquifer with a medium permeability;
- Aquifers with cracks - hard karst; and
- Very hard Karst Aquifer (rocks).

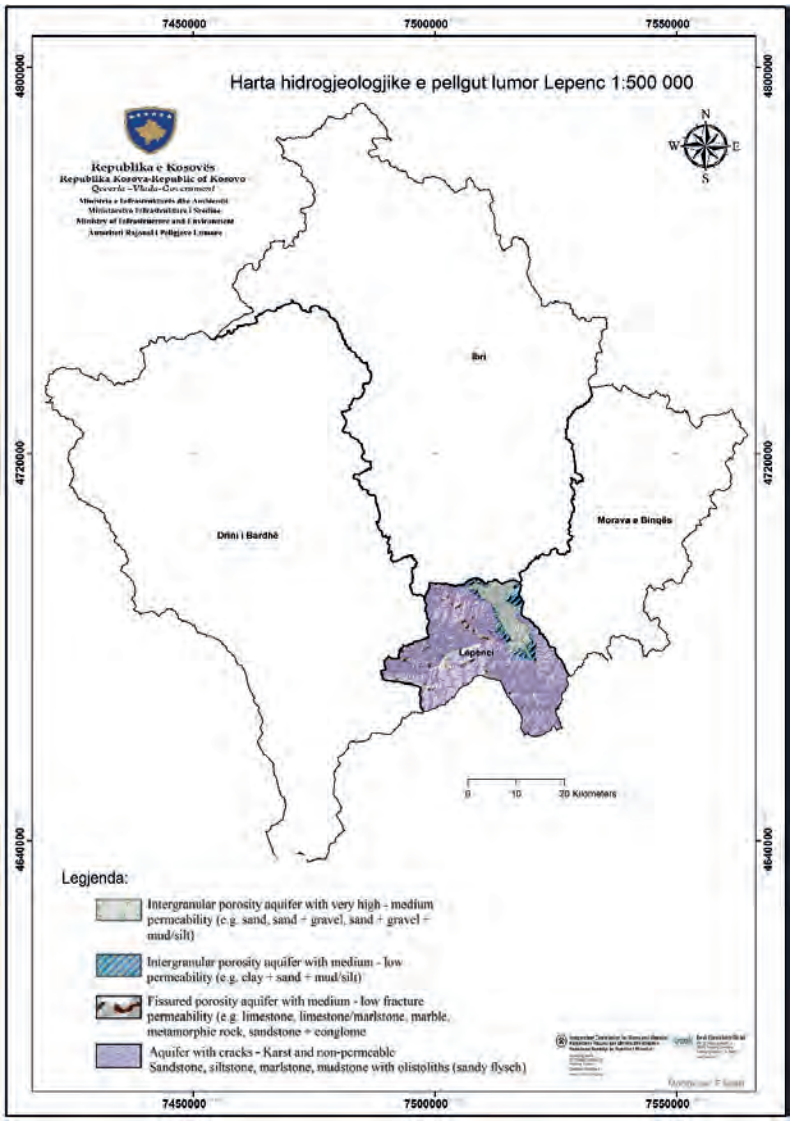

Figure 8. Hydrogeological map of the Lepenc River Basin

2. LEGAL FRAMEWORK AND RESPONSIBLE INSTITUTIONS

The Republic of Kosovo has undertaken the adoption of EU environmental standards and substantial progress has been made in the development of legislation related to environmental protection in general, including water protection. Harmonization of Kosovo legislation with the EU Acquis is assessed by monitoring the transposition and implementation progress of the legislation. A considerable number of environmental laws have been reviewed and adopted in recent years by the Assembly of Kosovo. The MESO has made evident progress in adopting secondary legislation as well (administrative instructions, regulations, decisions, etc.). It has also approved the Kosovo National Water Strategy, which will affect the development of water resources.

2.1. Legal and Strategic Framework

2.1.1. Laws, Administrative Instructions and Decisions in the water sector

During the recent years, the MEE has drafted a number of laws, administrative instructions and the water strategy. Laws, AIs and decisions (primary and secondary legislation) in the water sector constitute the legal basis governing the water management sector in Kosovo. Primary legislation includes the following basic laws:

Law No. 04/L-147 on Waters of Kosovo – The purpose of this Law is:

- to ensure sustainable development and utilization of water resources, which are essential to public health, environmental protection and social-economic development of Kosovo;
- to establish procedures and guiding principles for optimal allocation of water resources based on use and purpose;
- to ensure protection of water resources from pollution, overuse and misuse,and
- to determine the institutional framework for administration of water resources.

Law No. 02/l-79 on Hydro-meteorological activities - Is another important law for the water sector, which aims to regulate hydro-meteorological activities and how they are conducted.

Law No. 02/L-78 on Public Health - This law determines institutions responsible for enforcing health policies and stipulates duties of the National Institute of Public Health, which, among others, include drinking water quality monitoring.

Law No. 03/L-086 on the Activities of Water, Wastewater and Waste Services Providers - Is an important law that establishes the Water and Waste Regulatory Office (WWRO) and constitutes the legal framework for the economic regulation of public companies providing water and wastewater services.

Law No. 02/L-9 on the Irrigation of Agricultural Lands - This law regulates the organization and administration of irrigation and drainage of agricultural land in Kosovo, competences and delineation of responsibilities of irrigation and drainage entities, establishment and registration of irrigation companies, federations, their organization, fees for water for irrigation, business of associations and other issues related to irrigation and drainage.

Secondary legislation

The following administrative instructions were drafted and signed as part of obligations deriving from the Law on Waters and the Law on Public Health:

- Administrative Instruction No. 30/2014 30/2014 on conditions, manner, parameters and limit values of wastewater discharge into public sewage system and in the water body;
- Administrative Instruction No. 26/2013 determining verification and legitimization of the water inspectorate;
- Administrative Instruction No. 12/2013 on the water information system;
- Administrative Instruction No. 16/2012 on the quality of water used for human consumption;
- Administrative Instruction No. 28/2013 on protected sanitary zones;
- Administrative Instruction No. 19/2015 on protection from harmful water activities;
- Administrative Instruction No. 02/2016 on water payment structure;
- Administrative Instruction No. 16/2017 on the classification of surface water bodies;
- Administrative Instruction No. 17/2017 for the classification of groundwater bodies;
- Administrative Instruction No. 15/2017 on criteria for determining sanitary protection areas for water resources;
- Administrative Instruction No. 11/2016 on determining measures and actions for protection from erosion;
- Administrative Instruction No. 04/2016 on the criteria and procedures for the protection of water streams and accumulations;
- Regulation No. 02/2016 on the manner for determining the acceptable ecological flow;
- Administrative Instruction No. 05/2016 on regulation of water resources status;
- Administrative Instruction No. 20/2015 on bathing zones;
- Administrative Instruction No. 09/2016 on the organizational structure and additional tasks of the river basin regional authority;
- Administrative Instruction No. 05/2016 on regulation of water resources status;
- Administrative Instruction No. 09/2017 instruction for design, construction and use of dams;
- Administrative Instruction No. 03/2018 on procedures for water permit;

2.1.2. Kosovo National Water Strategy 2017-2036

The Kosovo National Water Strategy is one of the main documents of water resource planning in the Republic of Kosovo. This document represents a legal obligation pursuant to Article 31 of the Law No.04/L-147.Through this document, the Government aims to address and guide policy, operational and investment developments in the water sector for a 20-year timeframe. The purpose of the strategy is to ensure integrated and sustainable development of the water sector by meeting the following needs:

- Drinking water supply,
- Water for food production,

- Water for irrigation of agricultural land,
- Water for industry,
- Sports and recreation, and
- Electricity generation.

2.1.3. Water monitoring plan and programs

The water monitoring program is drafted by the Ministry and is approved by the Government. The monitoring program is drafted for a period of forty (40) years, with the possibility of review, amending and supplementing based on the monitoring data[1]. The competent authority for the implementation of monitoring is KHMI.

The Surface and Groundwater Monitoring Program of the Republic of Kosovo aims to:

- Monitor the quality of surface and groundwater in a systematic and coherent way,
- Fulfil the obligations provided for by local laws and pursuant to WFD 2000/60 EC and EU's surface and groundwater directives;
- Facilitate the decision-making procedures;
- Ensure reliable data on the quality of surface and groundwater.

The surface and groundwater monitoring program includes:

- Grid location of sampling site;
- Number of sampling frequencies;
- Physical-chemical parameters (heavy metals and pesticides), and biological elements presented in table form;
- Radioactive parameters in the water;
- Presentation of monitoring sites on the map; and
- Cost and financial analysis of implementation[2].

2.2. European Union Water Directives

List of guidelines from the questionnaire guide, Annex 34_Acquis,ch 27: Environment and Climate Change, from the monitoring of the European Commission for the Annual Report of Kosovo.

Council Directive 91/676/EC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources, as amended by Regulations No. EC/1882/2003 and EC/1137/2008

Council Directive No. 91/271/EEC of 21.05.1991 concerning urban wastewater treatment, as amended by Directive No. 98/15/EC and Regulation EC/1882/2003 and Regulation EC/1137/2008.

Council Directive No. 98/83/EC of 03.11.1998 on the quality of water intended for human consumption, as amended by Regulations No. EC/1882/2003 and EC/596/2009

1 Law no. 04 / l-147 on Waters of Kosovo, Assembly of the Republic of Kosovo, 2013

2 Surface and Groundwater Monitoring Program 2014-2015, MESP, date: 26.03.2014, Nr. SP1451 / 14.

Directive No. 2000/60/EC of the European Parliament and of the Council of 23.10.2000 establishing a framework for Community action in the field of water policy, as amended by Decision No. 2455/2001/EC and Directives No. 2008/32/EC, 2008/105/EC and 2009/31/E

Directive No. 2009/90/EC of 31 July 2009 laying down, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, on technical specifications for chemical analysis and monitoring of water status (Text with EEA relevance).

Directive No. 2006/7/EC of the European Parliament and of the Council of 15.02.2006 concerning the management of bathing water quality and repealing Directive No. 76/160/EEC, as amended by Regulation No EC/596/2009.

Directive No. 2006/11/EC of the European Parliament and of the Council of 15.02.2006 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (repealing 76/464/EEC) (codified version) (to be repealed as of 22.12.2013 by Directive 2000/60/EC).

Directive No. 2006/118/EC of the European Parliament and of the Council of 12.12.2006 on the protection of groundwater against pollution and deterioration

Directive No. 2007/60/EC of 23 October 2007 on the assessment and management of flood risks (Text with EEA relevance).

Directive 2008/105/EC of 16 December 2008 on environmental quality standards in the field of water policy as amended by Directive 2013/39/EU amending Directives 2000/60/EC and 2008/105/EC as regards Priority substances in the field of water policy.

Drinking Water Directive (98/83/EC)

Nitrates Directive (91/676/EEC)

2.3. Responsible Institutions

There is number of central and local level institutions, as well as public enterprises that deal with water protection and administration.

2.3.1. According to the Law No. 04/L-147 on Waters of Kosovo, the **MEE/RBDA** has the following responsibilities:

- ✓ drafting laws and bylaws, strategies, plans and policies related to all water resources issues in the Republic of Kosovo;
- ✓ implementation of laws and bylaws in the field of water resources, including other environmental laws;
- ✓ administration and management of all water resources in the territory of the Republic of Kosovo;
- ✓ conducting all duties and administrative, professional, organizational and development activities obliged by this Law;

- ✓ close cooperation with other line ministries in the Republic of Kosovo regarding water resources and living environment; and
- ✓ Cross-border cooperation with neighbouring countries and beyond in the field of water resources.

2.3.2. Inter-Ministerial Water Council is a coordinating and decision-making body that examines systematic issues of water, harmonization of different needs and interests, and proposes measures for the development, utilization and protection of water resources and system of Kosovo.

- Provides opinions and recommendations on water issues in the country:
- Proposal for laws and other bylaws relating the regulation of matters in the field of water in general;
- Implementation of laws and bylaws relating to water management;
- Drafting and approval of the Kosovo National Water Strategy;
- Policy development in the field of water;
- Resolving the financial policy in the field of water.

2.3.3. Kosovo Environmental Protection Agency (KEPA) has been established by the Ministry and, pursuant to the Law on Environmental Protection, has the following responsibilities:

- ✓ to provide proper information for administration, Government and Kosovo Assembly for the implementation of environmental protection policies;
- ✓ to develop and coordinate unique system of information on environmental protection regarding to system for conduction of environmental state in Kosovo as well as collecting the records for environment;
- ✓ emplacement and keeping of referent centers with data base regarding to environmental
- ✓ monitoring (socioeconomic records, pressures on environment, state and quality of environment);
- ✓ to develop procedures for elaboration of data gathered for environment and their evaluation (modelling, presentation and visualization);
- ✓ to accomplish professional tasks – consulting during the designation of content, methodology and manner of conducting of environmental state;
- ✓ to progress and compare the quality data for environment;
- ✓ to compile reports for certain issues for environmental protection, such as regions with increased radioactivity, environmental quality, health and similar;
- ✓ to compile report for certain fields as region with additional radioactivity, environmental quality, health and similar;
- ✓ to give advices for determination, keeping and following-up projects and programs for environmental protection;
- ✓ to support administrative bodies on developing of new forms of policy for environmental protection and monitoring the implementation of environmental protection plans and programs;

- ✓ to cooperate with European Environmental Agency – EEA, that is on composition of European Environment Information and Observation network – EIONET;
- ✓ to cooperate with institutions and other international organizations of European Union for environmental protection;
- ✓ to ensure approach on all information for environment in Kosovo according to the standards of EEA;
- ✓ Utilization and interstate exchange of the environmental data shall be regulated by special law.

Kosovo Hydrometeorological Institute (KHMI), under the Law on Waters of Kosovo, is responsible for the implementation of the Monitoring Program which is drafted by the Ministry and approved by the Government for a period of forty (40) years with the possibility of reviewing, amending and supplementing, based on monitoring data.

Also, this institute is responsible for monitoring the quantity and quality of surface water, groundwater and reservoirs.

Whereas, regarding the responsibilities in the basic law, respectively the Law on Hydrometeorological Activities, this institution has the following responsibilities:

- ✓ planning, construction, equipping, maintenance and development of national systems or networks of meteorological, hydrological stations, air quality and water stations;
- ✓ systematic measurements and monitoring (observations) of hydrological, meteorological elements and phenomena through the national hydrological and meteorological network system, including radar observation system, monitoring system of air, water and soil;
- ✓ development, establishment and functioning of computer and telecommunications systems for collection, processing, exchanging and distribution of data and information on the current situation, and climate and hydrology weather forecast and data on monitoring air, water and soil quality;
- ✓ development and updating the database of meteorological and hydrological data, including air and water quality, collection, control (validation) processing, publication and archiving of the data;
- ✓ support by warnings and reports to the competent institutions of central and local levels in case meteorological and hydrological disasters occurrence, with importance for flooding protection, the phenomenon of ice and other disasters and catastrophes of meteorological and hydrological changes in quality of air, water and soil, associated with breakdowns and other listed pollutants;
- ✓ monitoring and analysis of changes in the state of weather, climate, water resources and water regime of surface and groundwater, solar radiation, potential solar, wind and water energy;
- ✓ development and user of different types of models for weather forecasting, climate change, depositing and disbursement (transport) of pollutants in the atmosphere,

including air, water and soil pollutants;
- ✓ testing and calibration of measuring instruments used in the field of meteorology, hydrology, air monitoring and laboratory instruments, in compliance with the national and international legislation;
- ✓ development of meteorological system in preventing (fighting) hail and other types of modifications (artificial actions) of the weather, as well the study of artificial activities methods of weather and climate;
- ✓ Hydrometeorological cross-border activities relating to the quality of air and water for water management and environmental purposes according to the requirements of the responsible institutions;
- ✓ staff training and professional development in the field of meteorological and hydrological activities, according to the criteria prescribed by the World Meteorological Organization;
- ✓ national and international cooperation in the field of meteorology and hydrology by enforcing standards and principles of international conventions in the field of hydrometeorology, monitoring and research of climate change, air, water and soil quality;
- ✓ other Hydrometeorological works which are determined by the law that is in interest for Kosovo;

Kosovo Hydrometeorological Institute (KHMI) represents the State in the field of meteorology and hydrology, and carries out the functions of state Hydrometeorological institution in international organizations of Meteorology and Hydrology.

2.3.4. National Institute of Public Health (NIPH), under the Law on Waters of Kosovo is an institution responsible for monitoring the quantity and quality of water used for human consumption and water service providers.

Otherwise, it is a Health Institution within the Ministry of Health that prepares and implements the public health strategy (Hygienic-sanitary measures, prophylactic-counter-epidemic measures, social and medical measures, health promotion, health education, quality control of air, water, food, EPI (Expanded Programme on Immunization), health policy and health economics, health information) throughout the territory of Kosovo.

2.3.5. Local government – Municipalities have the following duties and responsibilities:
- ✓ Issue water permits pursuant to sub-legal act on water permits;
- ✓ Protect from water damages, erosion and other harmful activities in urban and sub-urban areas harmful water actions and protection from erosion and other harmful actions in urban areas, and city borderlines;
- ✓ Draft protection program for harmful water effects;
- ✓ Protect river beds, banks of water streams, canals, tunnels and water reservoirs within urban areas;

- ✓ The Municipality and the Authority determine the measures and works for the protection of erosive areas and regulation of streams based on the technical documentation and in accordance with the plans for the management of river basins;
- ✓ Funding for the maintenance and regulation of streams and activities for protection from erosion shall be conducted by the Ministry, Municipalities and the Authority;
- ✓ Manage flow regulation facilities in urban areas and undertake all necessary measures to regulate flows in urban areas;
- ✓ Municipalities and the Authority are obliged to take all measures for the regulation of streams in urban areas and river basins;
- ✓ Municipalities and the Authority are obligated to notify the Minister within a short -terms in cases of risk from erosion and streams;
- ✓ The Ministry, in cooperation with the Ministry of Health, Municipalities and Water Service Providers, determine swimming areas based on the relevant sub-legal act.

2.3.6. River Basins District Authority (RBDA)

The River Basins District Authority is an authority established by and reports to the Ministry, which aims to administer water according to the Law on Waters of Kosovo in the territory of certain basins, with which Kosovo is treated as a river basin region.
The River Basins District Authority shall be obliged to:

- ✓ collect data needed for resource determination, quantities and features of waters;
- ✓ undertake necessary measures for the preservation of surface and underground waters;
- ✓ compile estimates for each water basin;
- ✓ provide management with parts of the international basin, in the territory of Kosovo;
- ✓ manage and maintain the register of water protected zones;
- ✓ develop plans for managing the waters for basin;
- ✓ compile and implement the program of monitoring and measures;
- ✓ attend to implementation of the measures for protection from harmful water impacts in the basin;
- ✓ collect, process and attend to the data on observing the waters;
- ✓ collect and process data for registry of water facilities and equipment;
- ✓ establish, prepare and attend to the registry of pollutants in the basin;
- ✓ propose expropriation of land in which there are underground waters, necessary for public supply;
- ✓ collect funds from the compensation, contributions, budget, grants;
- ✓ performs financial-administrative tasks in the relevant basin;
- ✓ apply technical methods for the preservation of waters; and
- ✓ perform additional tasks, determined by sub-legal act by the Ministry.

2.3.7. Water Services Regulatory Authority (WSRA) as an independent authority is responsible for regulating the activities of water service providers in Kosovo.

The WSRA role is to ensure the provision of quality, efficient and secure services on a non-discriminatory basis for all consumers in Kosovo, taking into account the protection of the environment and public health.

This Authority, according to Law no. 05/L-042 for Regulation of Water Services, reports to the Assembly of Kosovo and is responsibilities for:

- ✓ licensing service providers and supervision of application of conditions defined with service license;
- ✓ tariff setting of service for service providers, ensuring the tariffs to be fair and reasonable, and to enable financial sustainability of service providers;
- ✓ installing Service Standards and supervision of application by service providers of such standards;
- ✓ performance monitoring of service providers to estimate if they fulfil the conditions defined by service license as well as the targets defined by tariff process;
- ✓ establishment and support of consumer consultative committees in seven Kosovo regions;
- ✓ drafting and approving regulations, standards and regulatory decisions in compliance with authorizations based on this law and other applicable laws;
- ✓ inspection of service standards and supervision of implementation of Authority`s legal acts.

2.3.8. Public Enterprises / Companies – public enterprises, regional irrigation and water supply companies are established according to the Law No. 05/L-009 on amending and supplementing the Law No. 03/L-087 on Publicly Owned Enterprises, amended and supplemented by the Law No. 04/L-111, and are classified into the following groups: Central Publicly Owned Enterprises, Regional Irrigation Companies, Regional Water Companies, and Local Publicly Owned Enterprises.

Central Publicly Owned Enterprises: Public Company Hydro-system "Iber Lepenc" JSC, as inheritor of the former Publicly Owned Enterprise "Iber-Lepenc", Hydrometric Public Enterprise "Iber Lepenc" JSC and Hydroeconomic Enterprise Iber - Lepenc JSC is responsible for assets, properties and enjoys the rights and obligations that come as a result of this transformation. The Company, within its scope of activities has the following responsibilities:

Supply with raw water, accumulated in Lake "Ujman", of the following users:

- ✓ Industry (Trepça, KEK and Feronikel)
- ✓ Regional Water Supply (Mitrovica and Prishtina) and
- ✓ Agriculture (Maintenance and supply of irrigation network up to hydrant).
- ✓ Generation and sale of electricity;
- ✓ Maintenance and operation of hydrometric facilities of the Enterprise;

- ✓ Protection of hydro-system facilities from water;
- ✓ Protection of water in hydro-system facilities from pollution;
- ✓ Cultivation and sale of fish in hydro-system facilities;
- ✓ Cultivation and sale of mushrooms in hydro-system facilities;
- ✓ Necessary activities related to the implementation of the second phase Lepenci; and
- ✓ Other activities, in accordance with the nature of the enterprise activity.

Regional Water Companies:

Irrigation Company "Drini i Bardhë" JSC in Peja, and Irrigation Company "Radoniqi-Dukagjini" JSC in Gjakova, within the scope of the Company, its responsibilities are;

- ✓ Water supply service
- ✓ Maintenance of irrigation system(s)
- ✓ Water collection and distribution
- ✓ Low and high construction of irrigation facilities, control gates and dams
- ✓ The company operates as a general public service
- ✓ The company will perform any action in order to obtain the necessary permits, authorizations, licenses and approvals for the performance of its activities, for which these administrative documents are required.
- ✓ General public service activity.

Regional Water Companies:

Regional Water Company "Prishtina" JSC in Prishtina, Regional Water Company "Hidrodrini" JSC in Peja, Regional Water Company "Mitrovica" JSC in MItrovica, Regional Water Company "Hidromorava" JSC in Gjilan, Regional Water Company "Radoniqi" JSC in Gjakova, within their scope of activity have the following responsibilities:

- ✓ Drinking water supply service.
- ✓ Maintenance of drinking water supply system(s);
- ✓ Production and / or purchase of drinking water to meet consumers demand;
- ✓ Wastewater collection, disposal and treatment services;
- ✓ Maintenance of wastewater systems and their plants.
- ✓ The company can carry out any type of financial or commercial operation, which is directly or indirectly related to its facility, within the limits provided for by applicable law.
- ✓ The company will take any action to obtain necessary permits, authorizations, licenses and approvals for the implementation of its activities, for which these administrative documents are required.

Regional Water Company, "Hidroregjioni Jugor" J.S.C in Prizren, within its scope of activity has the following responsibilities:

- ✓ Water storage, treatment and distribution (provision of water supply services to consumers);
- ✓ Other specialized construction works;
- ✓ Road transport of goods;
- ✓ Canalized transport through pipelines;
- ✓ Warehousing;
- ✓ Leasing of own real estate;
- ✓ Consulting and providing software(s);
- ✓ Architecture, engineering and consulting activities;
- ✓ Cleaning and avoidance of polluting waters, waste treatment, similar sanitary activities,
- ✓ Carrying out any kind of financial or commercial operation, which is directly or indirectly related to its facility, within the limits provided for by applicable law;
- ✓ The company will take any action to obtain necessary permits, authorizations, licenses and approvals for the implementation of its activities, for which these administrative documents are required.

Local Publicly Owned Enterprises:

Water and Waste Company "Ibar" (Zubin Potok);
Water and Waste Company "24 November", Leposavic;
Regional Water Company "Bifurkacioni" J.S.C, Ferizaj:

2.3.9. Kosovo Geological Survey (KGS) – The with Law No. 06/L-039 on Kosovo Geological Service stipulates the following duties and responsibilities for KGS:

- ✓ basic geological surveys, applied geological surveys, important for the Republic of Kosovo
- ✓ systematic land and lake based geological studies in the territory of the Republic of Kosovo, through complex cartography of various scales;
- ✓ geochemical studies of the territory of Kosovo and to compile geological maps on various scales;
- ✓ thorough scientific studies on geology and metalogeny, studies and geophysical research of any scale for the purpose of studying the earth's crust in or near the surface of the earth, formations affected by horizontal and vertical internal distribution of physical properties in different geological field;
- ✓ studies to promote the perspective of useful minerals and their economic evaluation;

- ✓ hydrogeological studies and research, underground waters, mineral and geothermal water;
- ✓ geological-engineering and geometry research and studies;
- ✓ complex geological studies for the geo-environment in the function of territorial planning;
- ✓ geo-monuments' studies and evaluations;
- ✓ researches and evaluations of metal, non-metal, and energy minerals, hydrocarbons, industrial minerals, precious and semi-precious stone;
- ✓ general paleontological, stratigraphic, sedimentologic, petrographic, mineralogical, chemical, geomorphological, geodynamic, geological, geo-structural and geo-statistical research and studies;
- ✓ conducts qualified services, expertise, consultations, geological research monitoring, prepare projects for other public institutions for geological-engineering and geotechnical research, and other works under this Law;

2.3.10. Non-Governmental Organizations (NGOs) in accordance with Law No. 06/L-043 on Freedom of Association in Non-Governmental Organizations have the responsibility to:

- ✓ Exercise its activity independently from state institutions.
- ✓ Public institutions shall make public all forms of cooperation and support of NGOs.

Also the Law No. 03/L-025 on Environmental Protection stipulates that:

- ✓ On compiling of local environmental plans and programs shall participate the public, NGO, professional organizations and business community (Article 24).
- ✓ Article 44 stipulates that: Awards and gratitude for achievements in the field of Environmental Protection may be made for prevention of environmental pollution.

Article 20 of the **Law no. 04 /L-147 on Waters of Kosovo** stipulates that: With the purpose of development and researching and projecting progres, the Ministry shall establish the Kosovo Institute for Waters as an independent body.

3. WATER RESOURCES MANAGEMENT

The competent authority for water resources governance and management in the Republic of Kosovo is the Ministry of Environment and Spatial Planning (MESP), and is supported by the Kosovo Environmental Protection Agency (KEPA), which monitors the state of the environment.[3]

3.1. Water planning and management

The River Basins District Authority (hereinafter RBDA) handles Kosovo water resources planning and management, and operates within the Ministry of Economy and Environment.

Within the RBDA there are three divisions:

- Division for Water Resources Planning (DWRP),
- Division for Water Resources Management (DWRM),
- Division for Water Payments and Projects (DWPP).

3.1.1. Water Information System (WIS)

Water Information System (WIS) operates within the Division for Water Resources Planning. Information Water System consists of databases, archived data, catalog information, the book of water, information technology communication network with GIS (Geographic Information System) rules, forms, procedures and activities to use the data and system.

The Information Water System includes data on:

- ❖ Water quantity and quality,
- ❖ Water protocol and cadastre of the water system,
- ❖ Protocol of all water permits,
- ❖ Register of all substances discharged by water permit holders,
- ❖ Rehabilitation measures and water protection programs,
- ❖ Water damage incidents and environmental accidents,
- ❖ Register of substances hazardous to public health and the environment,
- ❖ Hazardous substance impact analyses and
- ❖ Register with data of existing constructions, installations or landfills that are hazardous.

According to the Administrative Instruction 12/2013 for the Water Information System, the duties and responsibilities of the Water Information System are as follows:

- collection, storage, recording and storage of data in an organized system;
- design and management procedures to manage data or information (preparation, transmission, updating, presentation, distribution of information);

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- control system upgrade for the validity of the data or information from the areas of water management;
- registration, insurance, protection, maintenance of data, support for the development of the database system and its supporting material;
- organization of the database for advanced water technology;
- fulfil legal obligations to inform the public on national level, international standards and conventions of the International Union of Waters;
- Exchange and harmonization of data, information with other information systems counterparts.

3.1.2. Water protection

In order to protect Kosovo's waters, the principles of sustainable management must be adhered, which is also the objective of the Kosovo National Water Strategy.

Water protection is a challenge for all institutions that are responsible for the water management. The current state of wastewater treatment in the Republic of Kosovo is in the phase of continuous investments, starting from the feasibility study for the seven large urban centers, to continue with smaller settlements, business centers, etc. With the support of external donors, wastewater treatment feasibility studies have been carried out for seven regional centers, that of the region of Prizren, Gjakova, Peja, Gjilan, Ferizaj, Mitrovica, Pristina. The feasibility study for the region of Prizren, Gjakova, and Peja was funded by KfW (German Development Bank) and the Government of Kosovo, while the feasibility study of urban water treatment for the region of Gjilan, Ferizaj, Prishtina, and Mitrovica was funded by the EU.

Also, the Swiss Government is investing in the field of water treatment in rural areas with the feasibility of 18 settlements, where four settlements are being implemented, that of Orllan – Municipality of Podujeva, Marmull – Municipality of Gjakova, Lokvica – Municipality of Prizren and Shallc – Municipality of Vushtria, with an approximate value of EUR 1.2 million.

Water pre-treatment requires taking some actions, like;

- collection of household wastewater (public sewerage system)
- collection of extractive and processing industry wastewater (special systems)
- collection of storm water (rain, snow, etc. - public systems)
- wastewater treatment (infrastructure)
- monitoring of wastewater discharge parameters in the recipient.

Wastewater Treatment Plants have been constructed in Llausha – Municipality of Skenderaj, Harilaq village, Dubrava and Lipjan prisons, Business Park in Drenas, and others with lower capacity and cost.

The following measures are applied for water protection;

- Floods (regulation of river segments, biological measures, flood protection walls, gabions, embankments, etc.)
- Overflows (protective walls, rising of the terrain with artificial filling, etc.)
- Erosion (mountain slopes, afforestation, forest protection, etc.)
- Drainage (drainage canals, etc.)
- Drying (drainage canals, filling, injections, etc.)
- Drought (early warning systems)
- Climate change

3.1.3. Water and sanitary protected areas

A protected water area is a geographically defined water area, known with clear physical boundaries and managed through legal or other effective means, to achieve long-term preservation/protection, as well as the values of its ecosystem.[4], [5]

Protected water areas are:

- sanitary protected areas;
- protected areas for strategic purposes; and
- ecologically protected areas (Natura 2000)[6]

Sanitary protected areas are zones that are being used and can be used in the future for water supply of the population. Sanitary protected areas and their protective measures are intended to protect water resources from adverse effects which may impair normal condition and stable water quality and quantity[7].

Sanitary protected areas are divided into three areas:

Area I – Strictly protected area - designated for strict and direct protection around water source and the installation facilities to take water and protecting water source from discharges of pollutants that can directly affect the water by human activity.

Area II - Limited protective area - the surface of this area shall be sufficient to provide protection from movements of microbial and chemical contaminants, and other types of pollutants**.**

Area III – Moderate regime protective area - surface of the area presents preventive protection of water source relevant basin and increases efficiency of protection from chemical and radioactive pollution.

Protected water areas are declared by the Government, at the proposal of the relevant ministry of environment.

In Kosovo, 34 Sanitary Protected Areas have been declared so far (see Table 2).

4 B. Mustafa, E. Hoxha, "Biodiversiteti dhe Zonat e Mbrojtura", Prishtina, 2004.
5 Law no. 81/2017 on Protected Areas, Assembly of the Republic of Albania, 2017.
6 Law no. 04 / l-147 on Waters of Kosovo, Assembly of the Republic of Kosovo, 2013
7 Administrative Instruction No. 28 on Sanitary Protected Areas, MESP, Republic of Kosovo, 2004

Table 2. Water resources as protected areas

No.	Basin	Name of Source	Signed by the Government	Decision protocol No.
1	DB	BD. Accumulation "RADONIQ", Municipality of Gjakova	24.04.2013	09/127
2	DB	FB. Source of " ISTOG", Municipality of Istog	24.04.2013	10/127
3	DB	FB. Source of "Vrelle", Municipality of Istog	24.04.2013	11/127
4	DB	MG. Sources of "Goç, Lipovice and Livadhe"	24.04.2013	12/127
5	DB	MG. Source of "Shkoze" Municipality of Malisheva	24.04.2013	13/127
6	DB	MG. Source of "Drini i Bardhë"	24.04.2013	14/127
7	DB	MG. Source of "Uji i Zi, Uji i Bardhë, Galerija and Drenazha"	24.04.2013	15/127
8	I	BD. Accumulation of "BADOVC"	24.04.2013	16/127
9	I	BD. Accumulation of "BATLLAVE", Municipality of Podujeva	24.04.2013	17/127
10	MB	SR. Source of "BAJA"	24.04.2013	18/127
11	MB	SR. Source of "GURI I HOXHES"	24.04.2013	19/127
12	MB	SR. Source of "LETNICË", Municipality of Vitia	24.04.2013	20/127
13	MB	SR. Accumulation of "PERLEPNICA" Municipality of Gjilan	24.04.2013	21/127
14	L	SL. Source of "PRROI I SYLES" in Municipality of Ferizaj	24.04.2013	22/127
15	L	LM. Source of "PRROI I PUKES" in Municipality of Ferizaj	24.04.2013	23/127
16	L	LM. Source of "LUMI I VOGEL" in Municipality of Ferizaj	24.04.2013	24/127
17	DB	MG. Jarine Wells in Klinafc, Municipality of Klina	18.06.2014	02/191
18	DB	MG. Wells in Klina and capture in the river Drini i Bardhë, Municipality of Klina	18.06.2014	03/191

19	DB	MG. Wells 1,2,3 in Fidanishte and 1,2,3, in Topallnica, Municipality of Suhareka	18.06.2014	04/191
20	DB	MG. Pusi i Atit 1,2,3,4,5 në Malsi të re (Shpenadi), Municipality of Suhareka	18.06.2014	05/191
21	DB	MG. Wells 1,2,3 in Banja-Malisheva, Municipality of Malisheva	25.06.2014	02/192
22	DB	MG. Capture on the river Radeshe, Municipality of Dragash	25.06.2014	03/192
23	DB	MG. Bunarllyk 1,2 and wells 1,2,3, Municipality of Prizren	25.06.2014	04/192
24	DB	MG. 40 Wells at the bridge, Municipality of Prizren	25.06.2014	05/192
25	DB	MG.Vrella in Semetisht, Municipality of Suhareka	28.08.2015	10/46
26	DB	MG. Vrella in Reshtan, Municipality of Suhareka	28.08.2015	09/46
27	DB	MG. Wells and captures Sallagrazhd, Municipality of Suhareka	28.08.2015	08/46
28	DB	MG. Drainage I and II with catchments-SOPI, Municipality of Suhareka	28.08.2015	07/46
29	DB	SR. Wells in the Municipality of Lipjan - Paper Factory - Municipality of Lipjan	28.08.2015	11/46
30	DB	Well 1,2,3 in Samadraxhe, Municipality of Suhareka	28.08.2015	04/46
31	DB	MG. Vrella and well in Doberdelan, Municipality of Suhareka	28.08.2015	05/46
32	DB	MG. Vrella in Studençan, Municipality of Suhareka	28.08.2015	04/46
33	DB	MG.”Vrella Mushitisht” in Mushitisht, Municipality of Suhareka	28.08.2015	03/46
34	DB	MG.”Pusi Juglindor” in Savrove, Municipality of Suhareka	28.08.2015	02/46

Note: DB-Drini Bardhe; I-Iber; L-Lepenc; MB-Morava e Binçes

Protected areas for strategic purposes - areas used for strategic purposes. Responsible for defining the boundaries of strategic protected areas is the ministry in cooperation with line ministries, municipalities, the community living in the vicinity of the area, and civil society.

The Ministry drafts the proposal on establishing a working group for the delimitation of the strategic protected area. The decision is issued by the Prime Minister of Kosovo. We do not yet have a protected area for strategic purposes.

Ecological protected areas (Natura 2000) - Natura 2000 is the main EU policy system for the protection of nature and biodiversity. It is an extensive network of protected areas in the EU. The purpose of this ecological network is to ensure long-term survival of endangered species and habitats[8].

3.1.4. Sensitive water areas

Sensitive areas are not yet defined in the territory of our country. Sensitive areas must be determined by decision of the Minister in accordance with the AI No. 30/2014, mainly for water areas where water is used for drinking (lakes), with monitoring of nitrates and phosphates.

3.1.5. Water basins and sub-basins

Kosovo has four water basins, such as:

- Drini i Bardhe River Basin,
- Iber River Basin,
- Morava e Binçës River Basin and
- Lepenci River Basin (Fig. xx).

For the division of water sub-basins in Kosovo as a basic criterion is taken by assessing the distribution of surface and groundwater bodies. There are a total of 82 water sub-basins, which we will present in tabular form as well as in the thematic map of informative character (Table 3 and Figures 9, and 10).

8 https://www.eea.europa.eu/themes/biodiversity/natura-2000/the-natura-2000-protected-areas-network

Table 3. Water sub-basins

No.	Name of the sub-basin	PAR	CODE		No.	Name of the sub-basin	PAR	CODE
1	Beranica River Sub-Basin	04	04_01		42	Ceran River Sub-Basin	02	02_12
2	Cernica River Sub-Basin	04	04_02		43	Bistrica River Sub-Basin	02	02_13
3	Pasjan River Sub-Basin	04	04_03		44	Llap River Sub-Basin	02	02_14
4	Perlepnica River Sub-Basin	04	04_04		45	Soqana River Sub-Basin	02	02_15
5	Shtrember River Sub-Basin	04	04_05		46	Leposavic River Sub-Basin	02	02_16
6	Gercanica River Sub-Basin	04	04_06		47	Trudan River Sub-Basin	02	02_17
7	Llapushnice River Sub-Basin	04	04_07		48	Dren River Sub-Basin	02	02_18
8	Livoq River Sub-Basin	04	04_08		49	Bistrica River Sub-Basin	02	02_19
9	Gryka River Sub-Basin	04	04_09		50	Trbicka River Sub-Basin	02	02_20
10	Sojeves River Sub-Basin	04	04_10		51	Drenova River Sub-Basin	02	02_21
11	Zhegre River Sub-Basin	04	04_11		52	Joshanica River Sub-Basin	02	02_22
12	Prroni i thate River Sub-Basin	03	03_01		53	Drenica River Sub-Basin	02	02_23
13	Krivenik River Sub-Basin	03	03_02		54	Brosovaca River Sub-Basin	02	02_24
14	Perroni i madh River Sub-Basin	03	03_03		55	Lushta River Sub-Basin	02	02_25
15	Rapot River Sub-Basin	03	03_04		56	Bërnjaçka River Sub-Basin	02	02_26

16	Dubrava River Sub-Basin	03	03_05		57	Siçevë River Sub-Basin	02	02_27
17	Karacheva River Sub-Basin	03	03_06		58	Rovacki River Sub-Basin	02	02_28
18	Bicevaqka River Sub-Basin	03	03_07		59	Zubin Potok River Sub-Basin	02	02_29
19	Ortica Sub-Basin	03	03_08		60	Pades River Basin	02	02_30
20	Radushka River Sub-Basin	03	03_09		61	Kosareva River Sub-Basin	02	02_31
21	Kotline River Sub-Basin	03	03_10		62	Banjska River Sub-Basin	02	02_32
22	Kalludre River Sub-Basin	03	03_11		63	Lucka River Sub-Basin	02	02_33
23	Murzica River Sub-Basina	03	03_12		64	Zupqan River Sub-Basin	02	02_34
24	Lumi i thate River Sub-Basin	03	03_13		65	Gadime River Sub-Basin	02	02_35
25	"Suhareka" River Sub-Basin	03	03_14		66	Shtime River Sub-Basin	02	02_36
26	Susic River Sub-Basin	03	03_15		67	Gerkaja River Sub-Basin	02	02_37
27	Lumi i thatë River Sub-Basin	03	03_16		68	Dobrava River Sub-Basin	02	02_38
28	Rikovc River Sub-	03	03_17		69	Erenik River Sub-Basin	01	01_01
29	Tatnjanka River Sub-Basin	03	03_18		70	Plava River Sub-Basin	01	01_02
30	Plesinac River Sub-Basin	03	03_19		71	Lumbardh i Pejes River Sub-Basin	01	01_03
31	Prishtevka River Sub-Basin	02	02_01		72	Istog River Sub-Basin	01	01_04
32	Sudimla River Sub-Basin	02	02_02		73	Restelica River Sub-Basin	01	01_05
33	Smrekovnice River Sub-Basin	02	02_03		74	Bistrica e Deqanit River Sub-Basin	01	01_06

34	Tërstena River Sub-Basin	02	02_04		75	Mirusha River Sub-Basin	01	01_07
35	Janjeva River Sub-Basin	02	02_05		76	Shushice River Sub-Basin	01	01_08
36	Gracanica River Sub-Basin	02	02_06		77	Prizren Bistrica River Sub-Basin	01	01_09
37	Zhegovc River Sub-Basin	02	02_07		78	Toplluga River Sub-Basin	01	01_10
38	Kamenica River Sub-Basin	02	02_08		79	Klina River Sub-Basin	01	01_11
39	Vuqina River Sub-Basin	02	02_09		80	Prue River Sub-Basin	01	01_12
40	Bari River Sub-Basin	02	02_10		81	Ribinicka River Sub-Basin	04	04_12
41	Lumi i zi River Sub-Basin	02	02_11		82	Llastice River Sub-Basin	04	04_13

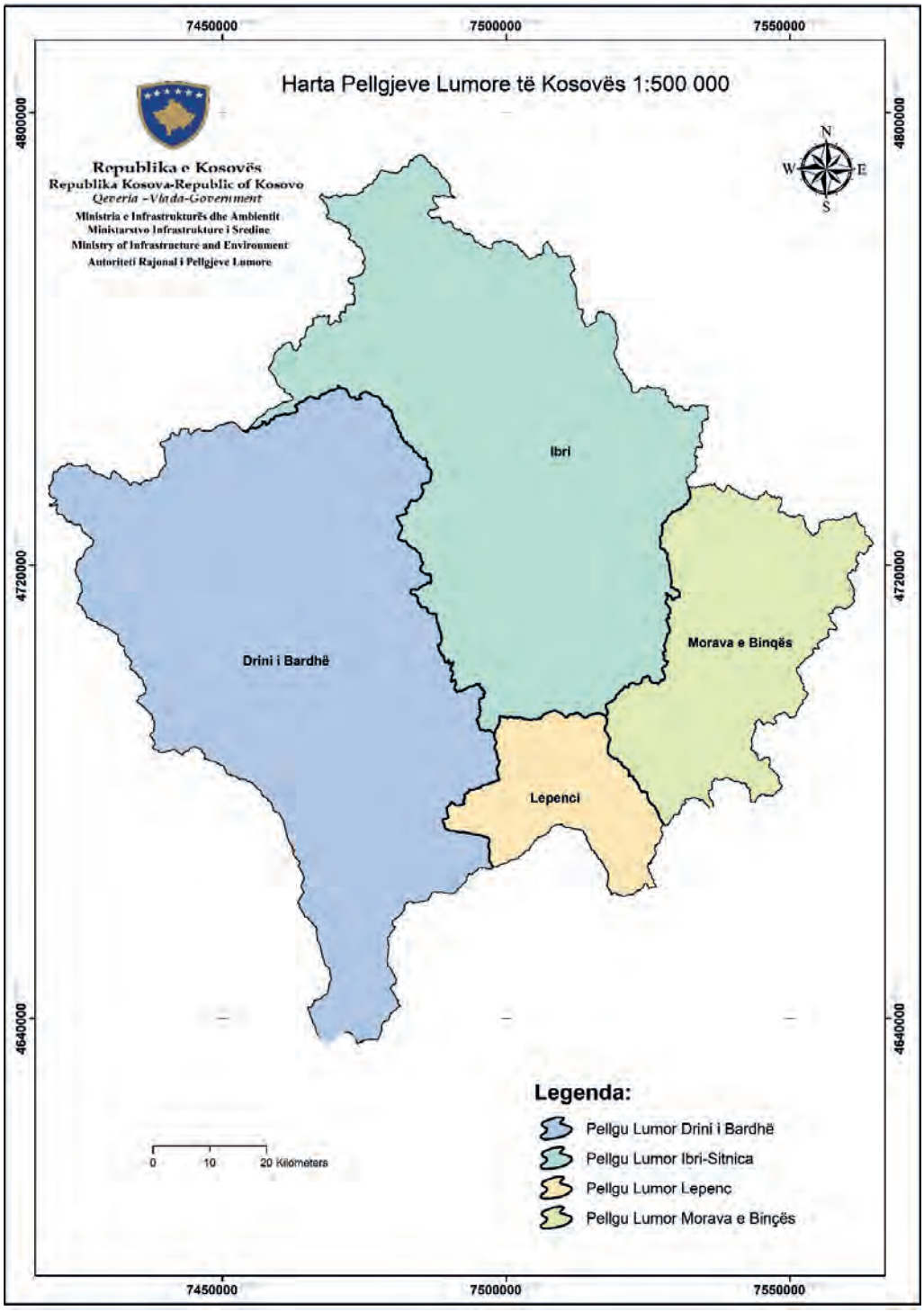

Figure 9. Map of Kosovo river basins

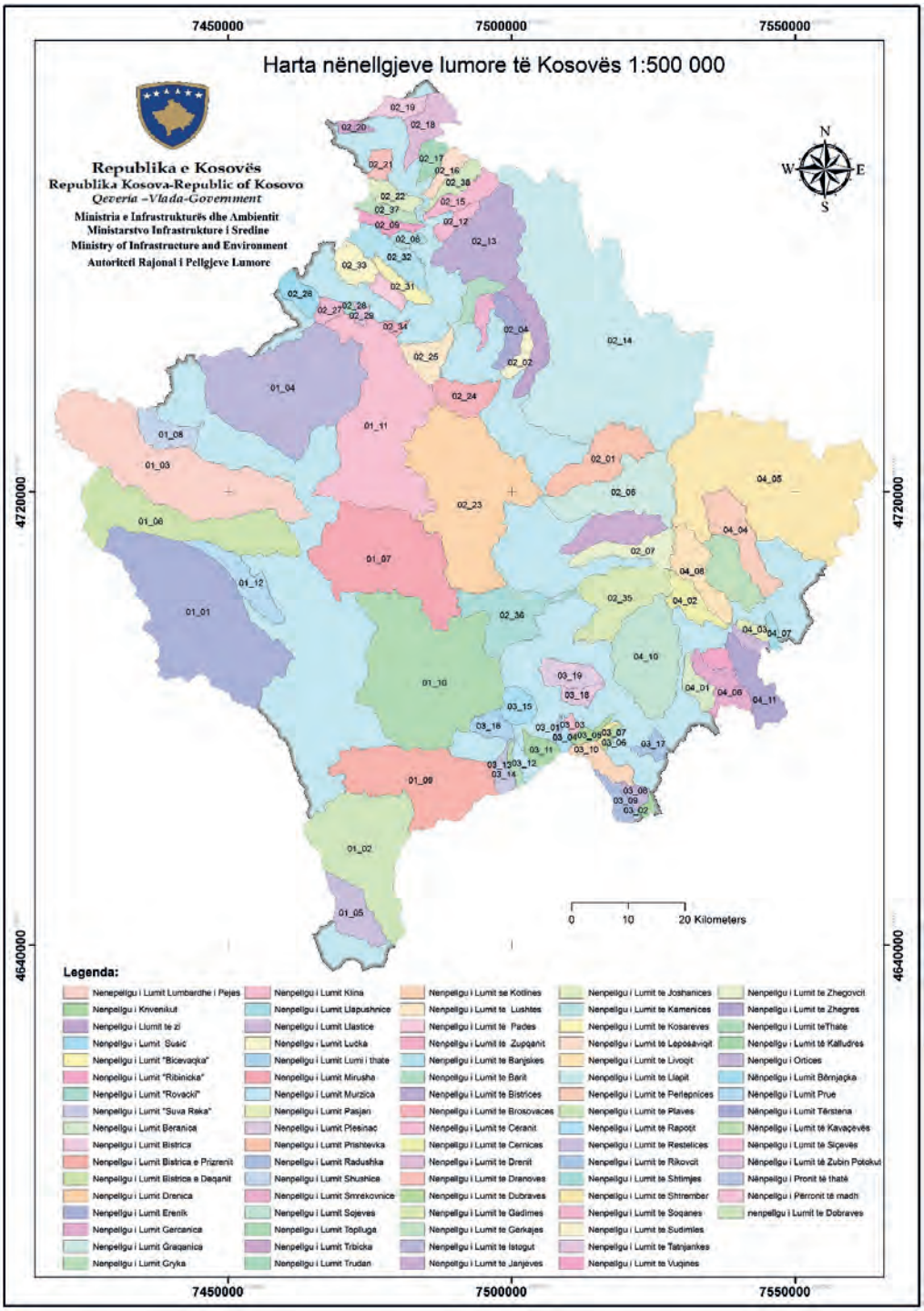

Figure 10. Map of Kosovo river sub-basins

Surface waters (rivers and river basins)

The topographic catchment area in Kosovo is 11,645 km^2, while existing accumulations reaches 569,690.00 m^2. Rivers with the greatest annual flux are located in the basin of Drini i Bardhë in the Dukagjini Plain.

In hydrographical terms, Kosovo is divided into 4 river basins (fig. 11):[9]

- **Drini i Bardhë** with its tributaries (Lumëbardhi i Pejës, Lumëbardhi i Deçanit, Erenik River, Istog River, Klina River, Mirusha River, Rimniku River, Toplluha River and Lumëbardhi i Prizrenit**),**
- **Iber with its tributaries** Sitnica (Gracanica, Prishtevka (Prishtina River), Sllakovaqa, Studime, Sazlia, Caraleva, Llapi, Drenica, Trepça, Smrekovnica, Gojbule, Dumnica), and Lushta, Kozareva, Bajska, Kamenica, Vuça, Gërkaja, Jashanica, Borogllava, Vraqeva, Trebiçka, Bistrica, Ceraja, Mushnica, Dubrava, Jagnjeniqa, Brusovaqa, Bernjaka, Çeçeva, Zubodolli (Albaniku), Zubqana, Drena, Tverdan, Leposavic and Sllatina,
- **Morava e Binçës with its tributaries** Kriva Reka, Desivojca, Perlepnica, Gjilani, Livoçi, Cernica, Smira, Pogragja, Llashtica, Ribniku, Svintulbkes, Llapushnica, Pasjani, Zhegra, Letnica, Pakita (Beranica),
- **Lepenci with its tributaries** Nerodime, Ortica, Kavaqeva, Dubrava, Biqeva, Verbeshtica, Suva Reka, Sushica, Ropoti, Prroi i Thatë, Murzhica, Kotlina, Koshtanjeva, Kerveniku.

  Plava River with its tributaries Restelica River, Brod, Radesha, Kapra, Karaxha, Renci, Belobrada, Brodosava, Bljaqa.

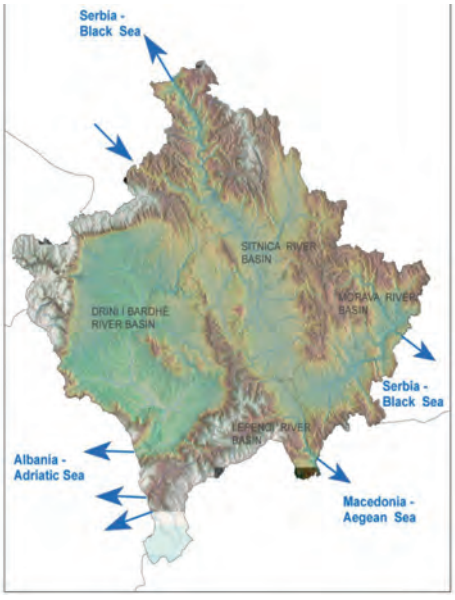

Figure 11. Map of river basins

9 MESP / KEPA - Report on the State of Water in the Republic of Kosovo, Prishtina 2015

The most important rivers are:

- Drini i Bardhë
- Lumbardhi i Pejës
- Lumbardhi i Deçanit
- Lumbardhi i Prizrenit
- Ereniku
- Toplluha
- Mirusha
- Klina
- Istogu
- Ibri
- Sitnica
- Llapi
- Drenica
- Lepenci
- Morava e Binçës and
- Kriva Reka (Table 4).

Table 4. Basic data on rivers and water basins

River	Area (S) km^2	Length of river (L) km	Flow (Q) m^3/S	(q) l/sec/ km^2	Slope %	Perimeter of basin (km)	Annual flow $x10^6/m^3$	Effective precipitation (mm)	Avg. precipitation (mm)	Coefficient of flow	Flows into
Drini i Bardh	4340.14	110.7	61.7		2.1	409.8	1946	452.5	900	0.508	
Sushica	49.4	17.25			9.4	32			1150		
LB.i Pejës	464.8	54	10.21	24.13	2.5	128	200.66	760.1	1168	0.651	
LB. i Deçanit	259.3	53	7.84	42.46	3.2	105	152.46	1337.4	1530	0.874	
Ereniku	519.3	51.74	12.16	26.73	3.9	109	383.04	841.8	1515	0.716	
Istogu	405.3	19.74	6.98		4.5	87			1200		
Klina	458.7	72.12	2.8	4.92	4.5	126	65.52	154.9	750	0.221	
Mirusha	336.7	37	1.661		1.7	83			700		
Toplluha	495	34.05	3.44		3.5	108			1000		
LB. Prizrenit	247.8	36.07	6.49	29.68	7.4	77	147.74	935.1	960	0.974	
Plava, Restelica	341.86	22.12	5.25	20.79	5.9	90.56	165.06	655	1080	0.644	

Basin total	4682	110.7	61.01		2.1	409.8	1946	452.5	900	0.508	
Ibri	4044.21	89.5	36.4	6.39	0.3	436.8	1148	218.4	782	0.301	
Sitnica	291.2	78	13.94	5.38	1.1	276	439.11	169.5	690	0.258	
M. Binçes	1564	76	8.7	5.99	1.5	216	330	188.8	736	0.256	
Kr. Reka	640.7	44.5	4.43	7.27	1.2	128	139.55	229.1	736	0.311	
Lepenci	653	50	8.4	14.91	4.6	130	190	469.8	912	0.516	
Nerodime	209.4	38.5			2.1	81.5			750		
Total	10907.00		121.2				3.8*10*				

3.1.6. Lakes (artificial lakes, natural lakes)

Within the territory of Kosovo, 6 infrastructural accumulations of surface waters have been built, as presented in the table. (Table 5), (Fig. 12)

Table 5. Surface accumulations in the territory of Kosovo

			Volume million m³					**Destination**		
Reservoir	River	Area of water catchment	Users	Total	Construction year	Height of dike	Territory by irrigated system	Irrigation	Drinking water	Industry
Ujmani/Gazivoda	Ibër	1060	350	390	1979	101	Mitrovica, Vushtrri, Prishtina, Skenderaj Drenas Zub.Potok	20000 ha	Yes	Yes
Batllava	Batllava	226	25.1	30	1960	46	Prishtina Podujeva	No	Yes	Yes
Badovci	Gracanica	103	20	26.4	1963	45	Prishtina	No	Yes	Yes
Livoç	Livoç	53.6	-	-	-	-	Gjilan	No	No	No
Radoniq	Përrue	130	102	116.6	1982	61	Gjakova Rahovec Prizren	10000 ha	Yes	No
Prilepnica	Prelepnica	62	-	-	1982	40	Gjilan	No	Yes	No
Total		1634.6	497.1	563						

Figure12. Hydrographical network map and surface accumulations of Kosovo[10]

According to the Strategic Water Plan, other accumulations are planned to be built (see Figure 3).

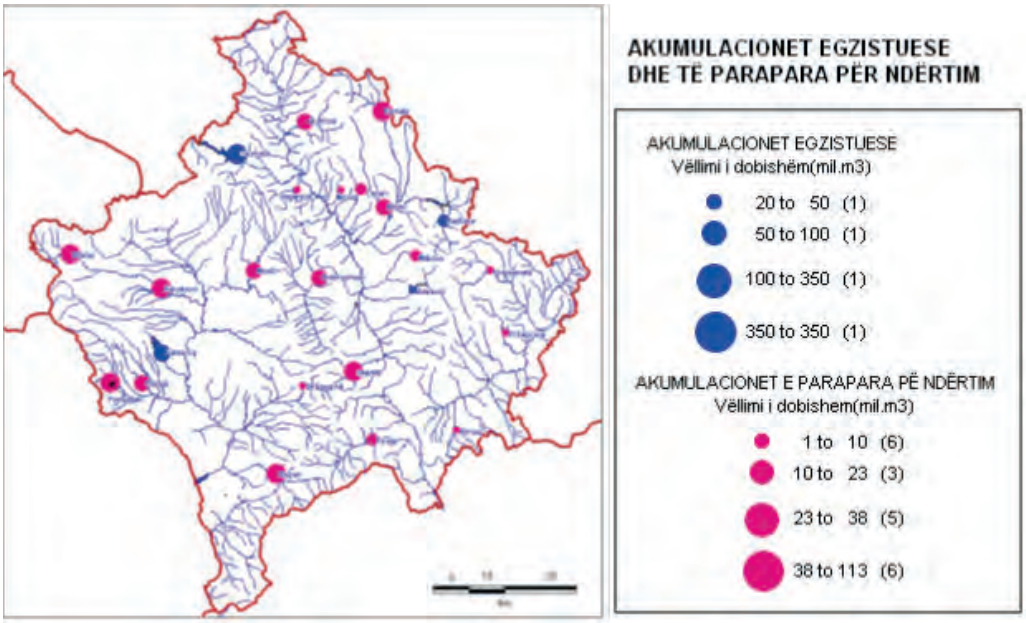

Figure 13. Map of existing and planned accumulations

10 Kosovo Agency of Statistics

3.1.7. Groundwater (Water sources)

Groundwater reserves in Kosovo are limited and they are mainly found in the western part of the country.

As part of the "Development of water sources in south-eastern Kosovo" project, geophysical studies of groundwater were conducted during 2005-2007 in the municipalities of Gjilan and Ferizaj (basin of Morava e Binçes). Furthermore, during 2008-2010 as part of activities of the EC supported project on the basin of Drini i Bardhe, groundwater survey sites were planned for this basin. Historical data point out that this zone is richest in groundwater.

According to the Kosovo Water Master Plan 1983-2000, the Dukagjini Plain has the greatest groundwater potential (see Table 6).

Table. 6. Groundwater accumulations in the Drini i Bardhe basin, their area, volume and capacity

No.	Groundwater accumulation	Area of basin (km^2)	Usable volume (m^3)	Assessed capacity	
				m^3/sec	Total (m^3)
1	Istog	76	12x106	2.8	89x106
2	Vrellë	28	14x106	0.600	19x106
3	Drini i Bardh	90	14x106	3.23	102x106
4	Lubizhdë	42	45x106	4.2(150)	55x106
5	Peja	300	37.5x106	4.0(150)	52x106
6	Deçan	144	33x106	3.5(150)	45x106
7	Lloqan	39	12x106	1.2(150)	15x106
8	Krk Bunar	81	10x106	1.6	50x106
9	Korisha	18	3.6x106	0.38	12x106
10	Field of Theranda	50	75x106	2	63x106
Total		998	271x106		511x106

3.1.8. Thermo-mineral water

The Republic of Kosovo has important thermal water sources, which are mainly used for healing and recreation purposes.

Research to identify and study the value of these sources and the amount of such water has been scares. Data point out that there are about 30 identified sources of thermal and mineral water in Kosovo (Tab.7).

More detailed research has only been conducted for the sources of such water in Banja e

Pejës (fig.14), Kllokot and Banjska, which function as thermal treatment spas. In addition to the healing aspect, these thermal water sources may also be used for the thermal energy production. The overall temperature of thermo-mineral water ranges from 17 to 540 °C, with a mineralization scale of 2-5 g/l. Thermal and mineral water springs contain sulphates, hydrocarbon, calcium and magnesium.

Figura.14. Thermal-mineral spring in Banja e Pejës

Table 7. Physical-chemical properties of some thermo-mineral sources

No.	Location	Q l/sec	t ^{0}C	pH	Mineralization g/l
1	Banja e Pejës	4.0	48.9	6.9	2.04
2	Banja e Kllokotit	10.0	32.0	6.6	3.601
3	Banjska	2.50	50.0	6.7	1.356
4	Banja e Runikut	15.0	24.8	7.1	0.598
5	Hot Spring of Runik	5.0	23.0	7.2	0.61
6	Gojbula	-	12.0	6.3	2.193
7	Uji i Lluzhanit	0.01	14.0	6.3	1.144
8	Studencia	1.0	25.0	7.1	0.670
9	Deçan	2.0	12.5	6.3	1.433
10	Upper Getnja	0.1	9.0	6.6	2.539
11	Ponesh	0.03	13.0	6.3	3.539
12	Poklek	1.0	13.0	6.3	3.52
13	Uglar	6.0	25.0	6.8	0.688
14	Zhiti	0.3	20.0	6.5	5.126
15	Dobërçan	-	26.0	6.4	-

Mineral water and thermo-mineral sources are scattered throughout the country (see Figure 15).

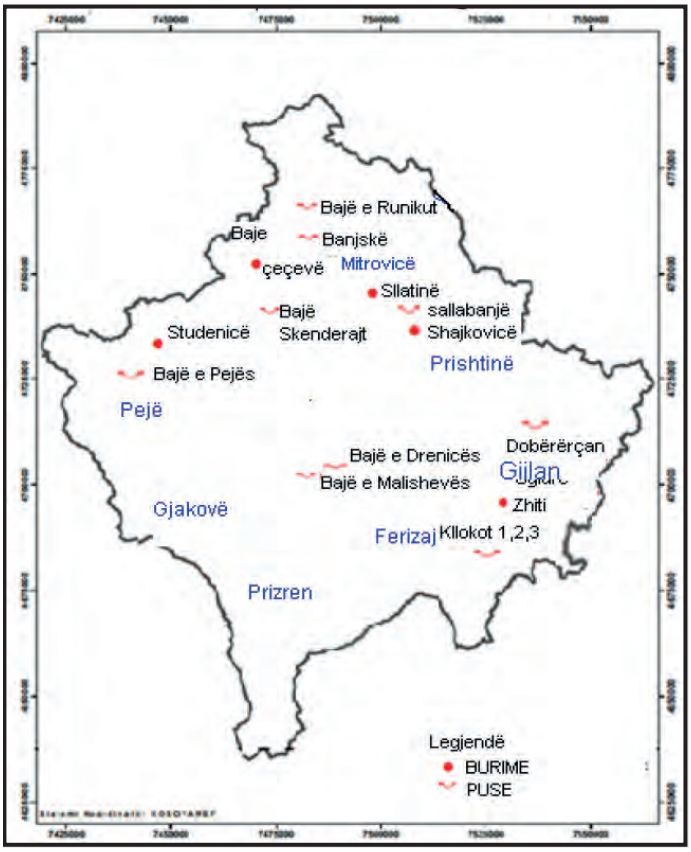

Figure 15. Thermo-mineral water sources

3.1.9. Wetlands

Kosovo has declared a protected area which is categorized as wetland. The wetland of Henc/Radeva is a special protected bird area located near the "Adem Jashari" International Airport between the villages Henc, Vrellë and Radeva. The wetland has a total area of 109 ha 52 ares. Although artificially created, it is characterized by special natural values, including ornithological, etiological, hydrogeological, botanic, landscape features, etc. Due to these values, in 2014 the Decision was issued to declare this area as a Special Protection Bird Area. The wetland of Henc/Radeva, in terms of floristic, is rich in plant species (see Figure 16). The wetland of Henc/Radeva is a very rich area in terms of zoological diversity, where it is found that a large number of species of wild fauna live there, dominated by wild birds of about 80 types of birds.

Figure 16. Landscape in the Wetland of Henc/F.Bajraktari

4. USE OF WATER RESOURCES IN ECONOMIC ACTIVITIES

4.1. Use of water for drinking and households

The drinking water supply service to Kosovo's population is provided by seven Regional Water Companies (Tab.8). Regional Water Companies provide their water supply services to urban settlements and some parts of rural settlements. A part of the population uses its own household water supply sources (wells and other sources), which are not managed by regional companies nor monitored by NIPH. According to the performance report of the Regional Water Companies, the coverage with the water supply service in the RWC area during the period 2015 - 2019 is 75-91%.

Table 8. Licensed companies for water supply and wastewater services (Licensed water service providers):[11]

RWC "Prishtina" JSC	**Prishtina, Fushë Kosova, Obiliq, Podujeva, Lipjan, Shtime, Drenas and Gracanica**
RWC "Hidroregjioni Jugor" JSC	Prizren, Malisheva, Suhareka Dragash and Mamusha
RWC "Hidrodrini" JSC	Peja, Istog, Klina, Junik and Deçan
RWC "Mitrovica" JSC	Mitrovica, Skenderaj and Vushtrri
RWC "Gjakova" JSC	Gjakova, Rahovec and some Prizren villages
RWC "Hidromorava" JSC	Gjilan, Kamenica and Viti
RWC "Bifurkacioni" JSC	Ferizaj and Kaçanik

Table 9. Supply of households with drinking water in Kosovo 2015-2019[12]

Years	**2015**	**2016**	**2017**	**2018**	**2019**
Unit	mil m³/ vit				
Water supply to households	50.37	52.33	49.194	48.300	49,014,648
Water supply to institutions	4.631	4.662	5.134	6.554	6,922,027

The amount of water consumed (m³/per capita) by households monitored by the public system, in 2018 was 2.60 m³ per month and 0.09 m³ per day, whereas calculated in litres was 86.67 litres/day per capita.

11 WRA-Annual Report 2018

12 Kosovo Agency of Statistics 2019

4.2. Use of water for irrigation

The use of water for irrigation during 2012 has increased compared to the previous year. According to data of the Kosovo Agency of Statistics and the Ministry of Agriculture, Forestry and Rural Development, during 2015 about 123 million m^3 of water have been used for irrigation, which marks a significant increase compared to previous years. While from 2016 the amount of water used for irrigation started to drop significantly (see Figure. 17).

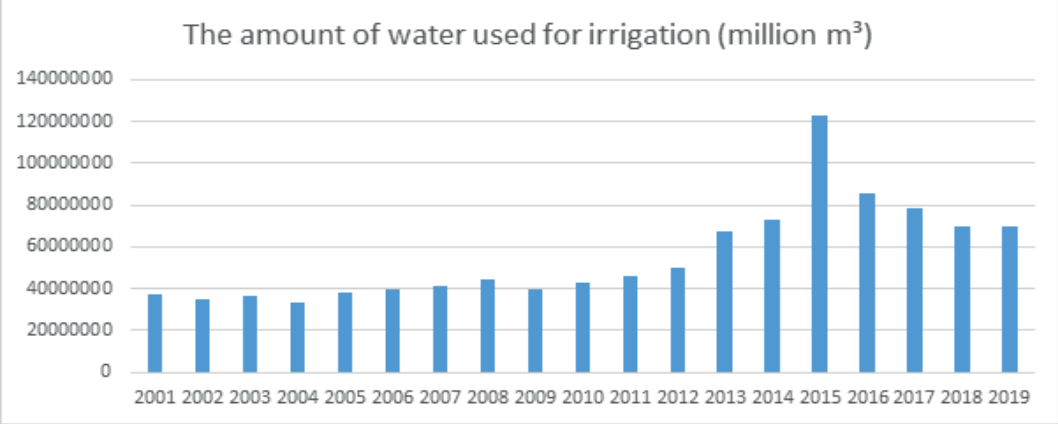

Figure 17. The amount of water used for irrigation 2001-2019[13]

In addition to the increase in the quantity of water used for irrigation, the number of irrigated areas has also increased. Approximately 12 thousand and 300 hectares of land were irrigated during 2012, which in the following years marked an increase reaching its peak in 2015 with about 31 thousand and 300 hectares. While from 2015 the irrigated surface areas started to drop significantly (see Figure. 18).

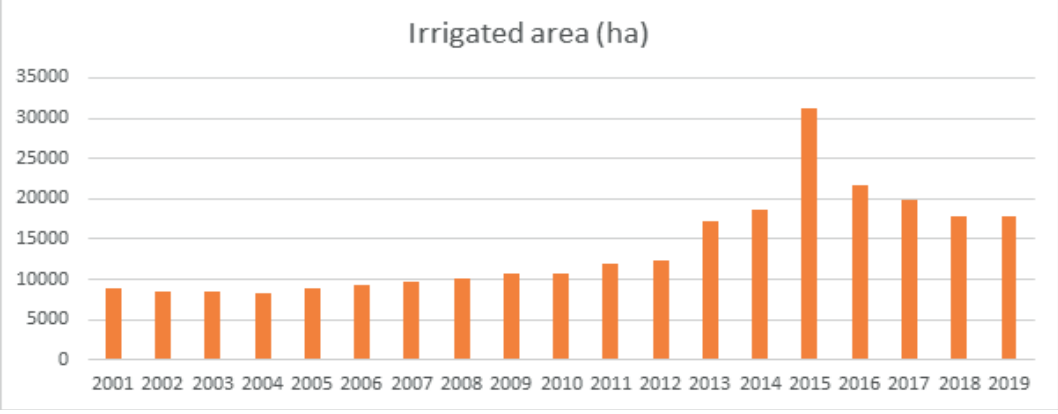

Figure 18. Irrigated area 2001-2019[14]

From the two charts we notice that the amount of water used for irrigation and the irrigated areas has been balanced between the amount of water used for irrigation and the irrigated areas.

13 Kosovo Agency of Statistics and the Ministry of Agriculture, Forestry and Rural Development

14 Kosovo Agency of Statistics and the Ministry of Agriculture, Forestry and Rural Development

4.3. Use of water in industry

Industrial operators are considered to be the greatest users of water. The largest industrial consumers of water in Kosovo are companies, such as: KEK, NewCo Feronikeli, Sharrcem, etc. Most of the industrial enterprises are supplied with water from superficial accumulating lakes. The data show that large industrial enterprises (for technological needs, cooling processes, sanitation, etc.) consume more than 30% of the total amount of water consumption in Kosovo[15].

Kosovo Energy Corporation (KEK) - is one of the economic operators that spend most water for energy production purposes.

TPP Kosova A is supplied with raw (unprocessed) water from the Llap River and from the HPE Iber-Lepenc and Batllava Lake when necessary, while TPP Kosova B is supplied with raw water from HPE Iber-Lepenc. According to data provided by KEK, the corporate used 16.3 million m^3 of water for energy production during 2019, which is higher compared to the previous year, an increase by 1.2 million m^3 of water (see Figure 19).

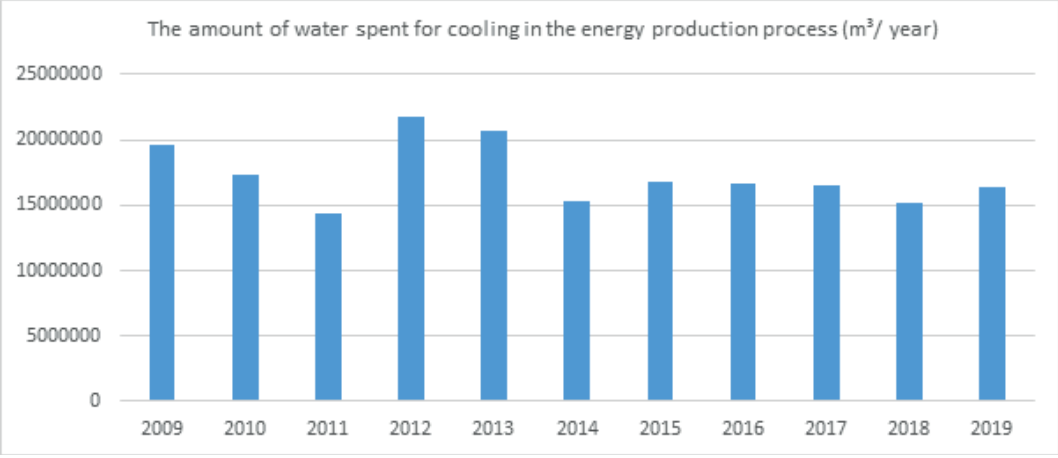

Figure19. The quantity of water spent by KEK for energy production process 2009-2019[16]

NewCo Feronikel – is supplied with water for its technological process from Bivolak (HPE Iber-Lepenc), which is located 17 km away from the factory and which supplies water reservoirs located above the factory. Ferronikeli uses this water for industrial needs of the operator, while a small amount of the water is treated for use as drinking water.

The industrial water is mainly used for electrical furnaces cooling, slag granulation, steam production and for gas and dust cleaning systems in converters and electric furnaces. The majority of the industrial water used to cool electrical furnaces is re-circulated, while most water is spent in steaming process (cooling towers, slag granulation).

According to data provided by NewCo Feronikeli, approximately 1.5 million m^3 of water were spent during 2019, which marks an increase of approximately 0.16 million m^3 of water compared to the previous year (see Figure 20).

15 Kosovo National Water Strategy 2017 - 2036

16 KEK monthly and annual environmental reports 2009-2019

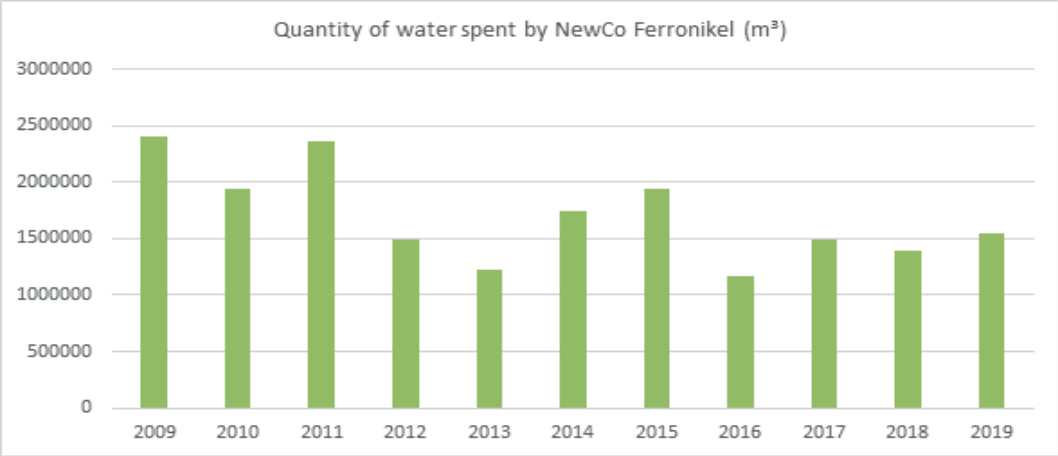

Figure 20. Quantity of water spent by NewCo Feronikel, 2009-2019[17]

SharrCem - The cement factory Sharrcem in Hani i Elezit operates with a closed water system at all points of the production process. This system is supplied with water from sources of the Lepenc River and Dimca stream. This operator uses the water for conditioning furnace gases, for cooling processes in the air conditioning tower and for sanitary purposes.

According to data provided by the cement factory SharrCem, approximately 103 thousand m^3 of water were used during 2019, which is lower compared to 175 thousand m^3 of water spent in the previous year (see Figure 21).

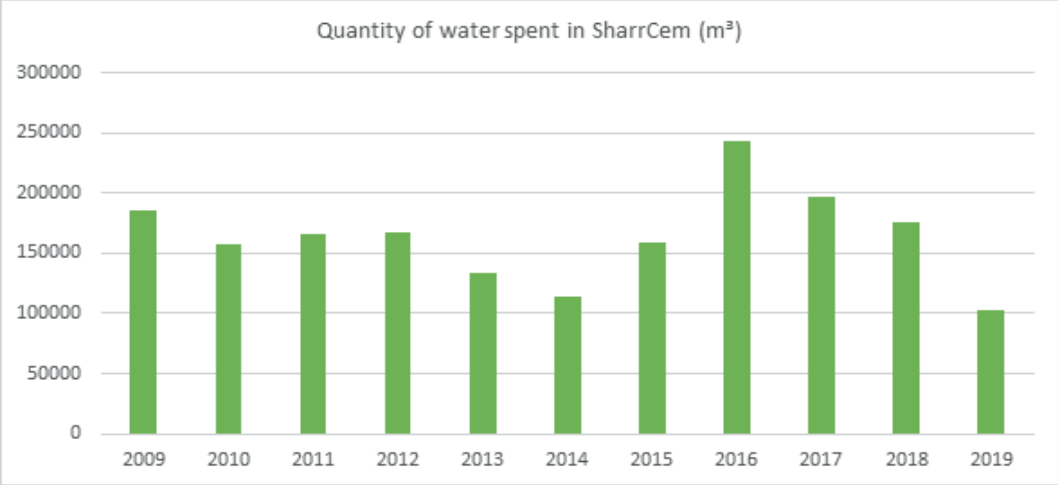

Figure 21. Quantity of water spent in SharrCem, 2009-2019[18]

17 Monthly and annual environmental reports of NewCo Feronikeli 2009-2019
18 Monthly and annual environmental reports of SharrCem 2009-2013

4.4. Use of water for hydro-energy

It is known that our country has full capacity for energy production. After KEK, which is the main source of electricity generation and supply, another equally important factor is hydropower plants. Their construction, longevity and operation are important elements in the use of water resources.

Most hydropower plants have a lifespan of 25 years. While the development of a program for the activation of these hydropower plants is part of the energy policy of Kosovo's energy strategy.

Currently in our country there are 7 hydropower plants which are active and 12 are being constructed. It is worth mentioning that in 2018 MESP has issued no permit for construction of hydropower plants. The capacity of active hydropower plants is 36.6MW (see Table 10). 12 hydropower plants are in the phase of construction (see Table 11).

Table 10. Active Hydropower Plants in Kosovo

No.	Hydropower plant	Location	River	Capacity	Term
1	"Eurokos JH&Loreto consult AG"	Dragash	Brod 2	1.25MW	20 years
2	"Frigo Food Energy Invest"	Dikanc	Dikanc	2.50 MW	5 years
3	"Kelkos Energy"	Deçan	Lumbardhi i Deqanit I (dam)	5.50 MW	5 years
4	"Hydro-Line"	Albaniku I Mitrovicë	Bistrica river	6.80 MW	20 years
5	"Hydro-Line"	Albaniku II Mitrovica	Bistrica river	9.85 MW	20 years
6	"Hydro-Line"	Albaniku III Mitrovica	Bistrica river	9.90 MW	20 years
7	"Triangle General Contractors.INC"	Radavc	Radavci spring	0.80 MW	-

Table 11. Hydropower Plants in the phase of construction

No.	Hydropower plant	Location	River	Capacity	Term
1	"Eurokos JH&Loreto consult AG"	Dragash	Brod 1	1.06 MW	20 years
2	"Eurokos JH&Loreto consult AG"	Dragash	Brod 3	3.12 MW	20 years
3	"Kelkos Energy"	Deçan	Lumbardhi i Deçanit	9.30 MW	15 years
4	"Kelkos Energy"	Deçan	Lumbardhi i Deçanit	8.40 MW	15 years
5	"Eurokos JH&Loreto consult AG"	Dragash	Restelica river 2	1.20 MW	20 years
6	"Drini i Bardhë"	Dobrusha	Lumi Dobrushë	9.90 MW	20 years
7	"Eurokos JH&Loreto consult AG"	Dragash	Restelica river 1	1.20 MW	20 years
8	"Eurokos JH&Loreto consult AG"	Dragash	Restelica river 3	1.498 MW	20 years
9	"Hydro-Line"	Albaniku IV Mitrovica	Bistrica river	6.20 MW	20 years
10	"Edelweis Energy"	Ura e shenjët	Drini i Bardhë river	6.50 MW	20 years
11	"Hidroenergy"	Lepenc 1	Lepenc river	10 MW	20 years
12	"Hidroenergy"	Lepenc 3	Lepenc river	8.50 MW	20 years

4.5. Use of water for recreation

Water resources in Kosovo are also used for recreation and leisure. Thermo-mineral water sources, water accumulations, rivers and lakes are used every year by many vacationers for recreation and leisure purposes. Many businesses across the country have built dozens of mini-pools, which are frequented by many vacationers every summer. Since these facilities are registered as sports and recreational facilities, and there is no separate division only for swimming pools, their number is generally 199 registered as swimming pools, sports facilities, etc.). These sports facilities for recreation are spread throughout 28 municipalities of Kosovo (see Table.12).

Table 12. Facilities intended for recreation

No.	Deçan	Dragash	Ferizaj	F.Kosovë	Gjakova	Gjilan	Drenas	H. i Elezit	Istog	Kaçanik	Kamenicë	Leposaviç	Kline	Lipjan	Malishevë	Mitrovicë	Obiliq	Peja	Poduje	Prishtinë	Prizren	Rahovec	Shterpc	Shtime	Skenderaj	Suharekë	Viti	Vushtrri
Facilities sportive 3rekreacion	3	1	16	4	9	5	4	1	3	8	1	1	3	7	1	9	1	11	8	35	12	6	1	6	5	5	6	6

5. WATER MONITORING

5.1. Surface water monitoring

The monitoring of river waters in the territory of the Republic of Kosovo is conducted by the Kosovo Hydro-meteorological Institute. The quality of these rivers is determined based on physical-chemical analysis and presence of heavy metals. The monitoring network consists of 54 monitoring stations. Currently, 10 physical parameters are monitored (measured 11 times a year), 39 chemical parameters (measured 11 times a year) and 8 heavy metals (2 times a year). The complete list of parameters monitored by KHMI is included in Annex 3 of this report.

The Drini i Bardhë basin includes 10 rivers with 23 monitoring stations (10 of which are referent stations and are monitored twice a year, while 13 are stations along the river flows and are monitored 11 times a year).

The Iber basin includes 7 rivers with 18 monitoring stations (5 of which are referent stations and are monitored twice a year, while 13 are stations along the river flows and are monitored 11 times a year).

The Morava e Binçës basin includes 2 rivers with 6 monitoring stations (2 of which are referent stations and are monitored twice a year, while 4 are stations along the river flows and are monitored 11 times a year).

The Lepenc basin includes 2 rivers with 7 monitoring stations (2 of which are referent stations and are monitored twice a year, while 13 are stations along the river flows and are monitored 11 times a year).

Codes and locations of monitoring stations are presented in Annex 4 of this report. The following map shows the spatial distribution of the monitoring stations in Kosovo rivers (see Figure 22).

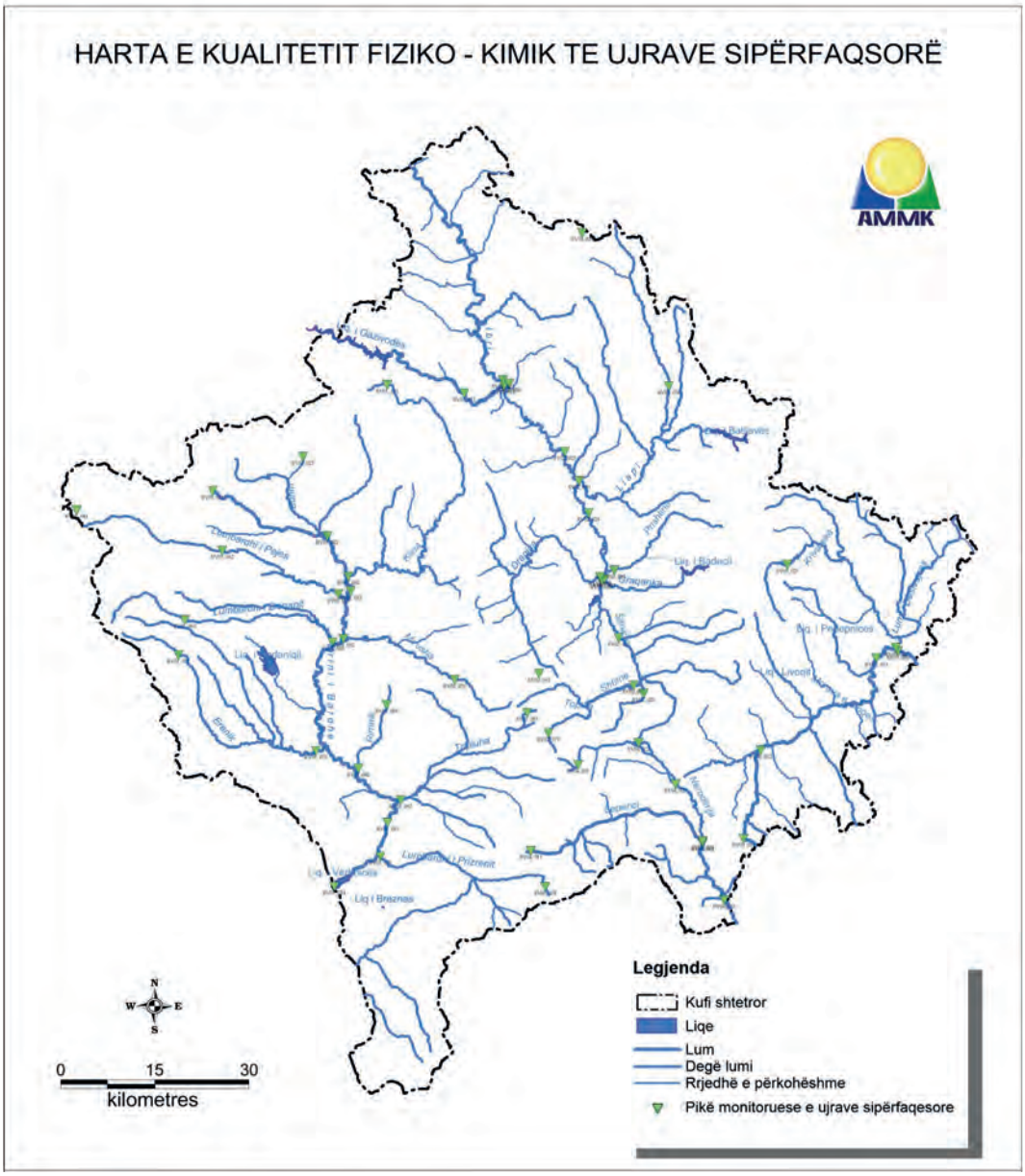

Figure 22: River water quality monitoring stations

5.1.1. Drini i Bardhë Basin

This basin has the greatest area of all other river basins in our country. The monitoring network of this basin consists of 23 monitoring stations of the physical and chemical quality. Three of these are base stations belonging to the Drini i Bardhe River: one at the river source in Radavc mountain above Peja, one at the confluence of Istog and Klina rivers near the city of Klina, and the last one at the confluence of the rivers of Lumbardhi i Pejes, Decani, Mirusha, Erenik, Rimnik and Toplluha, located at the bridge in Gjonaj village of Has. The quality of water varies as it flows through stations. Thus, water at the source has a good quality, but at the other two stations there is pollution caused by untreated waters discharged into the main river and into the rivers mentioned above which are sub-basins of this river. Pollution is also caused by water used to wash agricultural land.

Results of physical-chemical analyses for the last six years show that the quality of water at all river sources is good. The situation starts to change when approaching settlements due to the discharge of wastewater and water from industrial collectors along the flow of this river basin. Another cause of pollution is the throw of waste especially at locations of bridges and elsewhere. Water has a good quality up to the point of confluence with Istog River. Drastic changes begin in the regions of Zllakuqan–Ruhot and Zllakuqan–Klina. At the point of confluence of Drini i Bardhe and Klina rivers, the quality of water is very poor. To conclude, water of the basin of Drini i Bardhe is polluted by discharges into the sub-basins, which have beforehand been subject to human action. This situation continues up to Vllashnje at the point of flow into Lumbardhi i Prizrenit.

Istog River - Originates from the mountain above the town of Istog. It is very clean, with a very good quality, and compared to other rivers, this river does not change up to its confluence with the Drini i Bardhe River. Therefore, based on the monitoring conducted so far, it is known as the cleanest river in Kosovo.

Klina River - The first monitoring station is located in Kuqice, which does not meet the criteria as the first or main source because of its location far from the source. Until water reaches this location it is affected by human activity, therefore its quality at both monitoring stations is poor, as shown in the laboratory tests given in figures.

Lumbardhi i Pejes River (Bistrica e Pejes) – It is formed from several sources along the Rugova Canyon, which sources in the first monitoring station in Haxhaj have good physical and chemical quality, whereas at the other station, due to urban and industrial water discharge, the quality changes because during the summer irrigation season the river goes dry for approximately two months. The third monitoring station is located near Klina before its confluence with the Drini i Bardhe River, where its quality is very poor.

Mirusha River – It is formed from several small sources in the hills over the village Bllaca of

the municipality of Theranda. In the village of Banja e Malisheves, the water source flowing to the village basin is considered as a referent point, where the river gets its full shape, and at that very point a powerful surface water source, known as Uligja e Banjes, joins this river. This river is monitored at two stations, where before it joins the Drini i Bardhe River, its quality has little turbidity; therefore, it falls in the category of rivers with moderate water quality.

Lumbardhi i Decanit River (Bistrica e Decanit) - The first monitoring station of KHMI's network is located 3 km away from the town of Deçan, over the church, where its quality is very good. The next station is located 10 m before its confluence with the Drini i Bardhe River in Kralan village of Gjakova. Its quality at this station is not very alarming; however, it is noted an increase in the values of parameters compared to the first station. There is also little turbidity caused by the gravel excavation from its riverbed by private companies, which operate tens of meters above the monitoring station of this river.

Erenik River - The first water quality monitoring station of this river is located in the mountains above the village of Jasiq (Municipality of Junik). There is no human influence on the water at that point; therefore, its quality is very good. The second station according to the monitoring network is located near the confluence with the Drini i Bardhe River at Ura e Terzive bridge in Gjakova. The quality of water at this station is poor as analyses showed a presence of detergents. There is always foam on the surface this river, which is supposed to result from textile washing or car-washing activities or other uses of detergents from industries operating in the region and which discharge water without prior treatment.

Rimnik River – Its monitoring begins at the place called Zhdrella not far from its source. It is known as a river with a higher conductivity (~780 µS/cm) than all the other river sources. Its next station is located a few meters before its confluence with Drini i Bardhe River in Xerxe, measurements at which show a low quantity of oxygen and a high quantity of Ammonium ions, phosphates, etc.

Toplluha River - The first monitoring station for this river is located at the place called Buqalla above the touristic compound "SOLID" in Theranda/Suhareka. The quality of its water resulted as good in all measured parameters. However, this quality becomes poorer at the second monitoring station in Pirana village, tens of meters before its confluence with the Drini i Bardhe River. It has a permanent high turbidity because of gravel excavation from its riverbed continuously throughout the year.

Lumbardhi i Prizrenit River (Bistrica e Prizrenit) - It originates from Prevalla with a torrent flow. Its first monitoring station is located in the Prevalla Canyon and it has a good quality in all parameters. The second station is located in Vllashnje village, 3,5 km before its confluence with the Drini i Bardhe River, and the quality of water at this station, compared to the first monitoring station, is considerably poorer because of wastewater discharged into it along its stream.

5.1.2. Basin of Iber

The basin of Iber has 18 monitoring stations, three of which belong to the Iber River. Thus, the first station is located in Kushtova and its measurements show a satisfactory water quality. The next station is located at the town exit and monitors water after urban and other discharges resulting in a poorer water quality at this station. The third monitoring station is located at the Kelmend village, after its confluence with the Sitnica River, which contains water from all the sub-basins of this river basin. No alarming case has been noticed during this monitoring period.

Sitnica River - Starting from Ferizaj and up to Mitrovica, this is the most polluted river in Kosovo. Regarding physical parameters, suspended materials are present and exceed maximum allowed values. This is caused by the flow of Nerodime River, the rivers of Shtime, Graqanka, Prishtevka, Drenica, Llap and Trepca and other smaller streams into it, which contain household and industrial water discharges. The monitoring of chemical parameters, such as the quantity of dissolved oxygen and BOD_5, indicate permanent pollution of the river.

Llap River - This river is monitored from its source above the Marince village, and then continues to the second station in Podujeva, at the exit of the city, while the third and last monitoring station in Lumadh, before its confluence with the Sitnica River and the MAV is not exceeded.

Prishtevka River - This river is monitored in Bresje of Fushe Kosova before it flows into the Sitnica River. It is one of the most polluted rivers in Kosovo as it collects all urban waste water discharges of Prishtina. The monitoring showed that its water exceeds allowed values of nitrites and suspended materials, chemical and biochemical spending of oxygen, lack of dissolved oxygen, presence of detergents, etc.

Graqanka River - The water quality of this river is continuously polluted as a result of water pumping from Kishnica and Artana mines, as well as discharges from several settlements along its course. It has high values of electrical conductivity and sulphate ions. It is worth mentioning that this river dries during the summer.

Drenica River - This river is monitored starting from Pjetershtica, second station is located in Drenas, after urban wastewater discharges, and the third sampling point before its confluence with Sitnica River in Vragoli. During the spring, the water at the first monitoring station has a good quality, whereas in the second station in Drenas its quality is permanently polluted, and in the third station in Vragoli its quality is considerably poorer, e.g. its electrical conductivity increases by hundreds of units as a result of the waste discharges from Ferronikeli, as well as waters pumped into the river as a result of KEK's surface mining.

Shtime River - This river is monitored at two stations; at the first station its quality is measured before the river is affected by human activity, resulting in a good quality of water. At the second station, its quality is measured after the discharge of urban wastewater from the town of Shtime and surrounding villages, resulting in a poor water quality.

5.1.3. Morava e Binçes and Lepenc River Basins

Morava e Binçes - Monitoring of this river is conducted in Kurbuliq, then in Kllokot and Ranillug, and finally at the border with Serbia in Domorovc. In this village, this river joins Kriva Reka River in Dardana/Kamenica. The urban and industrial waters of Viti, Gjilan and Dardana/Kamenica are discharged into it.

Kriva Reka River – This river has two monitoring stations, where the water at the first monitoring station appears to be of a high quality, while in the Marevc village, where the Artana/Novoberde mine waters are discharged, the pollution is high, which results in a lower pH value and increase of some heavy metals concentrations. As a result, their precipitation causes turbidity and decantation at the bottom of the riverbed, which results in the brown riverbed colour. The quantity of these metals is eliminated as a result of the increased pH value. The quality of water in the second monitoring station in Domoroc is not good, where measured parameters such as turbidity, ammonia and nitrites show high pollution.

Lepenc River - This river has two sources, one of which in the Prevalla Mountain and the other in the Brezovica Mountain. The quality of water at both sources is good and this level is maintained until the "Silkapor" factory discharge site where occasionally water has a higher turbidity as a result of the discharge of waters used for raw materials washing in the factory. The turbidity continues for some kilometres and is observed at the second monitoring station, which is located in Kacanik, before the confluence of Lepenc River with Nerodime River. After joining this river, the quality of this river is monitored at the third station in Han i Elezit, which is a cross-border station with the Republic of North Macedonia. The quality of water at this point is within allowed limits.

Nerodime River - This river originates in Jezerc Mountains of the Municipality of Ferizaj with a good quality of water. At the second station, at the village of Gerlica, the quality drops as a result of discharge of urban and other waters of Ferizaj region. Its quality gets poorer at the next monitoring station in Kaçanik, before the confluence of Nerodime River with Lepenc River.

5.2. Situation assessment and monitoring results

5.2.1. Drini i Bardhë Basin

For purposes of interpreting the state of Drini i Bardhe sub-basins, the same variability model will be used at their entry and exit points. The following sections interpret the Average Annual Values (AAV[19]) of each parameter of each river of this basin separately.

Quantity of dissolved oxygen (O_2) – stands consistently at considerable values along the entire flow of this river (basin). The average value of dissolved oxygen in 2014 was 8.7 mg/l O_2. In 2015, the minimum value was 6.36 mg/l O_2, whereas the maximum value was 8.96 mg/l O_2. In 2016, the minimum value of dissolved oxygen was 4.99 mg/l O_2, whereas the maximum annual average value was 8.38 mg/l O_2. In 2017, the minimum value of dissolved oxygen was 5.25 mg/l O_2, whereas the maximum annual average value was 9.54 mg/l O_2. The situation was almost the same in 2019, with a minimum value of dissolved oxygen of 5.97 mg/l O_2 and a maximum annual average value of 9.10 mg/l O_2 (Figure 23).

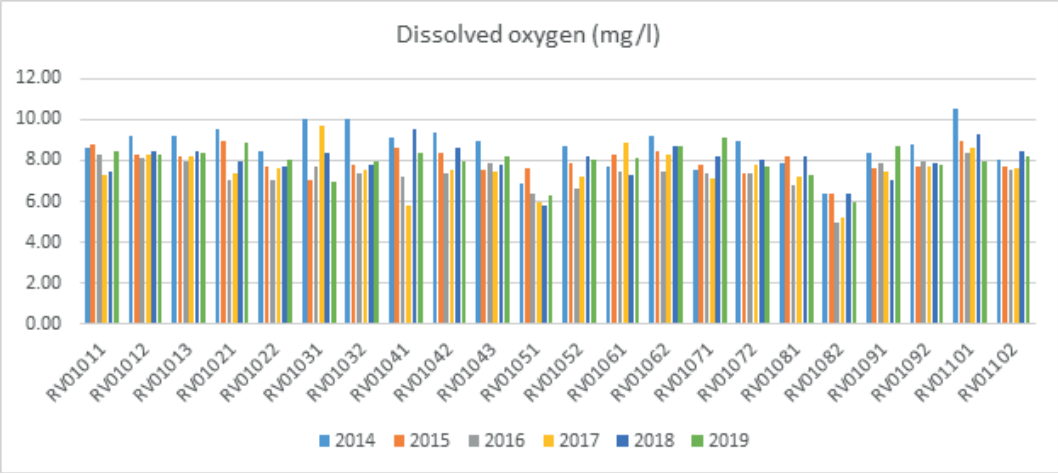

Figure 23: Dissolved oxygen at the Drini i Bardhe Basin in mg/l O_2

Biochemical Oxygen Demand in 5 days (BOD_5) - The maximum average value for 2014 was 13.55 mg/l, whereas in 2015 and 2016 there was an increase of the maximum average value of 16.53 mg/l. In 2017, the situation has improved, with 9.90 mg/l. During 2018 and 2019, the parameter of the Biochemical Oxygen Demand had a maximum average value of 22.75 mg/l.

If we compare the average annual values with the values of serial measurements, the BOD_5 values are even higher (see Figure 24).

19 Annual Average Values (AAV) are calculated basedd on serial monthly values.

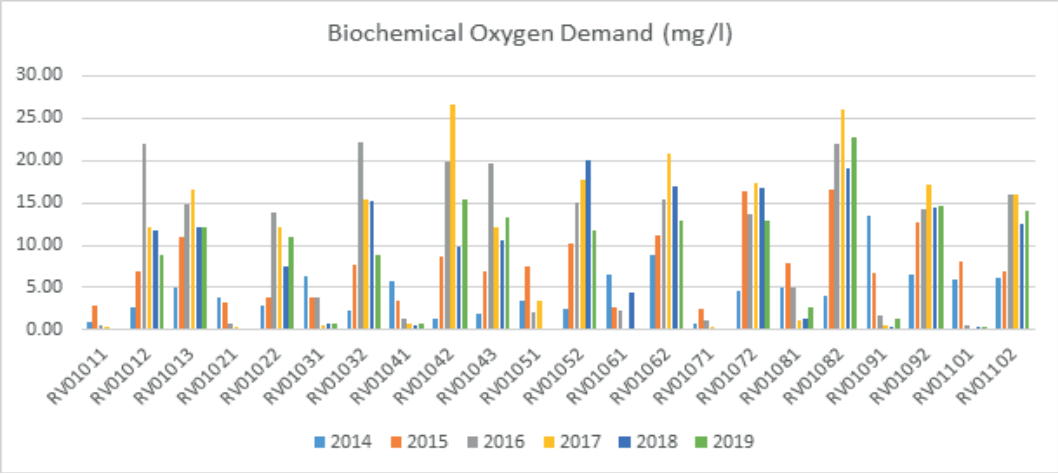

Figure 24: Biochemical Oxygen Demand at the Drini i Bardhe Basin in mg/l

Regarding quality, there is no significant pollution in any of the monitoring stations.

Electrical Conductivity (EC) – For years 2014, 2015, 2016, 2017, 2018 and 2019, the lowest values were noted in Lumbardhi i Prizrenit River in Prevalla -- 92 µs/cm, 65 µs/cm, 103 µs/cm, 106 µs/cm, 83 µs/cm and 81 µs/cm, respectively; whereas, for 2014, 2015 and 2016, the highest values were noted in Rimnik River in Xerxe, with values such as 713 µs/cm, 740 µs/cm and 780 µs/cm. In 2017, the maximum value was measured at the same river, namely in Rimik River, but at the sampling point called Zhdrella with 695 µs/cm, whereas for 2019, the maximum annual average value was measured in Klina River, sampling point Klina, with 627 µs/cm (see Figure 25).

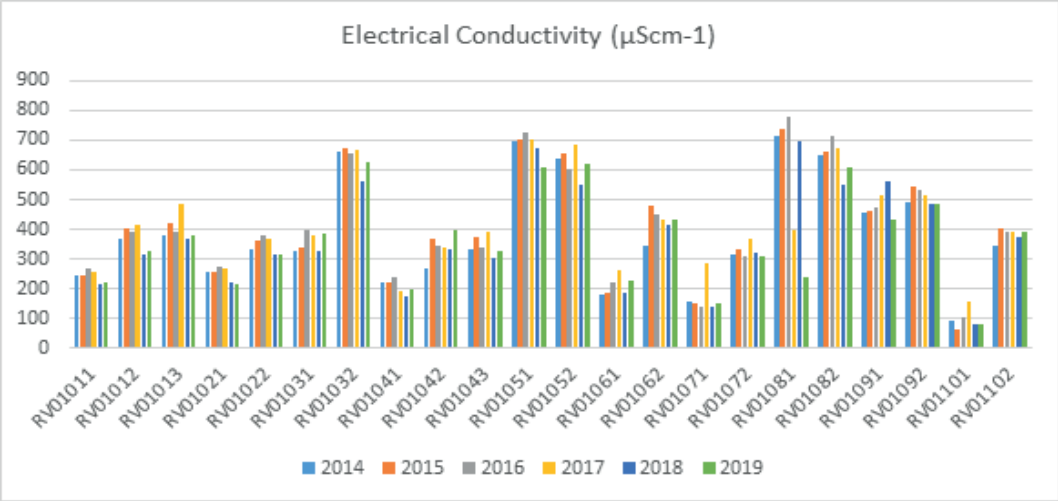

Figure 25: Electrical Conductivity at the Drini i Bardhe basin

Hydrogen ion concentration (pH) - The Klina River in Sternac i Ulet registered the lowest pH value of 7.13 in 2014, whereas the highest value for this year of 8.04 was registered in the Rimnik River in Zhdrella. A wider pH interval was noted in 2015, with the lowest value of 7.30 in Mirusha River in Banja e Malisheves, whereas the maximum value of 8.18 was recorded at the Rimnik River in Zhdrella. In 2016, the lowest pH value of 7.26 was registered at the Mirusha River in Banja e Malisheves, whereas the maximum annual average value was marked in Toplluha River in Buqalle, with a pH value of 8.48.

In 2017, 2018 and 2019, the lowest pH value of 7.15, 7.12 and 7.21, respectively, was marked at the Mirusha River in Banja e Malisheves, whereas, in 2017, the maximum pH value of 8.33 was marked at the Lumbardhi i Deçanit River in Kralan. In 2018 was marked a pH value of 8.13 at the Lumbardhi i Pejes, Peja exit, while in 2019, the maximum pH value of 8.13 remained the same in the two monitoring stations, namely at the Drini i Bardhe River in Gjonaj and Klina River in Sternac i Ulet (see Figure 26).

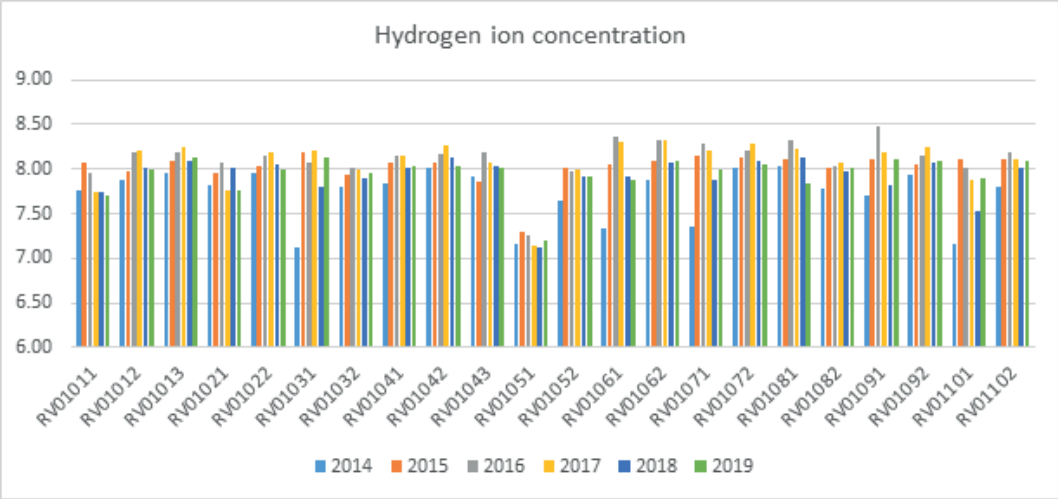

Figure 26: Hydrogen ion concentration at the Drini i Bardhe Basin

Nitrogen - nitrate ($N\text{-}NO_3^-$) – For all years, almost in all sources stations, the parameter of the Nitrogen-nitrate was registered as a limit of quantification. The maximum annual average value for 2014, 2015, 2016 and 2018 was marked at the Toplluha River in Pirane, with values 2.402 mg/l, 2.307 mg/l, 2.31 mg/l and 2.402 mg/l. In 2017, the maximum average value of 2.061 mg/l was recorded at the Klina River in Kuqice, while a significant increase in the annual average value of 2.398 mg/l was recorded at the Mirusha River in Volljake in 2019 (see Figure 27).

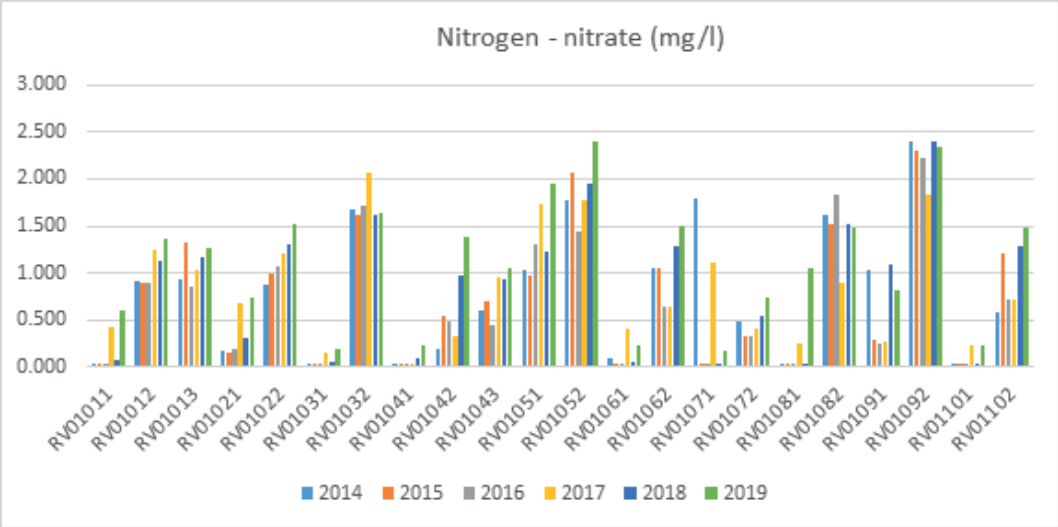

Figure 27: Nitrogen-nitrate at the Drini Bardhe basin

Nitrogen - nitrite ($N\text{-}NO_2^-$) - as for the nitrogen-nitrate, the measurement values for nitrogen-nitrite nitrogen appear as limit of quantification in almost all monitored source stations throughout all years.

The maximum annual average value for the six year period 2014-2019 was recorded at the Rimnik River in Zhdrella, with values ranging between 0.134 – 0.222 mg/l (see Figure 28).

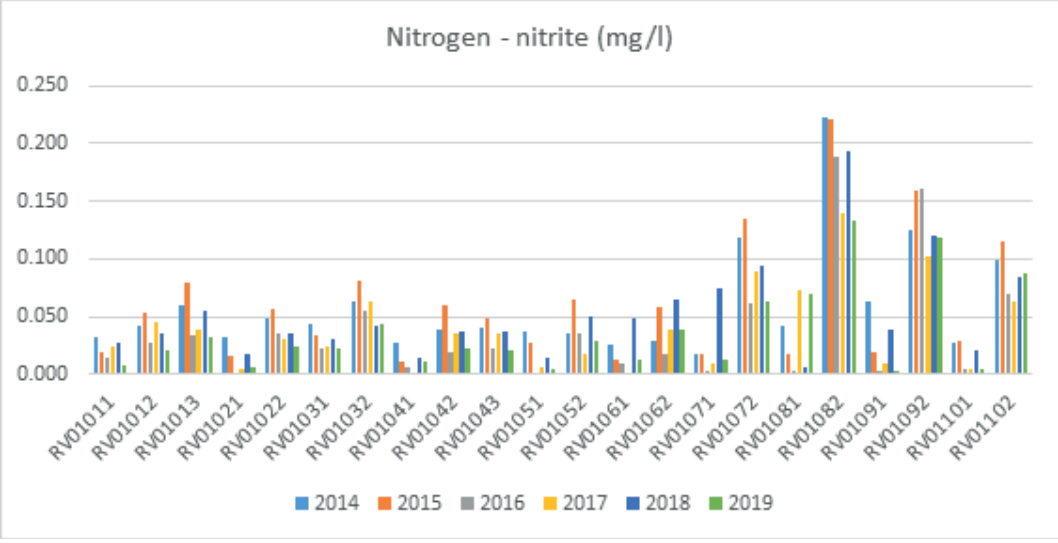

Figure 28: Nitrogen-nitrite at the Drini i Bardhe basin in mg/l

Ammonium Nitrogen ($N\text{-}NH_4^+$) – In 2016, at the Lumbardhi i Pejes River in Drelaj, the minimum AAV was 0.157 mg/l, in 2017, the minimum AAV at the Lumbardhi i Prizrenit River in Prevalla was 0.157 mg/l, in 2018, the minimum AAV at the Klina River in Sternac i Ulet was 0.544 mg/l, while in 2019, the minimum AAV was 0.105 mg/l. Whereas in 2014 and 2015, the limit of quantification was 0.015 mg/l N-NH4+ at the monitoring station Lumbardhi i Pejes River in Drelaj, namely Mirusha River in Banja e Malisheves.

Maximum AAV for the four years of the monitoring period were registered at the Rimnik River, monitoring station in Xerxe, with values ranging between 0.169 – 3.063 mg/l $N\text{-}NH_4^+$ (see Figure 29).

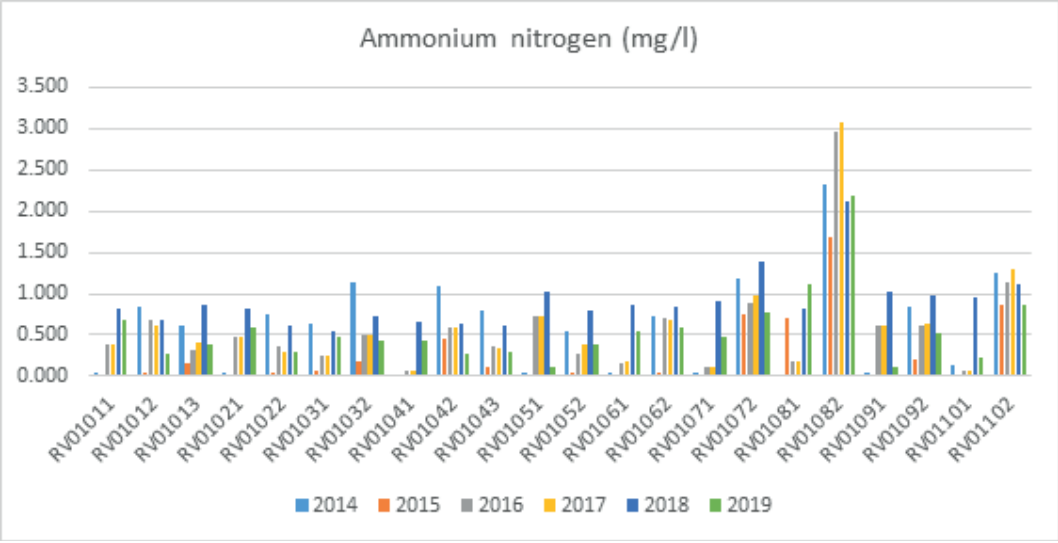

Figure 29: Ammonium nitrogen at the Drini i Bardhe basin in mg/l

Since allowed values should not exceed 1.5 mg/l, water has a good quality only at river sources, whereas water at other monitoring stations is resulted to be of a medium or low quality.

Orthophosphate phosphorus ($P\text{-}PO_4^{3-}$) – The limit of quantification (0.003 mg/l $P\text{-}PO_4^{3-}$) is registered at these monitoring stations: in 2014, 2017, 2018 and 2019 at the Drini i Bardhe River in Radavc, in 2015 at the Lumbardhi i Pejës River in Drelaj, while in 2016 at the Mirusha River in Banja e Malishevës was recorded a minimum annual average value of 0.043 mg/l.

The maximum annual average value was marked at the Rimnik River in Xerxe for all years (excluding 2018, where the maximum annual value of 0.342 mg/l was recorded at the Lumbardhi i Prizrenit River in Vllashnje), with a value ranging between 0.297- 0.578 mg/l (see Figure 30).

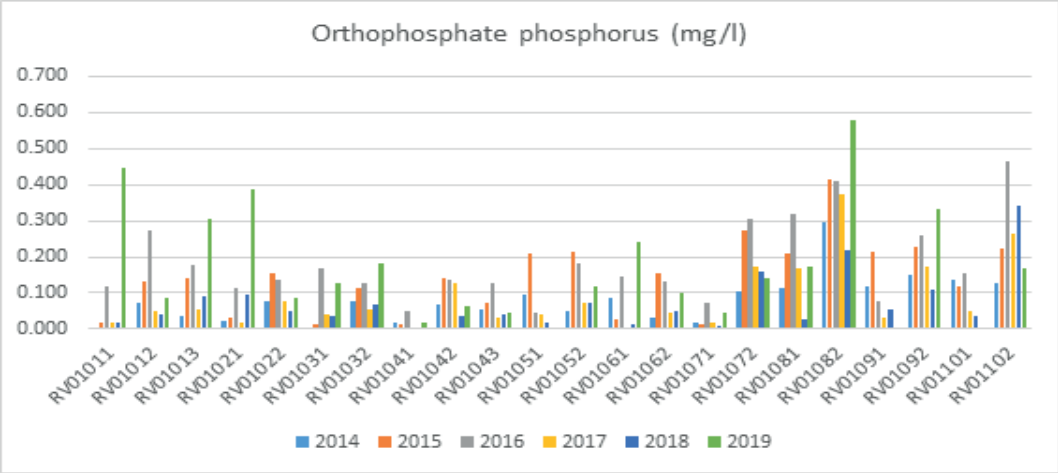

Figure 30: Orthophosphate phosphorus at the Drini i Bardhe Basin in mg/l

Total phosphorus (poly and ortho) - Total phosphorus values at the Drini i Bardhe basin show a high level of fluctuation. The minimum AAVs of the total phosphorus for 2014 was registered at the Drini i Bardhe River in Gjonaj with a value of 0.036 mg/l P. For 2015, the minimum annual average value for total phosphorus was marked at the Lumbardhi Pejes River in Grabanice with a value of 0.06 mg/l. Whereas, in 2016, 2017, 2018 and 2019, the minimum annual average value of the total phosphorus ranges between 0.003-0.091 mg/l in monitoring stations at Toplluha River in Buqalle, Lumbardhi i Prizrenit River in Prevalla and Mirusha River in Banja e Malisheves.

While the maximum annual values (MAV) in 2014 were recorded at the Toplluha River in Pirane with a value of 0.534 mg/l and during other years from 2015 to 2019, the maximum annual values (MAV) were recorded at the Rimnik River, sample point in the Xerxe, with the values ranging between 0.580 - 1.514 mg/l (see Figure 31).

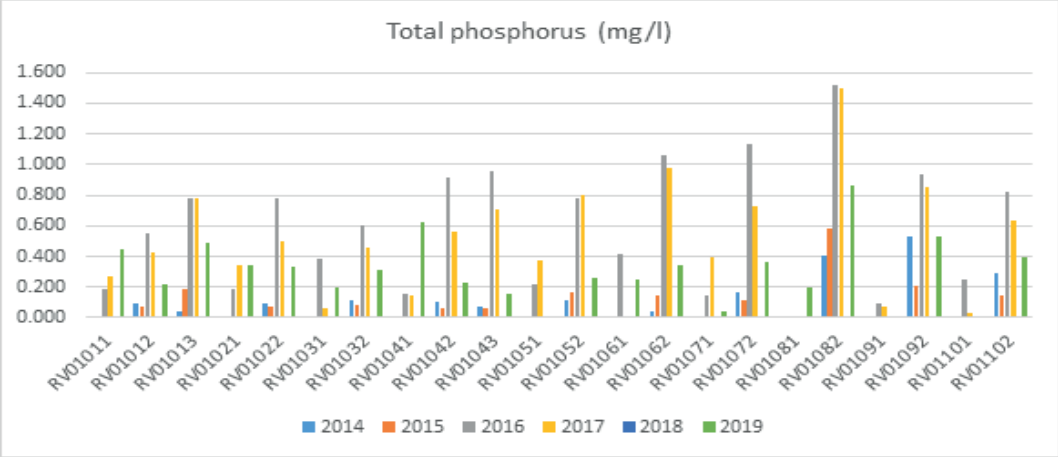

Figure 31: Total phosphorus (poly and ortho) at the Drini i Bardhe Basin in mg/l

5.2.2. Basin of Iber

The following sections present average annual values, shown in charts, for a number of selected parameters measured by KHMI, which help us interpret the water situation in the basin of Iber.

Quantity of dissolved oxygen (dissolved O_2) – It changes from station to station, however, all the rivers of this basin have a sufficient quantity of dissolved oxygen, except the Prishtevka River in Bresje, where the quantity of dissolved O_2 is low.

If we compare the values of this parameter, the quantity of dissolved oxygen over the years 2014 - 2019 is showing no great difference among the first (referent) stations, as a higher value of dissolved O_2 has been recorded at the Iber River in Kushtove with a value of 10.31 mg/l. However, along the monitoring stations, the minimum quantity was marked at the Prishtevka River in Bresje, with a minimum average value of 3.85 mg/l during the years 2014 - 2019. Nevertheless it should be kept in mind that these are annual average values because there are cases when performing monthly monitoring where this monitoring station has no dissolved O_2 (see Figure 32).

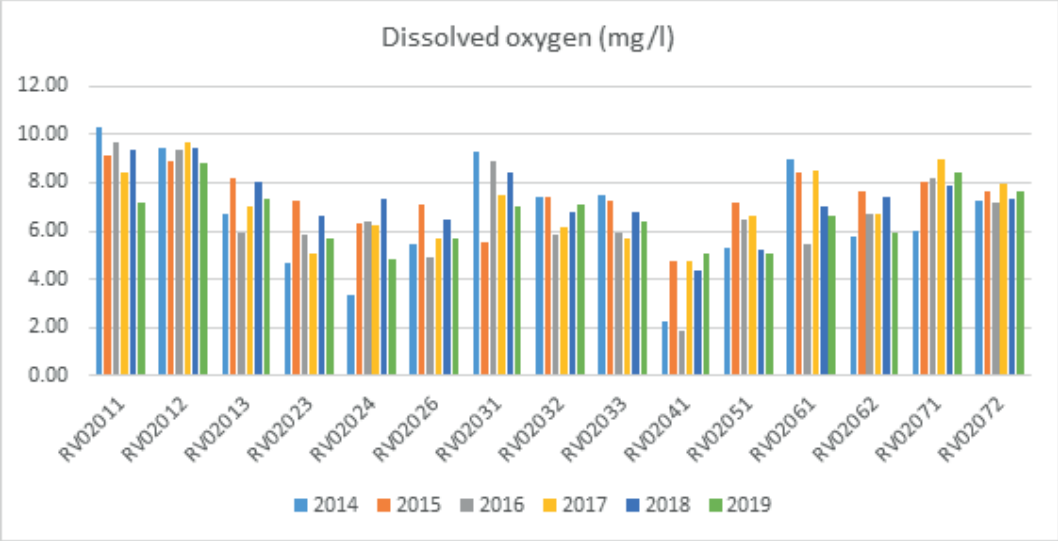

Figure 32: Dissolved oxygen at the Basin of Iber in mg/l

Biochemical Oxygen Demand (BOD_5) –The comparison of values during the period 2014 – 2019 shows minor changes, which implies that the water quality of this basin changes over the years too, i.e. changes from season to season. The highest BOD values were marked at the Prishtevka River in the Bresje monitoring station, with annual average values ranging from 29.29 mg/l - 77.20 mg/l over the years (see Figure 33).

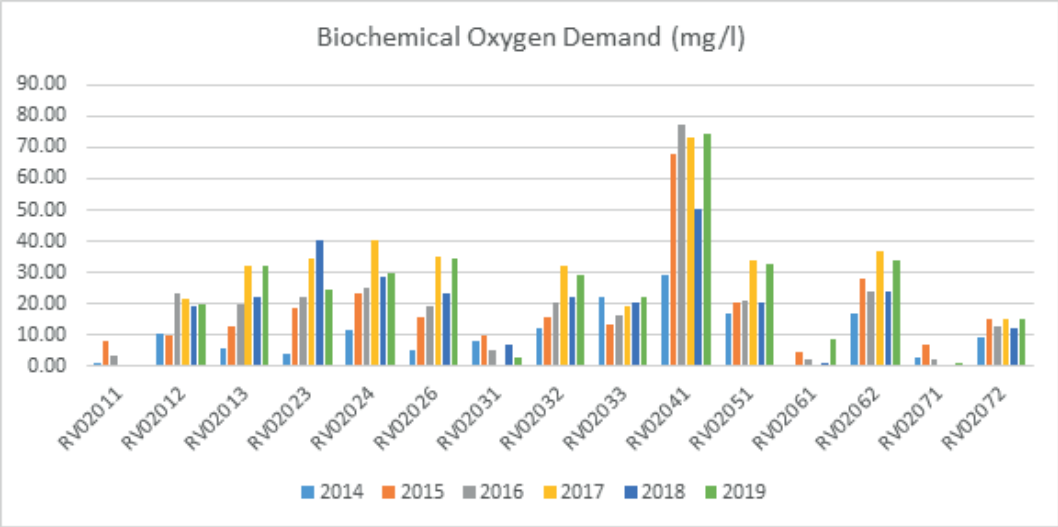

Figure 33: Biochemical Oxygen Demand at the Basin of Iber in mg/l

Electrical Conductivity – The overall situation in these sic years remained constant. As the sampling point with the lowest AAVs for the period 2014-2019 regarding electrical conductivity was the Iber River in Kushtova, with a range of 257 µs/cm -305 µs/cm. The lowest AAV for 2018 was recorded at the Shtime River in Devetak, with a value of 152 µs/cm. Whereas the sampling point with the highest AAVs for the four year monitoring period were recorded at the Graqanka River in Vragoli, with a value range between 1114 µs/cm - 1529 µs/cm (see Figure 34).

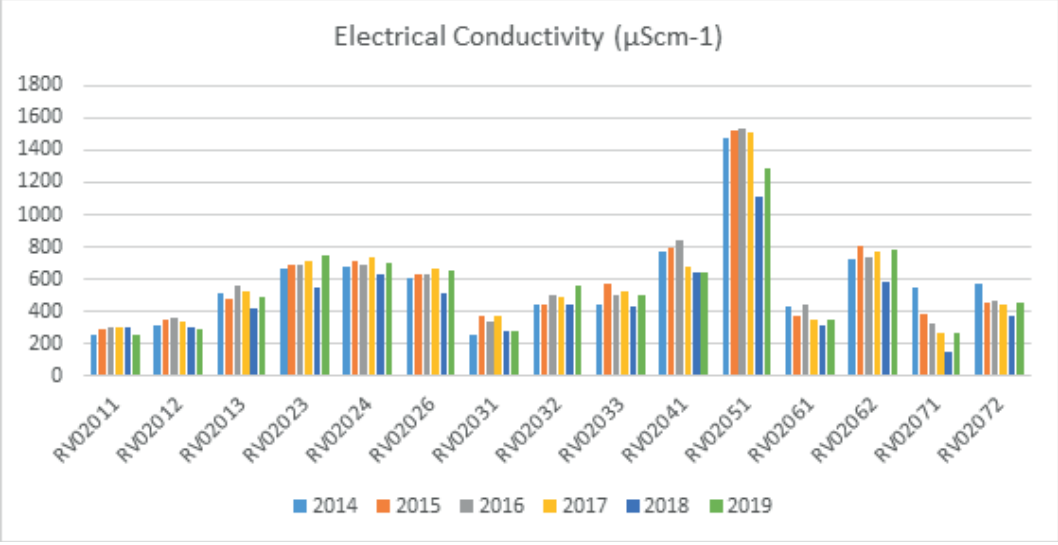

Figure 34: Electrical Conductivity at the Basin of Iber

Hydrogen Ion Concentration (pH) –The range of pH values in this basin was 7.36 - 8.28 in 2014, from 7.93 - 8.43 in 2015, and between 7.89 and 8.35 in 2016. The situation is the same for two years 2017-2018, where the pH values range from 7.64 – 8.2. Even in 2019 the value of pH remains almost the same 7.16-8.14. To summarize, the water of this basin falls in the category of low basic water (see Figure 35).

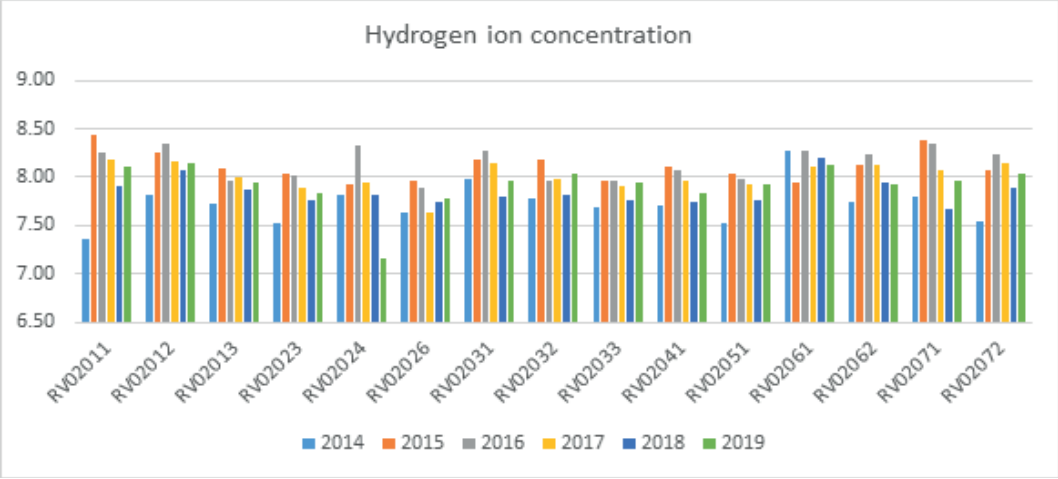

Figure 35: Hydrogen ion concentration at the Basin of Iber

Nitrogen-nitrate ($N\text{-}NO_3^-$) - limits of quantification of 0.3 mg/l are mainly registered at river sources (see Figure 36).

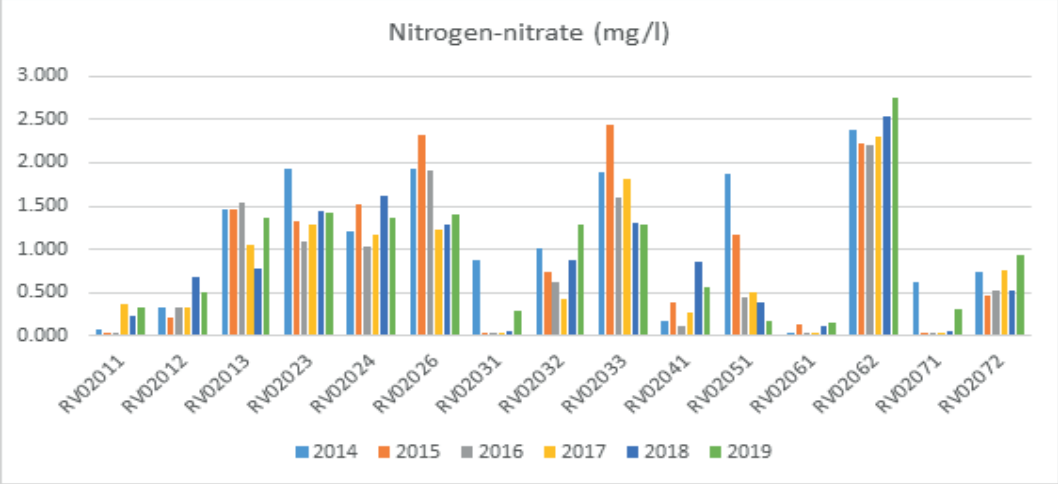

Figure 36: Nitrogen-nitrate at the Basin of Iber in mg/l

Maximum annual averages of the Nitrogen-nitrate parameter during the period 2014-2019 at the Drenica River in Vragoli range between 2.203 mg/l - 2.755 mg/l.

Nitrogen-nitrite ($N\text{-}NO_2^-$) – In 2014, the highest average value of 0.187 mg/l was recorded

at the sampling point of Llap River in Podujeva; in 2015 and 2016 the highest AAVs of 0.270 mg/l, and 0.191 mg/lm, respectively, were market at the Graqanka River in Vragoli; in 2017 and 2018 the highest AAVs ranging between 0.142 mg/l – 0.150 mg/l were marked at the Graqanka River in Vragoli. Whereas in 2019, the maximum AAV of 0.180 mg/l was marked at the Sitnica River sampling site in Vragoli (see Figure 37).

This implies a poor water quality of the Graqanka and Sitnica rivers.

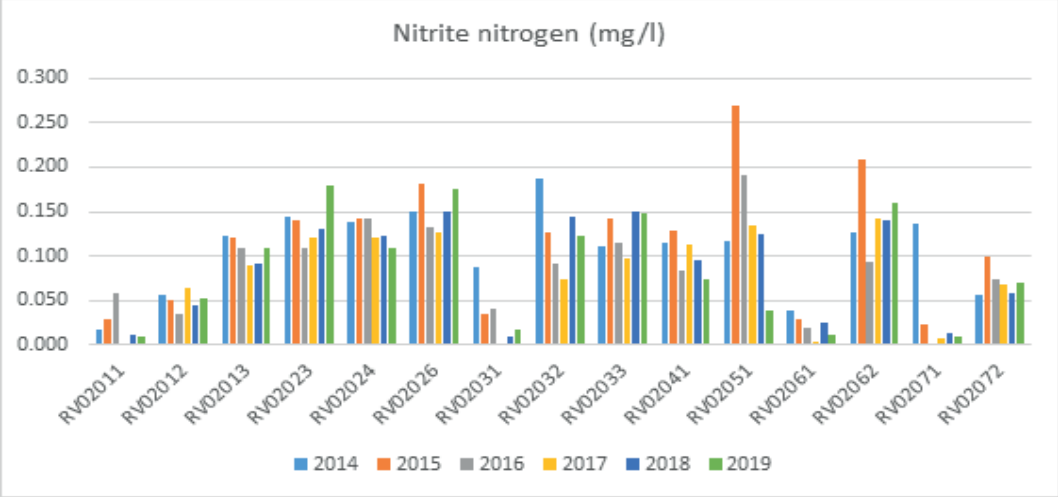

Figure 37: Nitrogen-nitrite at the Basin of Iber in mg/l

Ammonium nitrogen (N-NH_4^+) - The monitoring station in Bresje for the Prishtevka River shows higher values of this parameter than other monitoring stations of the rivers of this basin (see Figure 38).

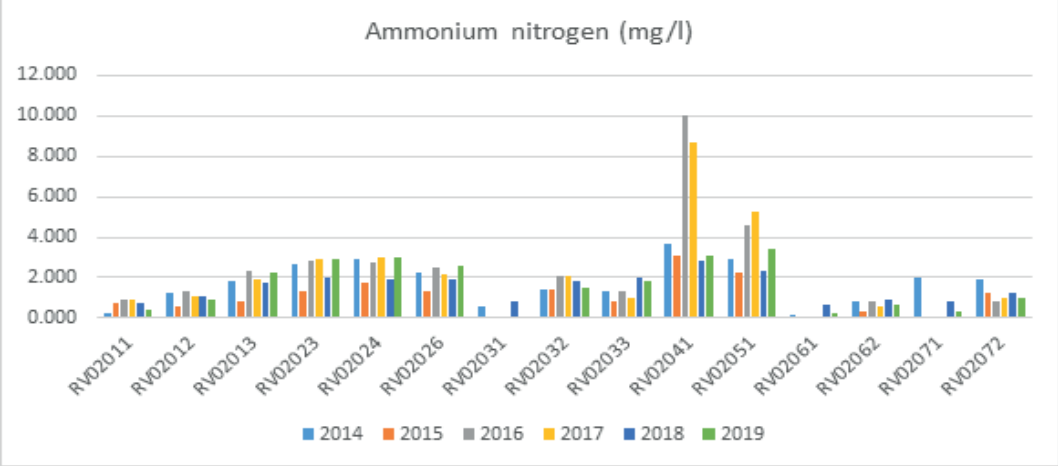

Figure 38: Ammonium nitrogen at the Basin of Iber in mg/l

The situation appears to be the same in 2019: at the Prishtevka River in Bresje, the highest AAV was 3.105 mg/l, whereas the lowest AAV was recorded at the river sources.

Orthophosphates phosphorus ($P\text{-}PO_4^{3-}$) - During a three-year period, the lowest AAV was registered in 2014 at the Drini i Bardhe River in Radavc, with a value of 0.0104 mg/l $P\text{-}PO_4^{3-}$, in 2015, 2017 and 2019 the lowest AAV was registered at the Drenica River in Pjetershtica with values ranging between 0.016 mg/l – 0.041 mg/l $P\text{-}PO_4^{3-}$. In 2016 and 2018, the lowest AAV value of 0.049 mg/l was marked at the Llap River in Marince, 0.016 mg/l respectively. The highest AAV for all years was registered at the Prishtevka River in Bresje with values ranging between 0.619 mg/l - 1.054 mg/l $P\text{-}PO_4^{3-}$ (see Figure 39).

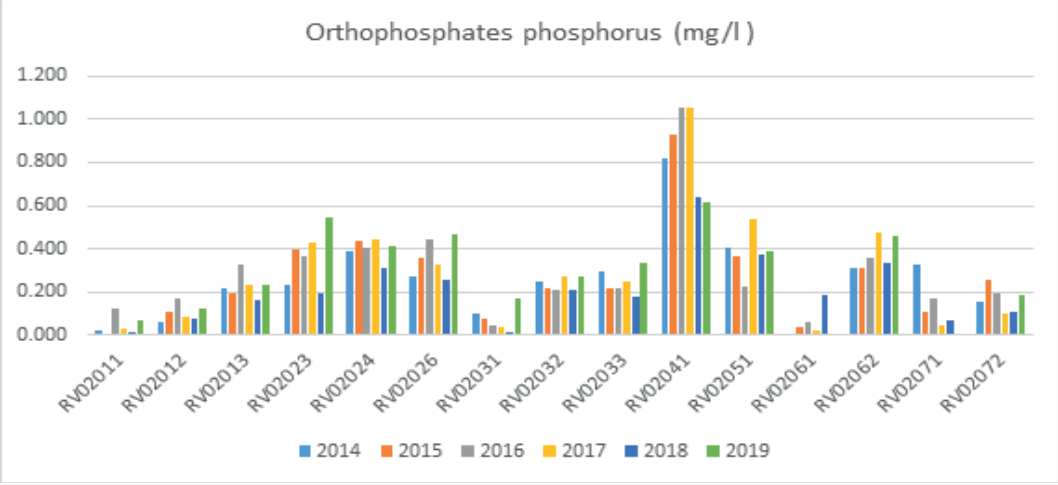

Figure 39: Phosphorus of orthophosphates at the Basin of Iber in mg/l

Total phosphorus (poly and ortho) – This parameter has been given only for the Prishtevka River in Bresje for the years 2014-2019, during which period were registered the highest AAV values ranging between 0.921 mg/l – 5.495 mg/l (see Figure 40).

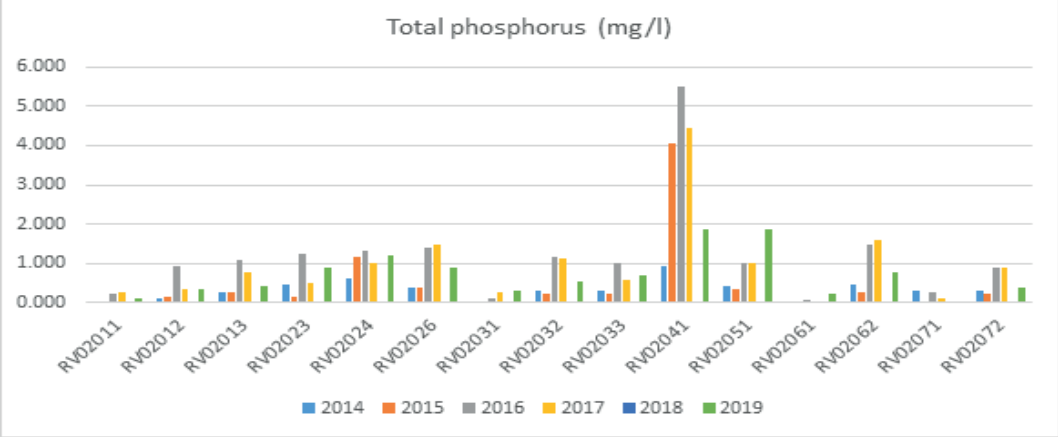

Figure 40: Total phosphorus (poly and ortho) at the Basin of Iber in mg/l

5.2.3. Morava e Binçës and Lepenc River Basins

In the following sections, average annual values of quality parameters are presented in figures for each separate river of Morava e Binçës and Lepenc sub-basins.

Quantity of dissolved oxygen (DO) –The graph shows a declining tendency of DO values in monitoring station after the discharge of urban wastewater. Waters in the upstream are clean and rich in oxygen. Oxygen impoverishment of rivers results from oxygen dissolving due to the discharge of organic matter in the form of urban wastewater (see Figure 41).

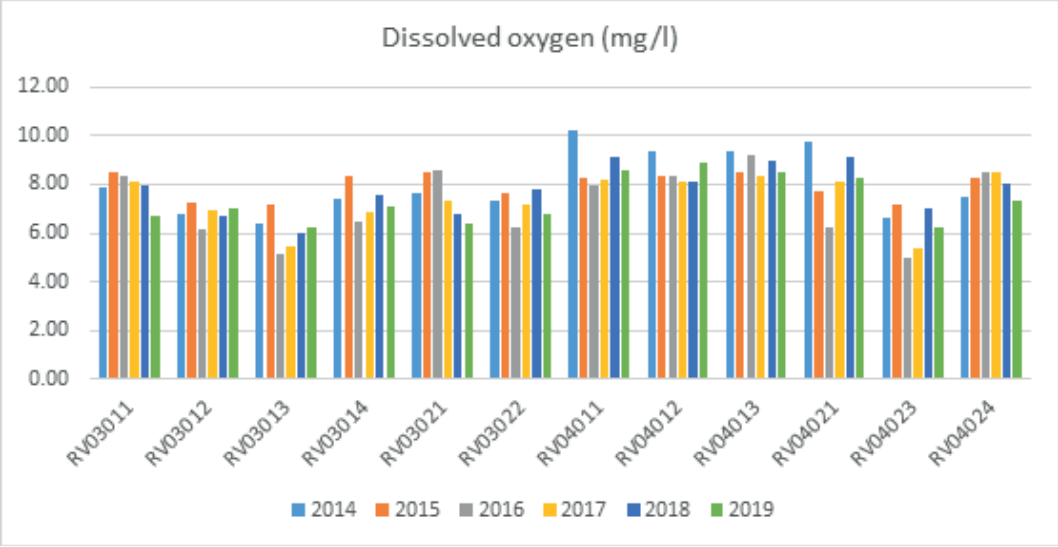

Figure 41: Dissolved oxygen (mg/l) at the Lepenc and M. Binçes basins

The DO parameter in the water of the Morava e Binces River in Uglar resulted low in the four-year monitoring period 2014, 2015, 2018 and 2019 (with values ranging between 4.97 mg/l – 7.15 mg/l), whereas the water of the Nerodime River in Gerlice for the years 2016 and 2017 resulted with a lower quantity of the DO parameter with a value of 4.97 mg/l and 5.36 mg/l, respectively. This is as a result of the discharge of urban and industrial wastewaters without prior treatment.

While in 2015, the highest AAV value of 8.54 mg/l was recorded at the Kriva Reka River in Marec, in 2014, the highest AAV value of 10.23 mg/l was recorded at the Lepenc River in Prevalle, Subain sampling point; in 2016, the highest AAV value of 9.21 mg/l was recorded at the Lepenc River in Hani i Elezit; in 2017, the highest AAV value of 8.51 mg/l was recorded at the Nerodime River in Kacanik; and in 2018, the highest AAV value of 9.14 mg/l was recorded at the Nerodime River in Jezerc. Similar situation appears to be also in 2019, where the highest AAV value of 8.87 mg/l O_2 was recorded at the Lepenc River in Kaçanik.

Biochemical Oxygen Demand in 5 days (BOD_5) - In 2014, the lowest AAV value of 1.05 mg/l was recorded at the Nerodime River in Jezerc; in 2015, the lowest AAV value of 4.00 mg/l was recorded at the Morava e Binçes River in Korbuliq; whereas for the years 2016, 2017, 2018 and 2019, the lowest AAVs values ranging from 0.20 mg/l to 0.53 mg/l were recorded at the Lepenc River in Prevalle, Subain sampling point.

The highest AAV was registered at the Kriva Reka River in Domoroc for the years 2014 and 2015, with respective values of 33.84 mg/l and 39.84 mg/l. In 2016, the highest AAV value of 42.40 mg/l was recorded at the Nerodime River in Gerlice; in 2017, the highest AAV value of 34.95 mg/l was recorded at the Morava e Binçes River in Domorovc; whereas in 2018 and 2019, the highest AAV values of 34.45 mg/l, namely 28.6 mg/l BOD_5 were recorded at the Morava e Binçes River in Ranillug (see Figure 42).

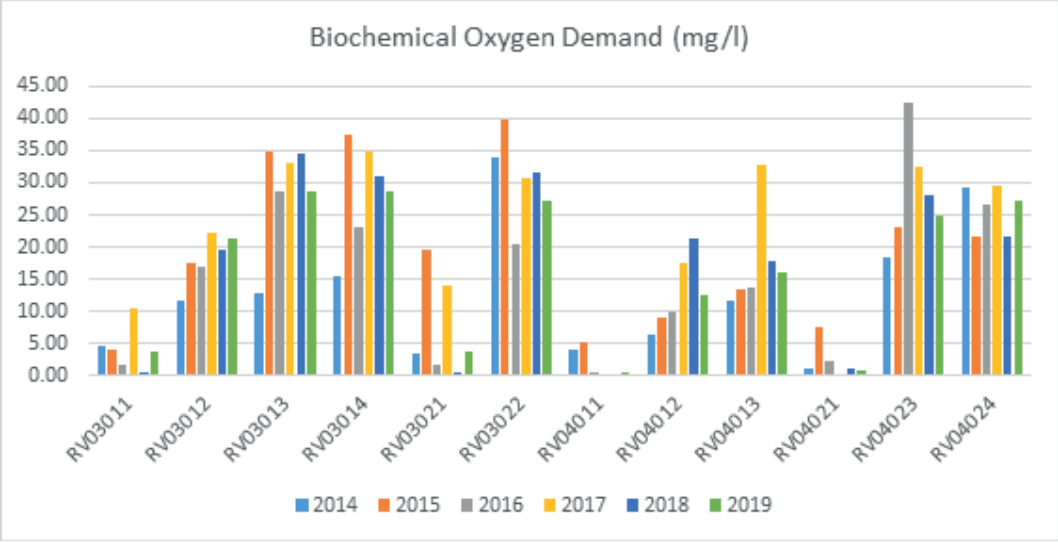

Figure 42: Biochemical Oxygen Demand (mg/l) at the Lepenc and M. Binçes basins

Electrical Conductivity – Throughout the years 2014-2019, the lowest AAV values ranging between 20 µs/cm - 73 µs/cm were recorded at the Lepenc River in Prevalle.

Whereas, the highest AAV values ranging between 58.3 µs/cm - 643 µs/cm for the years 2014, 2015, 2017 and 2019 were recorded at the Kriva Reka River in Domorovc. In 2016, the lowest AAV value of 656 µs/cm was recorded at the Morava e Binçes River in Ranillug, whereas in 2018, the highest AAV value of 477 µs/cm was recorded at the Lepenc River in Hani i Elezit sampling point (see Figure 43).

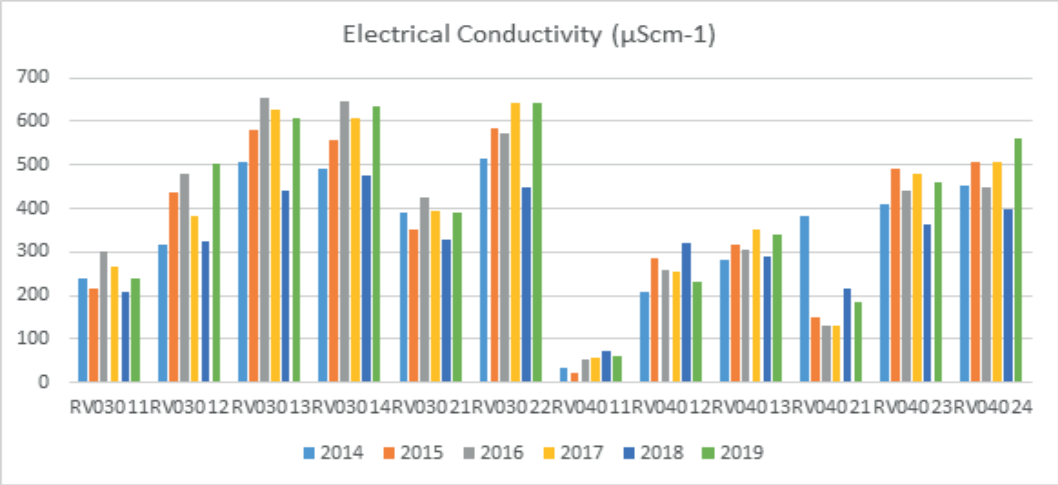

Figure 43: Electrical conductivity (µs/cm) at the Lepenc and M. Binçes basins

Hydrogen ion concentration (pH)- The pH values ranged between 7.29 and 8.24 in 2014; in 2015, pH values ranged between 7.79 - 8.43; in 2016, pH values ranged between 7.9 - 8.55; in 2017, pH values ranged between 7.89 - 8.35; in 2018, pH values ranged between 7.58 - 8.12; and in 2019, pH values ranged between 7.80 - 8.21 (see Figure 44).

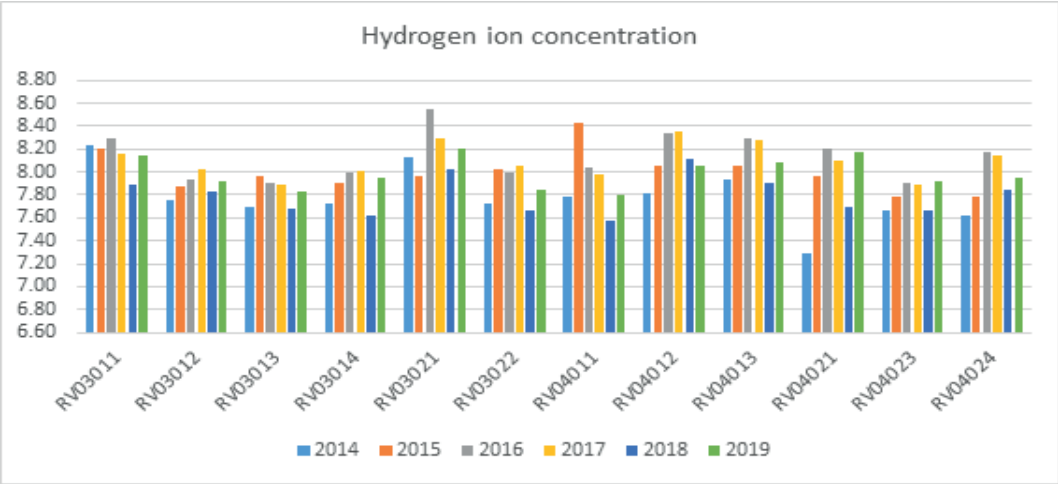

Figure 44: Hydrogen ion concentration (pH) at the Lepenc and M. Binçes basins

Nitrogen-nitrate ($N\text{-}NO_3$-) - in both basins at the water sources nitrogen-nitrates are mainly present with a quantification limit of (0.3 mg/l), while the highest AAV for the years 2014, 2016, 2017, 2018 and 2019 were registered at the Morava e Binçës River in Domorovc, with values ranging between 1.40 mg/l - 1.785 mg/l. While in 2015, the highest AAV value of 1.186 mg/l was recorded at the Nerodime river in Jezerc (see Figure 45).

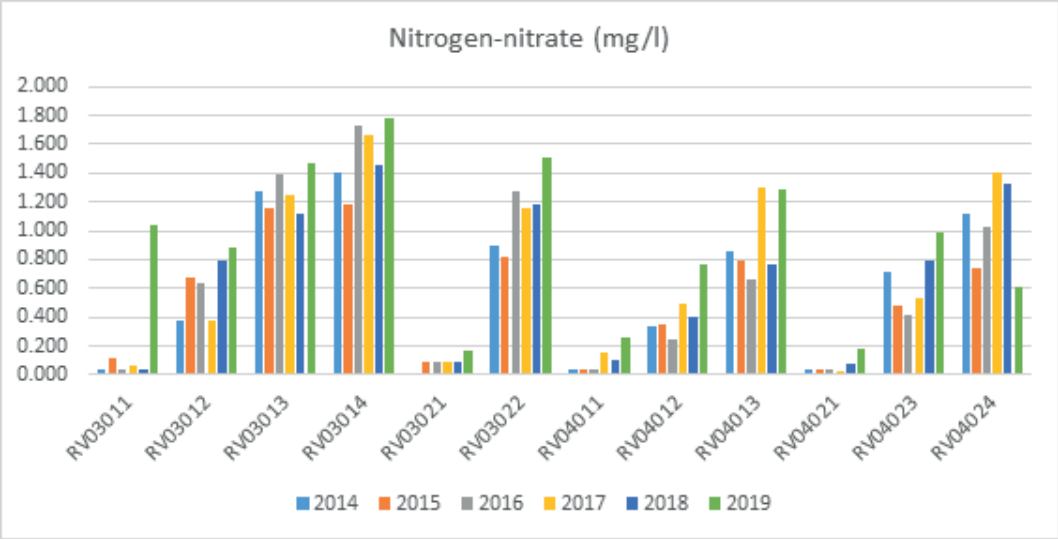

Figure 45: Nitrogen-nitrate (mg/l) at the Lepenc and M. Binçës basins

Nitrogen-nitrite ($N\text{-}NO_2\text{-}$) - in 2014, this parameter had the lowest AAV value of 0.02 mg/l at the Lepenc river in Prevalla; in 2015, the lowest AAV value of 0.036 mg/l was recorded ate the Lepenc river in Hani i Elezit; in 2017, the lowest AAV value of 0.016 mg/l was recorded at the Lepenc river in Prevalla; while in 2018, the quantification limit of (0.009 mg/l) was recorded at the Kriva Reka river in Marec, in years 2016 and 2019, the quantification limit of (0.009 mg/l) was recorded at the Nerodime river in Jezerc (see Figure 46).

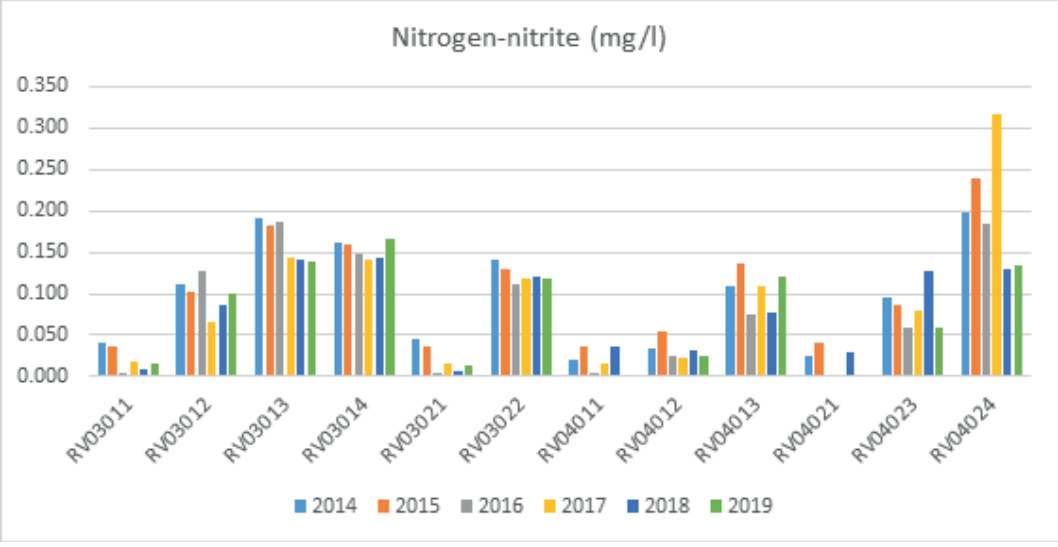

Figure 46: Nitrogen-nitrite (mg/l^-) at the Lepenc and M. Binçës basins

On the other hand, the highest AAV values of nitrogen-nitrite for 2014, 2015, 2016 and 2017 were recorded at the Nerodime river in Kaçanik with values from 0.198 mg/l to 0.317 mg/l, while in 2018 and 2019, the highest AAV vales of 0.144 mg/l and 0.167 mg/l respectively were recorded at the Morava e Binçës river in Domorovc.

Ammonium nitrogen ($N\text{-}NH_4^+$) - As a pollution factor, it is present in high quantities after the discharge of urban and rural wastewater. In alkaline environments of pH > 10, ammoniac has harmful effects upon the aqueous fauna. Its presence results in a foul smell (see Figure 47).

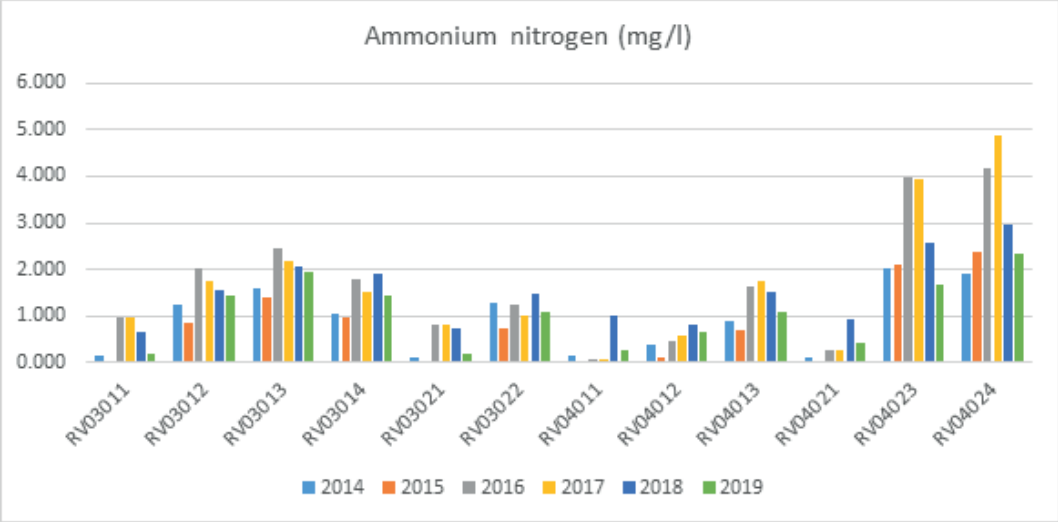

Figure 47: Ammonium nitrogen (mg/l) at the Lepenc and M. Binçës basins

In 2014 and 2019, the lowest AAV value of 0.102 mg/l and 0.183.mg/l respectively of ammonium nitrogen was recorded at the Kriva Reka river in Marec; in 2015 and 2018, the lowest AAV values of 0.006 mg/l and 0.654 mg/l $N\text{-}NH_4^+$ respectively was recorded at the Morava e Binçës river in Kurbuliq, and in 2016 and 2017, the lowest AAV value of 0.063 mg/l remained the same for both years at the Lepenc river in Prevalla.

In 2014, the highest AAV value of 2,023mg/l ammonium nitrogen was recorded at the Nerodime river in Gerlica; while in 2015, 2016, 2017, 2018 and 2019, the highest AAV values ranging between 2.335 mg/l - 4.895 mg/l were recorded at the Nerodime river in Kaçanik.

Orthophosphates phosphorus ($P\text{-}PO_4^{3-}$) - in 2014 and 2018, the lowest AAV value of 0.038 mg/l and 0.035 mg/l respectively were recorded at the Kriva Reka river in Marec; in 2015, the lowest AAV value of 0.060 mg/l was recorded at the Lepenc river in Prevalla;

in 2017, the lowest AAV value of 0.049 mg/l was recorded at the Morava e Binçës river in Kurbuliq; and in 2016 and 2019, the lowest AAV values of 0.101 mg/l and 0.005 mg/l respectively were recorded at the Nerodime river in Jezerc.

The highest AAV values for years 2014, 2016 and 2019 ranging between 0.292 mg/l - 0.477mg/l were recorded at the Morava e Binçës river in-Ranillug. Whereas, in 2015, 2017 and 2018, the highest AAV values ranging between 0.463 mg/l - 0.571 mg/l were recorded at the Nerodime river in Kaçanik (see Figure 48).

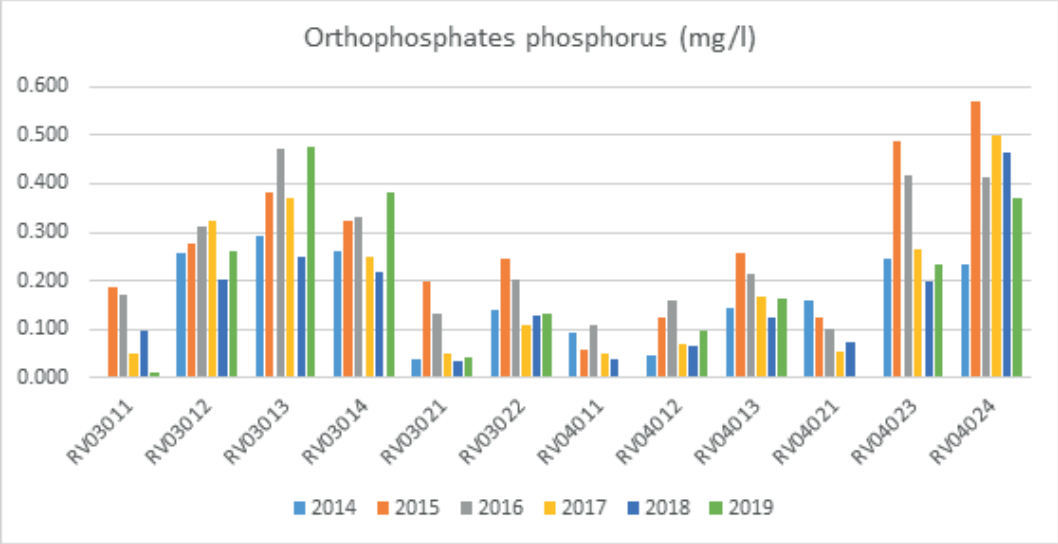

Figure 48: Phosphorus of orthophosphates (mg/l) at the Lepenc and M. Binçës basins

The results show that the phosphate parameter during these six years of monitoring recorded its highest AAV values at the Morava e Binçës and Nerodime rivers, more precisely phosphate ions with higher values appear mainly in those monitoring stations after urban and industrial discharges.

Total phosphorus (poly and ortho) - this parameter also appears with low values at water sources, but along the river stream total value of the phosphorus parameter increases.

In 2016, the highest AAV value of 1.835 mg/l was recorded at the Nerodime river in Gerlica; in 2017, a value of 1,740mg/l was recorded at the Morava e Binçës river in Ranillug; and in 2014, 2015 and 2019, the AAV values ranging between 0.360 mg/l - 1,163 mg/l were recorded at the Nerodime river in Kaçanik (see Figure 49).

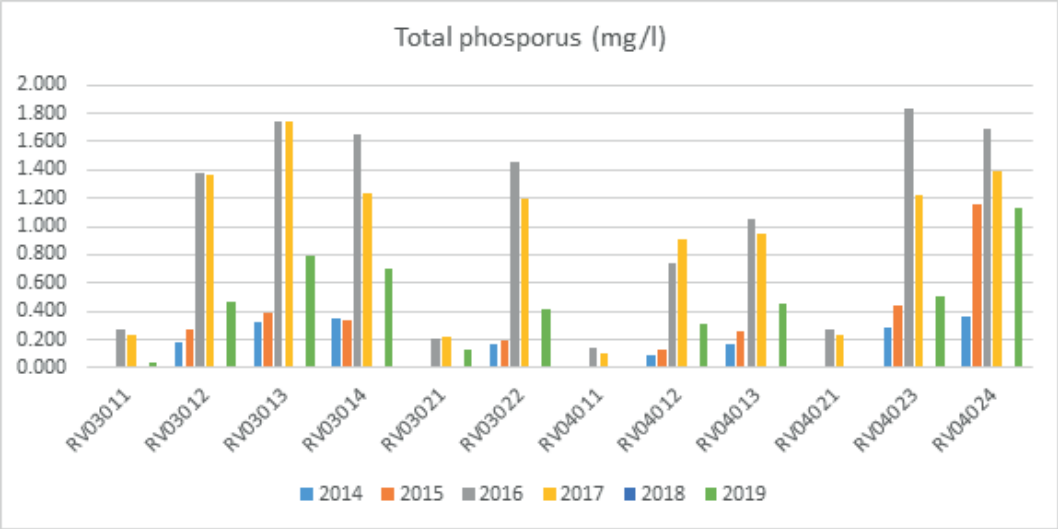

Figure 49: Total phosphorus (poly and ortho) (mg/l) at the Lepenc and M. Binçës basins

5.3. Groundwater Monitoring / Monitoring Plan

The component "Establishment of the groundwater monitoring network in Kosovo", is one of the eight technical components of the Kosovo Environmental Programme on Environment, Climate and Water Resources Management, proposed by MESP and funded by the Swedish International Cooperation Agency (SIDA).

The objective of this component is establishment of a groundwater monitoring network by KHMI/KEPA, the extent of which will have good coverage of all river basins in Kosovo. Through this component will be made rehabilitation of existing wells and selection of new wells (built by component 6) for monitoring purposes, as well as quipping with measuring instruments. The selection of wells for monitoring was made based on the analysis of the location in terms of hydrogeological, anthropogenic pressure and the criterion of easy access to the monitoring well, specifically wells that were taken into consideration were those with:

- Better capacity (debit);
- Extent to the groundwater body (aquifer);
- Easier access (public property is prioritized)
- Anthropogenic pressures

Based on the above criteria and taking into account the existing capacities, it has been determined that at this stage the groundwater monitoring network has 32 monitoring wells (see Figure 50), which will be equipped with sensors for measuring water level in wells and for measuring the quality of water. The wells will be located in the following geographical configuration;

12 wells in the Drini i Bardhë basin,

- 8 wells in the Iber basin,

- 6 wells in the Morava e Binçës basin, and
- 6 wells in the Lepenc basin.[20]

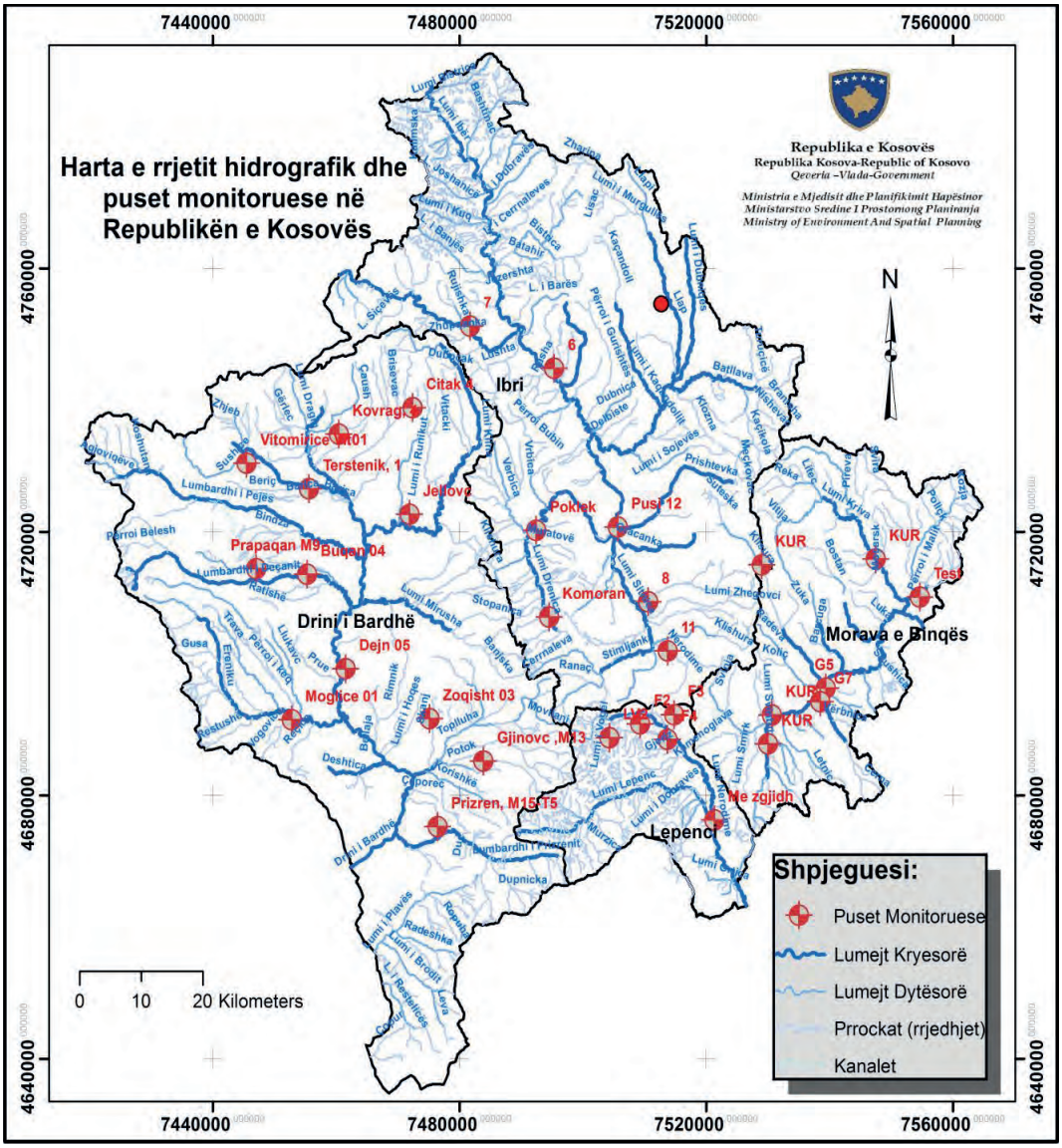

Figure.50. Hydrographical network map and monitoring wells

20 Groundwater Monitoring Network (Draft) -AMMK/IHMK, Prishtina, 2019

5.4. Drinking water monitoring

Drinking water quality refers to microbiological and physical-chemical properties. The quality of drinking water is an important indicator for the well-being and health of the population. Kosovo has good legislation for the protection of drinking water. Administrative Instruction no. 16/2012, Administrative Instruction No. 15/2017, are among the most important administrative instructions for the protection of drinking water, which are also in line with the EU drinking water standards.

RWCs are responsible for supplying quality water to their customers. They are also obliged to perform internal monitoring/testing of water quality. On the other hand, NIPHK is an Institution with legal responsibility to control and monitor drinking water throughout the country. NIPHK ensures that the water distributed by RWC is in compliance with the values under local standards for microbiological and physical-chemical parameters. In this report the quality assessment is conducted based on the data reported to WRA by Water Monitoring Centers.

Based on the results of monitoring conducted by the Water Monitoring Centre of the National Institute of Public Health (NIPH) and in accordance with its responsibilities, the overall quality of drinking water in Kosovo provided to customers in service areas of seven RWCs, it resulted that drinking water during 2018/2019 was in line with drinking water standards. During 2018, 8,598 water samples were taken from customer taps for the purpose of water quality testing in terms of physical-chemical and microbiological parameters, whereby 99.4% of samples resulted to be in accordance with the required standards. While in 2019, 9,229 water samples were taken from the taps for the purpose of water quality testing in terms of physical-chemical and microbiological parameters (See Figure 51). Out of the total water samples, 98.8% of them were in compliance with local water quality standards. Referring to these statistics, it is estimated that the quality of water supplied by RWCs is of a very good quality (see Table 13).

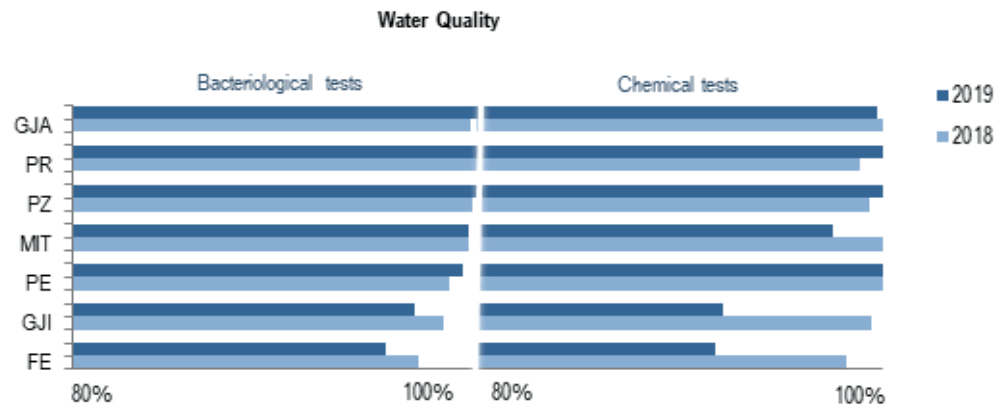

Figure 51. Compliance of drinking water tests under local standards for bacteriological and chemical parameters (RWCs, 2018/2019)

As it is shown in table 13, during 2018, the highest compliance in terms of values of microbiological parameters was in RWC Prishtina with 100%, while the lowest compliance in RWC Bifurkacion with 97.1%. In 2019, the highest compliance for microbiological parameters was in RWC Prishtina, Hidroregjioni Jugor, Gjakova with 100%, while the lowest compliance was recorded in RWC Bifurcation with 95.5%, which marked a decrease by 1.6% compared to the previous year.

Table 13: The rate (%) of bacteriological and physical-chemical tests in compliance with water quality standards by RWCs - 2018/2019

Companies	Year	RWC Prishtina	RWC Hidroreg-jioni Jugor	RWC Hidrodrini	RWC Mitrovica	RWC Gjakova	RWC Bifurk-acioni	RWC Hidro-morava	Sector average
Microbiological	2018	100%	99.7%	98.7%	99.6%	99.7%	97.1%	98.3%	99.3%
	2019	100.0%	100.0%	99.3%	99.5%	100.0%	95.5%	96.9%	**99.2%**
Physic-Chemical	2018	98.9%	99.4%	100%	100%	100%	98.2%	99.4%	99.5%
	2019	99.8%	100.0%	100.0%	97.6%	100.0%	91.7%	92.1%	**97.9%**
Average for RWC	**2018**	99.7%	99.6%	99.1%	99.7%	99.8%	97.4%	98.8%	99.4%
	2019	**99.9%**	**100.0%**	**99.5%**	**99.1%**	**100.0%**	**94.5%**	**94.9%**	**98.8%**

RWCs Hidormorava and Bifurkacioni are supplying lower quality drinking water, both in terms of bacteriological and physical-chemical compliance, due to non-regular supply of drinking water.

The coverage with the water supply service during these years according to WRA reaches the rate of 75%, while the coverage with wastewater services reaches the rate of 65%. RWCs Prishtina, Gjakova and Hidrodrini have achieved high coverage of population with services within their respective service areas.

In the framework of further commitment, to improve the safety of water quality provided to consumers and the population, NIPH is trying to advance, i.e. update AI 16/2012, in the spirit of the latest requirements of the European Directive and WHO Recommendations.

6. WASTEWATER DISCHARGE AND TREATMENT

6.1. Urban wastewater discharge

Urban wastewaters are still being discharged into river waters untreated. Untreated urban wastewater is estimated to be around 35-40 milion m^3. Urban wastewater treatment is very low. Kosovo, apart from the urban wastewater treatment plants in Skenderaj, Gjakova, a mini wastewater plant in Batllava and biological treatment plant in Halilaq, has not made yet any investment in this sector.

According to Kosovo water statistics, from 2015 to 2018 we had a variability of discharged wastewater (see Table 14).

Table 14. Urban wastewater discharge during 2015-2018

Years	Households Wastewater (m^3)
2015	34,230,062
2016	35,400,797
2017	37,713,245
2018	35,025,024

Investments for urban wastewater treatment in Kosovo are assessed according to various sources as shown in Table 15 (according to the Kosovo National Water Strategy 2017-2036) [21]

Table 15. Investment estimates for urban wastewater treatment

Estimations	Cost
World Bank AMVA:	€ 424 million (generic estimate for expansion without renovation)
Compliance model:	€ 800 million (including: renovations, storm water, all agglomerations)
Compliance model:	€ 493 million (minimum implementation)
Investment plans:	€ 675 million (adjusted estimate - excluding storm water)
Feasibility studies:	€ 557 million (excluding “smaller agglomerations”)

21 Kosovo National Water Strategy 2017 - 2036

6.2. Discharge of industrial wastewater

Compliance with Law no. 03/L-043 on Integrated Prevention Pollution Control is the main instrument for the prevention of water pollution from industrial discharges. Implementation of this law will prevent discharge of untreated industrial wastewater into rivers. The use of water by industry is very large, but so as the discharge of these wastewaters (see Table 16).

Table 16. Wastewater discharge from industry and economic operators during 2015-2018

Years	Industrial and economic operators Discharged wastewater (m^3)
2015	4,392,660
2016	4,874,424
2017	5,050,495
2018	5,013,557

6.3. Urban, industrial and agricultural wastewater treatment

Urban wastewater treatment in the country is very low. Currently, a wastewater treatment plant of larger dimension is located in Skenderaj, managed by RWC 'Mitrovica' (see Figure 52) and there are some small wastewater treatment plants at the local level. The rest of the urban wastewaters do not meet the environmental standards for their discharge into rivers.

The wastewater treated by the wastewater treatment plant in Skenderaj varies from year to year and by the form of its operation (see Table 17).

Table 17. Treatment of urban wastewater by the wastewater treatment plant in Skenderaj during the years 2015-2019[22]

Years	Wastewater Treatment Plant in Skenderaj Treated wastewater (m^3)
2015	595697
2016	487534
2017	521998
2018	761012
2019	967629

22 Water Statistics in Kosovo 2018-2019

Figure.52. Wastewater Treatment Plant in Skenderaj

7. WATER REGULATION AND CONTROL

7.1. Early flood warnings

Floods as a natural phenomenon are often caused by intense precipitation and rapid snowmelt. Rivers in Kosovo are characterized by evident changes between minimum and maximum levels of water. Different morphological features, such as wide fields surrounded by mountains, result in wide range and dynamic floods. Relatively hollow unregulated and unmaintained riverbeds, throwing waste into rivers and uncontrollable use of inert materials from riverbeds result in wider floods in Kosovo. According to the Water Master Plan of 1983 on floods probable to occur once in 100 year, they could have significant impacts.

Flood warning throughout 2015

Intense precipitation during these days is caused by a cyclone that came from the north-western part of the European Continent in which our country was included by a weather followed by high intensity rainfall, especially since February 4th, reaching a maximum during 5 and 6 February 2015, with a more pronounced intensity of temporal and spatial distribution, especially in the western and central part of the Balkan Peninsula. These precipitations have caused a quick rise in the water level of Kosovo Rivers which are rapid due to their mountainous character, where as a result most of them have risen from their beds causing floods in some areas of Kosovo. The hydrological situation is almost the same in the entire territory of Kosovo, but it is more aggravated in the Sitnica River basin, including most of its watercourses from both sides, starting from the central part of the Kosovo plain (Lipjan and its surroundings, Fushe Kosova, Obiliq, Vushtrri, etc.). Also the right stream of Sitnica, Llap River, in its middle course and especially in the lower section (Lluzhan, Lupç i Ulët, etc.), flooding the lands on both sides of it. Problematic are the mountain streams with the torrent character (creeks, etc.), which due to the configuration of the relief have a flood character causing damage in some villages and city neighbourhoods in some parts of Kosovo. The situation is almost the same in the Eastern part of Kosovo, in the Morava e Binçës basin, especially in the middle and lower course of it, where it has risen from the bed from near settlements Budrikë e Ulët, Lladovë, Dobërqan, Rranillug, Korminjan, Kriva Reka, Domorovc and its streams on the left side (Hogosht, Hodonoc, Karaçevë rivers, etc.) where as a result of this some houses in some villages are flooded and water infrastructure has been damaged.

Flood warning during 2016

As shown through the SPI analysis, 2016 has been a slightly wetter year. During winter, spring and autumn some flood warnings were issued for the Dukagjini Plain, Kosovo Plain (Iber River Basin) and for all of Kosovo. In Table 18 are listed official flood warnings issued in Kosovo and other parts, for which they were issued. Figure 53 describes as an example a flooded area near Nadakoc, along the Sitnica river on 10 November 2016. Floods have

occurred due to a frontal system of heavy rains over the Balkans from north-west to south-east for several days.

Table 18: Official flood warnings in Kosovo during 2016

No.	From	To	Affected area
1	06/01/2016	09/01/2016	All Kosovo
2	07/03/2016	08/03/2016	Kosovo Plain
3	13/03/2016	15/04/2016	All Kosovo
4	02/04/2016	05/04/2016	All Kosovo
5	21/05/2016	22/05/2016	All Kosovo
6	06/09/2016	08/09/2016	Dukagjini Plain
7	07/11/2016	09/11/2016	All Kosovo

Figure 53: Area flooded by the Sitnica River near Nadakoc on 10 November 2016

Flood forecast for 2018

It is noted that during 2017 there was no assessment of flood forecasts in Kosovo.

On 03/02/2018, according to the Kosovo Hydrometeorological Institute, there were heavy rains, initially in the western part of Kosovo (mountainous area of Bjeshkët e Nemuna), which caused rapid formation of streams in that area, causing rapid flooding. The intensity of precipitation in some areas was 25-40 mm/3h, where as a result it was caused rising of levels in the river streams and outflows from their beds in some river segments as well as material damage. The peak of the highest levels in the rivers reaches from 18 o'clock, which continued during the next day. Water levels in the main rivers of the country during this time were as follows:

- Drini Bardhe in Gjonaj - the level reaches 321 cm,
- Bistrica Peja in Gryke - the level reaches 135 cm,
- Lepenci in Hani i Elezit- the level reaches 162 cm,
- Drini i Bardhe in Kepuz - the level reaches 213 cm,
- Sitnica in Nedakoc - the level reaches 169 cm,
- Iber in Leposavic - the level reaches 180 cm,
- Morava Binçes in Konçul - the level reaches 294 cm.

There have also been landslides in sensitive areas near rivers.

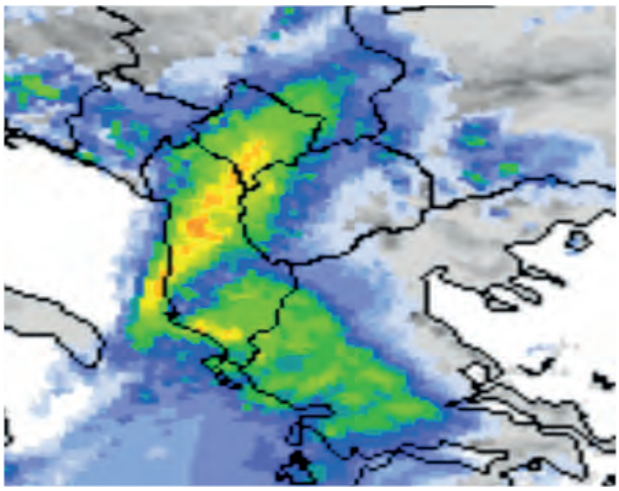

Figure 54. Dispersion of droughts

Flood forecast for 2019

The Hydrology Sector of the Kosovo Hydrometeorological Institute has forecasted that floods will occur due to heavy rainfall that is expected in the country in the coming days.

According to the notification of KHMI, the floods will occur on 14.05.2019, and will include the western, southern and northern part of Kosovo (see Figure 55).

Rainfall is expected to start 72 hours after the announcement, with an amount of >30 - 50 mm, and with a high probability of extreme rainfall, floods and severe landslides in sensitive areas.

The most affected areas will be the western and southern part of the country.

Fig.55. Images from the floods

On 06/11/2019, low to moderate rainfall has continued initially in the western part of Kosovo (Albanian Alps area), which during the day included the northern and north-western part of the country. While from 07/11/2019, rainfall covered most part of Kosovo, with the highest intensity in Dukagjini area.

7.2. Droughts

The Kosovo Hydrometeorological Institute, based on drought/humidity monitoring conditions in the Republic of Kosovo for the six-month hydrological period October 2019 - March 2020, has made an analysis of the situation according to the Standard Precipitation Index (SPI) (see Figure 56).

Kosovo is a country prone to droughts. KHMI/Hydrology sector continuously measures the SPI in a range of locations in Kosovo from where precipitation is monitored.

The SPI is defined in order to provide information to the public, water companies and drought policy makers for a sustainable economic development of Kosovo and better management of water resources.

As shown on the map, the SPI analysis shows that for the six months hydrology period, October 2019 - March 2020, humidity/drought conditions in Kosovo are close to normal in most parts of Kosovo (see Figure 57).

During this period, the locations in south-west Kosovo have shown that the country is close to the state of low drought, while part of the eastern Kosovo is close to normal, with the exception of a part of Kamenica town, where according to SPI calculation, appears a drought situation.

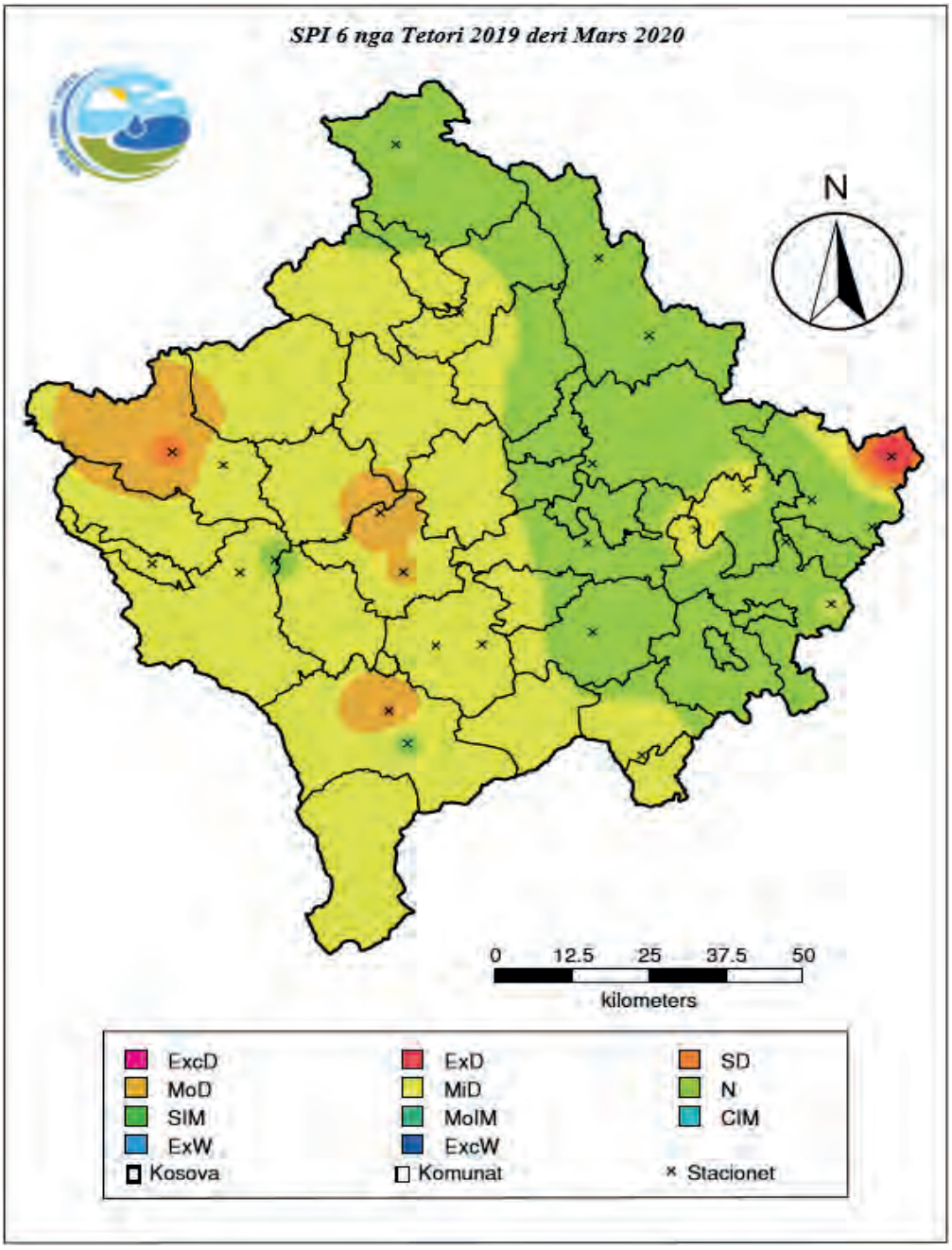

Figure 56. Precipitations according to the Standard Precipitation Index

Figure 57. Drought at the Badovc Lake

7.3. Erosive zones

Erosion is one of the most severe forms of degradation of soil, forests, landscapes, mountain slopes, residence and road infrastructure.

No complete information is available to assess damages caused by erosion. To prevent erosion, the provisions determined in the Law on Waters need to be enforced and actions foreseen by the Spatial Plan 2010-2020 need to be implemented. Necessary actions include hydro-technical and land management measures.

Thus, erosion prevention necessitates a range of technical, program and legal measures, including but not limited to:

- Limit zones at risk from erosion and develop appropriate measures for each zone.
- Determine legally zones at risk from erosion.
- Inform regularly and give instructions to all affected entities.
- Implement a program that aims law enforcement against violations of provisions regulating protected areas.

7.4. Dams

Law no. 04/L-147 on Waters of Kosovo covers some aspects related to water accumulation dams, such as: management, survey and alarm in case of danger from dams.

Dams are simple and robust structures. Never the less they store huge amounts of water,

which if uncontrolled released can produce loss of lives and properties. The safety of a dam depends on 4 pillars. They are:

• Clear legislative frame work defining responsibility of the owner of the dam and the controlling system of the governmental authority.

• Modern design concept taking into account natural and technologic hazards, appropriate material selection and careful supervised construction.

• Careful monitoring of the dam behaviour and continues comparison of the measured values with the behaviour predictions.

• Continuous maintenance and operation activities as well appropriate emergency concepts and alarming organisations.[23]

Table 19. Dams in Kosovo

No.	Dams	Data
1	Batlava Dam	Type of dam – zoned rock fill dam, central clay core Purpose - Water supply First impounding – about 1960 Height - 46.45 m Crest length – 288 m Crest level - 638.45 masl Freeboard - 3.45 m Reservoir volume - 40 000 000 m^3 Catchment area - 226 km^2
2	Badovc Dam	Type of dam – Zoned rock fill dam Purpose - Water supply First impounding - 1960 Height - 45.0 m Crest length - 289 m Reservoir volume - 32 million m^3 Reservoir area – 1'563'000 m^3
3	Radoniqi Dam	Type of dam – Zoned rock fill, central core Purpose - Water supply and irrigation First impounding - 1982 Height - 61 m Crest length - 770 m Reservoir volume - 113 million m^3 Reservoir area - 573 ha Catchment area - 180 km^2

23 WTF Project - Dam Safety Review Kosovo, 2012

4	Ujmani/Gazivoda Dam	Type of dam - Zoned rock fill, central core Purpose - Water First impounding - 1979 Height – 101 m Crest length – 519 m Reservoir volume – 370.000.000 m^3; live 350.000.000 m^3 Reservoir area - 11.9 km^2, of which 9.2 km^2 belong to Kosovo and 2.7 km^2 belong to Serbia Catchment area – 1.100 km^2
5	Perlepnica Dam	Type of dam - Rock fill with central clay core Purpose – Water supply First impounding - 1982 Height - 40 m Crest length - 165 m Reservoir volume – 4.200.000 m^3, live 3.300.000 m^3 Reservoir area - 18.24 km^2 Catchment area - 55 km^2

7.5. Degraded areas (years 2012-2018)

Our rivers in the last decade, not ignoring the previous period, have been subjected to an increasing pressure from human activity and economic development, which in most cases has been expressed as not in accordance with sustainable environmental development and long-term consequences. Many rivers in the country are suffering from degradation and overuse of inert materials. Indiscriminate overuse of inert materials has determined the use of natural reserves of rivers on their regenerative capacities. The natural ability of rivers to cover open pits with entire surfaces, many parts can be considered irreversible. The environmental conditions of rivers continue to be greatly deteriorated by gravel miners.

The most degraded and still being degraded rivers are;

- Drini i Bardh River,
- Lumëbardhi of Peja
- Ereniku river - Gjakova
- Desivojce and Krivareke River - Kamenica
- Iber river - Mitrovica

The degraded area from the sand excavation until 2018 is estimated to be 1421.06 ha. From 2009 to 2018, the degradation area of rivers has increased by 414.78 ha.

The best way and method of assessing and analysing environmental condition of rivers was to act according to comparative studies and models, based on the terrain condition and satellite images - Orthophotos of 2009/2012/2018 (see Table 20) and (see Figure 58).

Table 20. Degraded riverbeds by surface area during 2009-2018

No.	Year	Surface area (ha)
1	2009	1006.28
2	2012	1221.07
3	2018	1421.06

Figure. 58. Degradation of the Drini i Bardh River, 2012-2018

8. SERVICES, INSFRASTRUCTURE AND INVESTMENT

8.1. Fees for water use / water and wastewater services

Pursuant to AI no. 02/2016 on the Water Payment Structure, respectively compensation for the use of water, the fees are as follows:

Table 21. Untreated waters, which are taken directly

No.	Forms of water intake	m^3, ha, %
1	From the watercourses	0.003€ per m^3
2	From groundwater	0.001€ per m^3
3	From artificial accumulations	0.002€ per m^3
4	From thermal waters used for heating and healing	0.01€ per m^3
5	Manufacturers who make packaging of natural and mineral water for sold water	0.001 per litter sold
6	Water users who use water for Irrigation from	5 € per hectare
7	Water flows	10€ per hectare
8	Water users who use water for Irrigation from artificial accumulations	2.5€ per hectare
9	Water users who use groundwater for Irrigation	0.03€ per m^3
10	Water users for fish ponds	2.5€/ hectare
11	Users to produce electricity for every kilowatt-hour produced in the hydropower plant.	25% of the selling price
12	Every kilowatt-hour produced in power plants with closed cooling system.	1.7% of the selling price
13	Pool water users pay.	2.5% of the price for each ticket sold at the entrance
14	Users who use cooling water in technological processes.	0.002€ for 1m^3

Compensation for wastewater discharge

No.	Forms of water discharge	m^3
1	Waters used in technical-technological processes for processing and circulation of oil and petroleum products, ferrous metallurgy, non-ferrous metallurgy, textile industry, paper industry, leather, farms, slaughterhouses, meat industry, vehicle and car services	0.03€
2	Waters from other industries not specified above and other types of wastewater.	0.02€ / m^3
3	Urban wastewater collected in the sewerage system	0.001€ / m^3
4	Cooling water in power plants with open cooling system	- 1.5%€ / m^3

8.2. Water acts, water consents, water permits

Table 22. Activity for issuing permits in the water sector

Activity for issuing permits in the water sector	2019
Water Requirements	3
Water Consents	11
Water Permit	3
Extensions of Water Permits	3
Decisions for rejection of Water Permit	3
Change of Decisions	0
Conclusions	0

8.3. Water sector infrastructure, projects and investments

Investments in the water sector from the budget of the Government of the Republic of Kosovo have been made by financing capital projects for the River Basin District Authority / MEE (MESP).

During 2019 these investments financed from the state budget have been focused through projects in:

- regulation and rehabilitation of river beds;
- construction of irrigation canals;
- regulation of space at water sources;
- expansion of the secondary network and individual connections to the water supply;
- study, repair of monitoring equipment of existing dams in Kosovo;

- renovation and construction of protective infrastructure along rivers;
- feasibility study of erosive areas;
- drafting the water cadastre;
- water plants, water supply;
- sewerage network;
- cleaning of rivers.

Projects of 2018:

- construction of water supply system;
- regulation of the water supply system;
- construction of river beds;
- construction of fishermen's house at the accumulation lake;
- individual connections to the water supply system;
- construction of water supply pipeline.

Capital projects 2017:

- construction of sewerage systems;
- construction of water supply systems;
- regulation and rehabilitation of river beds;
- water accumulation;
- the sewerage system, and the infrastructure improvement project;
- water supply rehabilitation and increase of water capacity;
- regulation of irrigation canals;
- wastewater treatment plant;
- study, repairing and monitoring the equipment of existing dams in Kosovo;
- preliminary assessment for flood protection with risk and hazard maps for river basins;
- cleaning of critical-emergency river profiles for maintenance of water carrying capacity;
- drafting the water cadastre;
- renovation and construction of protective infrastructure along the river
- feasibility study for erosive areas, mountain dams;
- Wastewater treatment plant.

Capital projects 2016:

- construction of a flood protection wall on the river;
- rehabilitation and regulation of river beds;
- construction of sewerage systems;
- water accumulation;
- wastewater systems;
- water supply rehabilitation and increase of water capacity;
- regulation of irrigation canal;

- wastewater treatment plant;
- opening and cleaning of rivers;
- renovation of river dams;
- construction of wastewater collector; and
- reconstruction and rehabilitation of the water supply and sewerage network.

Capital projects 2015:

- construction of a flood protection wall on the river;
- construction, rehabilitation and regulation of river beds;
- construction of sewerage systems;
- construction of water supply system;
- water accumulation;
- wastewater systems;
- construction of the derivate canal for protection against eutrophication of lake;
- water supply rehabilitation and increase of water capacity;
- regulation of irrigation canal.

Based on the Draft Law on Kosovo Budget for 2020, from the Kosovo budget	52 capital projects for the central level are planned for financing.	Continuation from 2019, €11,153,631.00 have been invested	New investments in 2020 were € 2,510,431.00	Estimated for 2021 are € 3,100,000.00	In 2020 they realized a total of € 13,664,062.00	
Based on the Law on Kosovo Budget for 2019, from the Kosovo budget	75 capital projects for the central level have been financed	Continuation from 2018, € 9,103,548.00 have been invested	New investments in 2019 were € 8,655,426.00	Estimated for 2020 are € 19,061,868.00	In 2019, a total of € 17,758,974.00 were realized	Law no. 06 / L-133 on budget allocations for the budget of the Republic of Kosovo for 2019 / Official Gazette of the Republic of Kosovo / No. 4/14 February 2019, Prishtina / link https://gzk.rks-gov.net/ActDetail.aspx?ActID=18554

Based on the Law on Kosovo Budget for 2018, from the Kosovo budget	42 capital projects for the central level have been financed	Continuation from 2017, € 10,125,953.00 have been invested	New investments in 2018 were € 5,337,682.00	Estimated for 2019 are € 24,850,000.00	In 2018, a total of € 15,463,635.00 were realized	Law no. 06 / L-120 on the budget of the Republic of Kosovo for 2018 / Official Gazette of the Republic of Kosovo no. 01/09 January 2018 / https://mf.rks-gov.net/desk/inc/media/668E7D87-490C-4229-881B-E66CE614F4C1.pdf
Based on the Law on Kosovo Budget for 2017, from the Kosovo budget	37 capital projects for the central level have been financed	Continuation from 2016, € 9,744,187.00 were invested	New investments in 2017 were € 2,527,771.00	Estimated for 2018 are € 12,169,160.00	In 2017, a total of € 12,271,958.00 were realized	Law no. 05 / L-125 budget of the Republic of Kosovo for 2017 / Official Gazette of the Republic of Kosovo no. 1/06 January 2017 https://mf.rks-gov.net/desk/inc/media/DC67BF47-157C-4802-9837-976CBBDE9F5B.pdf
Based on the amendment and supplementation of the Law on Kosovo Budget for 2016	34 capital projects for the central level have been financed	Continuation from 2015, € 4,206,558.00 have been invested	New investments in 2016 were € 1,5,5,000,000.00	Estimated for 2017 are € 8,262,211.00	In 2016, a total of € 5,766,558.00 were realized	Law no. 05 / L-109 on amending and supplementing Law no. 05 / L-071 on the Budget of the Republic of Kosovo for 2016 / Official Gazette of the Republic of Kosovo No. 28/3 August 2016 / https://gzk.rks-gov.net/ActDetail.aspx?ActID=12760

Based on the amendment and supplementation of the Law on Kosovo Budget for 2015	20 capital projects for the central level have been financed	Continuation from 2014, € 2,325,827.00 were invested	New investments in 2015 were € 297,940.00	Estimated for 2016 are € 3,,338,999.00	In 2015, a total of € 2,623,767.00 were realized	Law no. 05 / L-046 on supplementing and amending Law no. 05 / L-001 on the Budget of the Republic of Kosovo / Official Gazette of the Republic of Kosovo No. 20/05 August 2015 / https://gzk.rks-gov.net/ActDetail.aspx?ActID=10996

Investments in the water sector by donors for the period 2015-2019 have mainly been interstate projects with neighbouring countries, or even investments in the water sector within general environmental projects.

Project name	**Support organization - donor**	**Project value**	**Implementation period**
Support for the implementation of the Energy Package with a focus on Energy Efficiency and Renewable Energy	EU & GFA	€2,274,190.00	2016 – 2019
Project "Support to the Environmental Program of MESP Kosovo"	SIDA	€6,810,000.00	2016 – 2020
Project "On integrated management of water resources of the expanded Drini river basin"	UNDP/GEF	$1,000,000,00	2016 – 2019
Project for the construction of the lagoon system for wastewater treatment in Kramovik	UNDP/GEF	€200,000.00	2016 – 2019
Regional project on floods "IPA FLOODS"	EU&CIMA	€1,998,386.00	2015 - 2017

9. MEASURES AND PREVENTION OF WATER POLLUTION

Measures to be taken to prevent water pollution are numerous, but only most important ones will be addressed;

- Functionalization and strengthening of institutions responsible for water protection,
- Drafting of a National Plan for the protection of water resources from pollution,
- Identifying all potential water pollutants,
- For violators of the law on water protection, actions should be taken to prevent and penalize them,
- Private sector should be more careful in preservation and protection of water from pollution,
- Integration of wastewater management system,
- Investment in expanding the coverage of the wastewater collection system,
- Continuous monitoring of wastewater,
- Water treatment to achieve compliance with EU standards,
- Drafting of a strategy for sustainable use of aggregates from river basins,
- Issuance of water use permits for hydropower plants only in cases when it does not damage the aquatic ecosystem of rivers and minimum biological observance,
- Management of diffusive pollution from agriculture,
- Registering of contaminated soils and their isolation with isolation barriers,
- Avoidance of any kind of discharge of pesticides and chemicals dangerous to water,
- Prohibition of waste dumping near any water source,
- Avoiding the discharge of any type of oils used in different sectors,
- Securing dams and investments to reinforce them,
- Securing and isolating accumulated pools to prevent access of unauthorized persons, etc.
- Measures to prevent areas that are at high risk of erosion and floods, etc.

10. CONCLUSIONS AND RECOMMENDATIONS

Although a National Water Strategy is in place in Kosovo, it must be implemented according to the planned projects. Despite the progress made, Kosovo is still far from meeting EU water standards. Our country is in the phase of construction of infrastructure for drinking water supply, sewerage network, wastewater treatment, flood protection, etc.

Conclusions

- There are still delays in the full implementation of the legal infrastructure for water,
- Lack of extension of the system for supplying the population with drinking water and land irrigation throughout the country
- Surface water pollution is estimated to be still high, especially in urban areas where there is discharge of used and industrial water,
- Lack of wastewater treatment plants is considered one of key problems in the water sector,
- The surface water monitoring system needs frequent monitoring and modernization, especially for monitoring heavy metals,
- Lack of groundwater monitoring system,
- Demands for the use of water resources are increasing,
- Degradation of river beds still continues, especially along the course of Drini i Bardh river, Lumbardh of Peja, etc.,
- There is lack of scientific research about water, especially groundwater resources.
- Despite the investments and projects implemented in the water sector, needs and requests for support remain numerous.

Recommendation

- Complete legal legislation and harmonize it with the European Union directives.
- Implement legal infrastructure for water in all sectors.
- Complete and modernize surface water quality monitoring system and establish groundwater monitoring system.
- Investments and completion of urban wastewater treatment infrastructure throughout the country.
- Improve and modernize the water supply system throughout the country.
- Maintain and expand the network for urban and industrial wastewater treatment.
- Take measures to prevent water loss in the network.
- Prepare and implement groundwater monitoring plan.
- Prevent any kind of water pollution in the country,
- Increase cooperation and information between central and local institutions.
- Conduct scientific research on water, focusing on groundwater resources.

- Establish community education for the protection and sustainable use of water resources.
- Raise awareness among business community and households on the sustainable use of water in the country.
- Assess needs for water infrastructure investments and prioritize them.

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22. Kosovo Water Statistics 2018-2019

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12. INDEX OF ABBREVIATIONS

MEE - Ministry of Economy and Environment

KEPA - Kosovo Environmental Protection Agency

KHMI - Kosovo Hydrometeorological Institute

MoH - Ministry of Health

NIPHK - National Institute of Public Health of Kosovo

RBDA – River Basins District Authority

WSRA – Water Services Regulatory Authority

WWRO - Water and Waste Regulatory Office

RWC - Regional Water Companies

KEK - Kosovo Energy Corporation

EU - European Union

EEA - European Environment Agency

WHO - World Health Organization

WFD - Water Framework Directive

WIS - Water Information System

GIS - Geographic Information System

SPI - Standard Precipitation Index

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