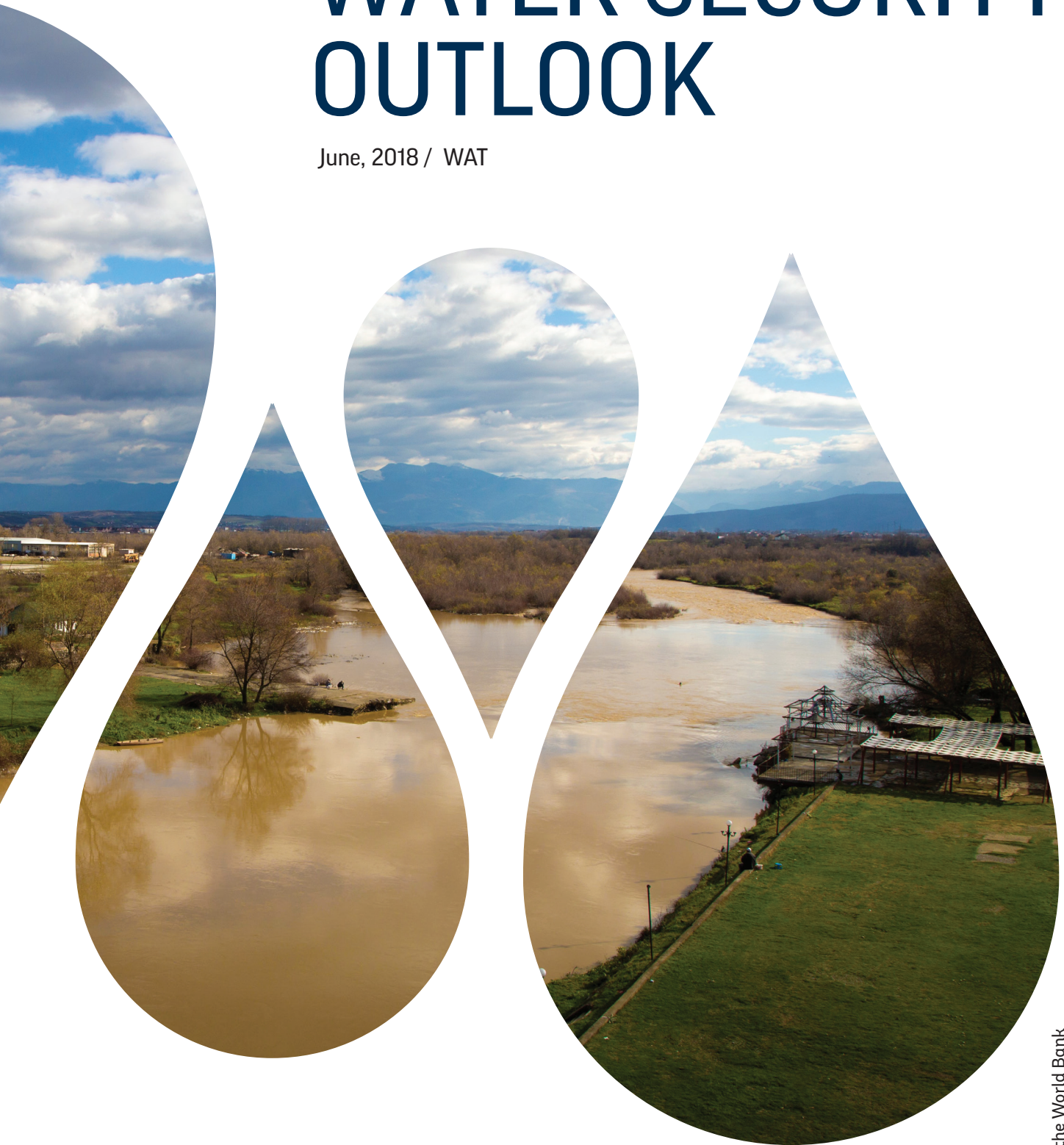


KOSOVO WATER SECURITY OUTLOOK

June, 2018 / WAT



WORLD BANK GROUP

KOSOVO **WATER SECURITY** **OUTLOOK**

June, 2018 / WAT



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Acknowledgement

The name of this report is a “Water Security Outlook for Kosovo”. It thus provides an outlook, a view, perspective on the issues of water security in the context of Kosovo. This report does not present a comprehensive vision, which requires an iterative and complex process, which starts with unravelling the major factors, how these can be influenced and an identification of possible trajectories. This report addresses this question as a first strategic input. While doing so, it utilized the best available information, used modern analytical tools and practical global experience to highlight scenarios for consideration for investment and reform.

Development of this report in this short timeframe was only possible because it could build on a long list of diligent work done by the Government, its partners and others. The team benefited greatly from comments and suggestions received from specialists and experts on areas of environment, energy, agriculture, economy, land tenure, spatial analysis, inside and outside the Bank. Yet, shortcomings in understanding are on the team, and we hope this report sparks further debate rather than concludes it.

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The team would like to express its sincere thanks and appreciation for the data sharing and support received from Kosovo counterparts, in particular the Ministry of Environment and Spatial Planning and the Interministerial Water Council.

[this draft version is to be presented to Kosovo technical stakeholders in June 2018 and its main findings discussed with policy makers in August 2018]

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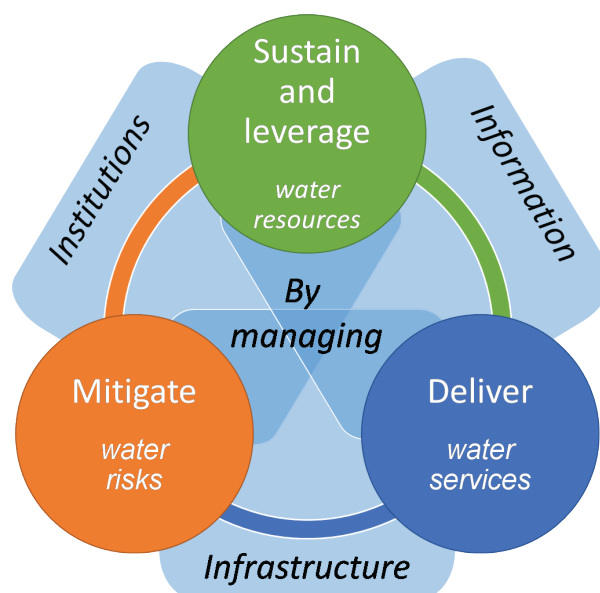
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Abbreviations and acronyms

BOD5	5-day Biochemical Oxygen Demand
CAPEX	Capital Expenditure
COD	chemical oxygen demand
EU	European Union
FAO	Food and Agriculture Organization of the UN
GDP	Gross Domestic Product
ha	Hectare
HPP	Hydro Power Plant
IMWC	Inter-Ministerial Water Council
INSPIRE	Infrastructure for Spatial Information in Europe
KEPA	Kosovo Environmental Protection Agency
Km³	Cubic kilometer (one billion cubic meter)
MAFRD	Ministry of Agriculture, Forestry and Rural Development
MALS	Ministry of Local Government Administration
masl	Meters above sea level
MED	Ministry of Economic Development
MEI	Ministry of European Integration
MESP	Ministry of Environment and Spatial Planning
MoE	Ministry of Energy
MoH	Ministry of Health
MUS	Multiple Use Systems
MW	Mega-Watt
N	Nitrogen
NDSI	Normalized Difference Snow Index
NDVI	Normalized Differentiated Vegetation Index
NIPHK	National Institute of Public Health of Kosovo
NRW	Non-Revenue Water
OPEX	Operational Expenditure
P	Phosphorus
RWC	Regional Water Company
SAA	Stabilization and Association Agreement
SCD	Strategic Country Diagnostic
SOE	State Owned Enterprise
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WFD	Water Framework Directive
WHO	World Health Organization
WMO	World Meteorological Organization
WSS	Water Supply and Sanitation

Executive Summary

Water Security is about building a water secure future for the people, the economy and the environment in the face of global challenges. It is thus the overarching goal of water management, including leveraging productive aspects of water for human well-being, livelihoods, environment and socio-economic development, and the management of destructive impacts of water such as floods, droughts, pollution to protect societies, economy and the environment. While water is a central issue in water security, it is increasingly clear that this goes beyond single sector single issue topics and it percolates into all parts of society and economy.



This diagnostic report aims at highlighting current situation and water resources issues in Kosovo including their historical and geographic spread, key trends and plans in water-dependent or water-influencing sectors (energy, agriculture, drinking water, flood protection, environment, etc.), identifying specific plans and ongoing activities, gaps, overlaps, and critical issues for further analysis and support as well as provide a brief overview of climate trends.

The document first describes the scope and frames water security in the broader development context of Kosovo. It then discusses the overall water resources diagnostic as a baseline for the water security messages later in the document. It continues to highlight key water security questions from the angle of people and society, economy, and environment and illustrates how water security plays out in different sectors and from different perspectives. From this, specific water management challenges are identified in the areas of overall resources management, service delivery and mitigation of water related risks. It concludes with key water security messages and an invite for further planning and dialogue in defining a water secure future for Kosovo.

Physical water stress, inadequate investments in infrastructure, mismanagement of water resources and national security issues make Kosovo water insecure. Kosovo has limited water resources – and all but one rivers flow out of its territory. It also has comparatively little storage. The last decade saw an impressive development of legal framework, strategies, action

plans and policies, as well as notable successes in sub-sectors. Yet, institutional capacity to deliver on mandates and integrated water resources planning remains weak and enforcement of plans and rules remains haphazard. The challenges stemming from the still pending normalizations of political relations between Kosovo and Serbia are a daily reality in water security, particularly around the management of the Gazivoda/Pridvorica Dam and the Iber Lepenc canal, which serves multiple critical services in the economic heartland of the country.

Kosovo's economy is not using natural and labor resources optimally. Agriculture and rural livelihoods in general are very important in Kosovo, yet not very productive and not very secure in terms of employment. Jobs should be key on the water security agenda and it should recognize that Kosovo's cities are rapidly expanding but its population remains predominantly rural.

Overall, Kosovo is water scarce, much more so than all its neighbors, and it also has among the lowest level of water resources development and storage. This makes Kosovo very vulnerable to climate shock. Kosovo's waters are unevenly distributed in time and space. In particular Iber basin is water stressed, but in the next 20 years it is expected that all Kosovo's basins will be water stressed. This is attributed to population and general economic growth, and resource variability, but also importantly to the anticipated revitalization of the irrigation and mining sector and additional demands from the energy sector. A number of large water users are currently showing suppressed demand, and their revitalization is key government priority. This will require careful water management. Kosovo is increasingly vulnerable to flooding and dry spells, and both can have profound impacts on the people and the economy. With increased water stress, water quality will become an ever-growing problem if not addressed at its multiple sources (domestic, industrial, agricultural and from catchment degradation).

Key challenges for the water sector therefore lie in strengthening the institutional framework, particularly for operationalization and implementation of intentions enshrined in policy and legal framework, in improving the information and knowledge base for decision making, and expanding the (green and grey) infrastructure platform to be able to manage water resources better. This also includes building on strengths of the water supply sector and moving to the frontier of waste water treatment, and improving service delivery in irrigation as part of a comprehensive agri-food revitalization program and linking irrigation support closely with land use planning and watershed management. Water related risk management needs to focus on reducing hazards, as well as building resilience through better planning, protection and readiness. Finally, such strategies need to be sustainably financed, not only for the capital expenditures, but also for their operation and maintenance. Investment costs have not all been determined and this will require an integrated and well-coordinated investment planning process, but it is already evident that the investment needs are high, already in the waste water sector, just to comply with WFD. Investment needs are only one part and currently, tariffs and taxes are not yet sustainably financing key water resources management functions. Cost recovery and affordability for O&M is somewhat better in the service sectors of drinking water supply and sanitation and irrigation, but uneven, and requires further strengthening.

The key messages going forward, emphasize implementation and practical coordination for action. Some recommendations are to overcome longstanding problems, and others address structural issues to ensure Kosovo's readiness for the future. It should be noted that this note only intends to feed into a broader dialogue on water futures and an assessment of Kosovo's future water security that requires broader and deeper engagement with all stakeholders, in the context of river basin plans:

- 1) Kosovo has the combined factors of low water resources availability, low storage and poor implementation of water resources management functions. This will become problematic soon.
- 2) Kosovo has adequate framework and strategies and high-level coordination, and needs to shift focus to on the ground implementation of its strategies, building the base for information, institutions and infrastructure in water management with real impacts and tangible outcomes.
- 3) It is important to embark on a more holistic and multi-sectoral programmatic approach on managing the country's water resources, both in the rural and in the urban space.
- 4) Energy is an important agenda from a water security perspective, now and in future.
- 5) Further improvement of services helps important economic and job agendas. Particularly rural development and agriculture revitalization
- 6) Integrated watershed management is critical to address environmental concerns and pollution management, including but beyond urban and industrial wastewater treatment.
- 7) Water Security is closely linked to national security in Kosovo, given its topography and history and its dependence on the Gazivoda/Iber-Lepenc system.
- 8) Kosovo has the opportunity and the urgent need with recent and ongoing dam safety assessments to improve its national approach to dam safety.
- 9) Longer term adequate WRM require additional professionals in public and private sector, and this requires collaboration with training institutes and academia.
- 10) Further analysis is important for selection of actual interventions. This must be done at a basin level in the context of River Basin Plans and investment programs in a participatory approach.

CHAPTER 1

INTRODUCTION

This report is drafted to support the World Bank and Government of Kosovo with updated information and outlook to inform policy dialogue and strategic engagement in the water security agenda.

Water security is the overarching goal of water management, including leveraging productive aspects of water for human well-being, livelihoods, environment and socio-economic development, and the management of destructive impacts of water such as floods, droughts, pollution to protect societies, economy and the environment. While water is a central issue in water security, it is increasingly clear that this goes beyond single sector single issue topics and it percolates into all parts of society and economy. It is not sufficient to allocate scarce resources and clean up pollution. It is about highlighting topics for policy dialogue and highlighting impacts of sector policies and water management choices on longer-term development goals.

This diagnostic report aims at highlighting current situation and water resources issues in Kosovo including their historical and geographic spread, key trends and plans in water-dependent or water-influencing sectors (energy, agriculture, drinking water, flood protection, environment, etc.), identifying specific plans and ongoing activities, gaps, overlaps, and critical issues for further analysis and support as well as provide a brief overview of climate trends.

1.1 Scope of the Water Security Outlook

This outlook is a short positioning paper, largely based on secondary literature and earth observation analysis, providing a rapid snapshot of the current situation highlighting key observed trends and updates from current assessments. This thus collates knowledge and provides a high-level overview of water security challenges and opportunities in Kosovo. It does not claim to be comprehensive and merely highlights key areas for further study, discussion, policy choices and action.

Water Security is looked at in its distinct aspects, following the UN-Water working definition (2013): “The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.” It aims to analyze the economic development objectives of Kosovo and how water resources affect achievements in growth, social development, poverty reduction and resource utilization, and helping to lay the foundation for well-informed discussion on water futures, identifying key measures and investments to overcome obstacles and support overarching development choices.

Water security, being a broad concept is not easily captured in one metric or in a single policy action. It addresses the collective of positive outcomes of water management. These include sustainable management of water resources to ensure adequate quantities of acceptable quality water to underpin water services delivery across multiple sector, as well as management of water-related risks including floods/drought, pollution, and ecosystem degradation. It intersects with energy security, food security, national security, jobs, equal access to services, social inclusion and climate change.

This means that the report shall touch on four key substituting aspects:

- Economic Activities and Development (are adequate water supplies available for food and energy production, industry, transport and tourism?)
- Ecosystems (are ecosystems preserved and can they deliver their services, on which both nature and people rely, including the provision of freshwater?)
- Drinking water and human well-being (do populations have access to safe, sufficient and affordable water to meet basic needs for drinking, sanitation and hygiene, to safeguard health and well-being, and to fulfill basic human rights?)
- Water-related hazards and climate change (Are populations resilient to water-related hazards including floods, droughts and pollution?)

And it will briefly cover boundary conditions of:

- Good governance (Does Kosovo have adequate legal regime, institutions, infrastructure and capacity in place?)
- Transboundary cooperation (Are actions discussed and coordinated with riparian neighbors to meet the varied and competing interests?)
- A specific factor in that is also Peace and Political Stability. (What are residual effects of conflict on water quality, quantity, reliability, compromised infrastructure, governance?)
- Financing (What sources of funding exist beyond public sector, including private sector investments, and innovative sources of financing to sustain water security?).

It is also important to make explicit what this document is not designed to provide. As an initial scoping and helicopter view of the sector it has utilized existing information from a wide source of literature, data, models, but has not carried out its own detailed optimization, modeling, or specific sector diagnostics. It has also not gone into scenario analysis, integrated planning, weighing costs and benefits for different sector investments against these overall goals. It also does not endorse or reject specific interventions, but mainly provides a framework for their analysis. Much of these more detailed analysis will have to be undertaken in comprehensive river basin management plan, sector investment plans and the day-to-day practice of licensing, analysis and enforcement of rules by competent agencies. Where warranted, chapter 6 provides priority actions and these include such further analytical work.

1.2 Stakeholders involved and interest

This note has been drafted based on the interviews and information obtained from relevant stakeholders. The Kosovo water sector involves relationships among various actors at the national and local levels (ref. Annex 1). The report is being prepared for discussion with stakeholders in government, the inter- ministerial water council and development partners and academia to distill key issues of concern to society that contribute to Kosovo's water insecurity and threaten human and environmental well-being; as well as priority pathways to overcome insecurity, build resilience and invest in infrastructure, institutions and information to ensure a more water secure situation for all.

1.3 Structure of the Document

The document is comprised of 6 short chapters, as follows:

Table 1 - Structure of the Document

Chapter 1: Introduction	This Chapter provides the overall scope of the note and guides the reader through the key concepts employed.
Chapter 2: Framing Water Security in the Kosovo Context	This Chapter provides boundary conditions for water security and thus ventures into a discussion on overall development trajectory of Kosovo, where the water security note should be cognizant and contributing.
Chapter 3: Water Resources in Kosovo	This Chapter discusses the overall water resources diagnostic. It provides the baseline on which to build the water security discussion in later chapters and discusses the different water sources, risks and institutional mechanisms for its management.

Chapter 4: Water Security Profile	This chapter highlights key water security questions from the angle of people and society, economy and environment and illustrates how different sectors are dependent on and impact on water resources and each other.
Chapter 5: Water Management Challenges	This chapter highlights key water management challenges that emanate from the diagnostic and water security and sector perspectives and presents them in the way of challenges to address in water resources management, delivery of water services, mitigation of water related risks and investment needs.
Chapter 6: Key water security considerations going forward	Chapter six briefly captures the key themes from earlier chapters in 10 key messages from this water security outlook that can help drive the water security dialogue.

CHAPTER 2

FRAMING WATER SECURITY IN THE KOSOVO CONTEXT

Water Security is about building a water secure future for the people, the economy and the environment in the face of global challenges. It places water management, services delivery and water risk management in the broader context of the country's development path and is therefore aimed at a broader dialogue on future pathways and how water may constrain or leverage opportunities. This chapter explores the broader development context of relevance to the water security dialogue. **Physical water stress, inadequate investments in infrastructure, mismanagement of water resources and national security issues make Kosovo water insecure.** Compared to its neighbors, Kosovo is water stressed, although by global comparison it is relatively benign. But Kosovo also has lowest level of water resources developed with infrastructure, young and not very effective institutions enforcing critical water (quality) issues, and is awaiting normalization of relations on arguably one of its key water sources in the north of the country. Kosovo, like most countries, depends on access to water for almost all its human and economic activities. This is obvious in irrigation, drinking water, hydropower, but also industries, services, where directly or indirectly (through use of energy, generation of which requires high degree of water security), dependence is evident. Kosovo directly feels the impact as most livelihoods depends directly or indirectly on agriculture, which is very vulnerable to hydro-climatic vulnerability; and deficient land and natural resources planning is increasing hazards and vulnerability to weather related shocks.

Kosovo is a small and young state and this largely frames the outlook for water security. Kosovo gained an interim UN-administered status with a UN Security Council resolution in 1999; it declared independence in 2008. Its current water security status and priorities are much informed by new statehood and the desire to develop sustainable economic development as an entity; overcome ecosystem challenges stemming from historic and recent environmental neglect, exacerbated during conflict and poor enforcement; building on successes for overcoming a legacy of underdeveloped drinking water service delivery and aspirations

to meet EU policy requirements and the Water Framework Directive; and are a response to growing realization that water is scarce and that last decades of development have led to high vulnerability to climate change and water related hazards.

The last decade saw an impressive development of legal framework, strategies, action plans and policies in the fields of water, environment, energy, climate adaptation, agriculture. Also, important achievements have been realized in terms of actual performance in sub-sectors. Especially in the water and sanitation services sector, Kosovo has made impressive progress and through a long-term dedicated reform agenda has achieved a decent regulatory framework, capacitated regional Water Companies with sound governance structures, national monitoring systems available to the public and achieved much higher levels of coverage in rural areas as compared to other countries in the region, for example Albania and Romania.

Yet, institutional capacity to deliver on mandates and integrated water resources planning remains weak and enforcement of plans and rules remains haphazard. In water resources management, agencies lack the infrastructure and information to carry out these functions, and in the water sector generally capacity remains a constraint across all levels. Compared to neighboring countries, it is still lacking in basic infrastructure and administrative and technical skills. The country has a well-functioning inter-ministerial water council for intersectoral coordination, yet at the local implementation level integration of various objectives in multi-purpose planning, infrastructure and land and water use planning is limited with only one of its basins having a river basin management plan under preparation and a water information system only currently being developed.

Challenges from the still pending normalizations of political relations with Serbia are a daily reality in water management. Transboundary collaboration is strained and the management of the Gazivoda/Pridvorica dam, Iber-Lepenc canal inlet and hydropower infrastructure, all critical infrastructure for water security in Kosovo, is contested between Kosovo and Serbia. Mining activities aren't in full operation because of similar disputes and in irrigation and flood defenses there is still compromised infrastructure and knock-on effects of lack of land use planning and enforcement of building codes, afforestation management in the early years of statehood.

Kosovo is dependent on external funding for much of its financing in the water sector, and tariffs and taxes aren't yet sustainably financing key water resources and water service delivery functions. Approximately 11.2 percent of GDP is based on remittances from the diaspora and approximately 2.5 percent of GDP on financial and technical assistance. Kosovo does receive substantial external funds and remittances, but because of its international status it is not yet a party to important financing, international or private. It is not a party to UNFCCC for instance. Private financing is happening in water use sectors (irrigation, water supply, industries) but is traditionally limited in public functions. As on all sectors of the economy and particularly on cross-cutting water sector this overall financing situation has important impacts on sustainable functioning of the sector in terms of its core functions of protecting the resource, delivering reliable services and managing risks.

Kosovo's economy is not using natural (including water) and labor resources optimally. The economy is dominated by the trade and services sectors. Trade and Services account for 48 percent of GDP in 2017, industry for 28 percent with particular growth in construction and manufacturing. Both sectors place claims on water resources in terms of water demand

and pollution; and indirectly through energy demand. Agriculture is still an important contributor to GDP, although slowly declining both in absolute terms as well as in share of the economy and agriculture, fisheries and forestry accounted for 11 percent of GDP in 2017. This is not currently a very competitive base and large part of consumption including food is met by imports (only about 5 percent of the value of all imports of agricultural products is paid from GDP generated by agricultural exports; and agricultural imports are almost equal total agricultural GDP). Agricultural livelihoods are all dependent on natural resources including water (through irrigation, storage, etc.). As highlighted in the WB SCD there is a need to rebalance growth towards higher productivity and greater international competitiveness. From a water security perspective this requires higher water productivity in a more integrated way to support a broader economic base, improving reliability of service delivery and better protection from current and future hazards.

Jobs and employment should be key on the water security agenda and it should recognize that Kosovo's cities are rapidly expanding but its population remains predominantly rural. Kosovo has a population of 1.8 million. The average age is about 26, making this the demographically youngest country of Europe. Over 62 percent of the country's population lives in rural areas and depends, directly or indirectly, on agriculture for its livelihood. The sector accounts for about 35 percent of total employment, although primarily on an informal basis (elementary occupations, unpaid family labor). This makes it the largest private employer in the country. Poverty remains a fundamental problem. About 12 percent of the population live in extreme poverty and about 30 percent live below the national poverty line. Poverty in rural areas is especially high and over 40 percent of the rural population is unemployed. The lack of job perspective, especially among the rural young population is putting a strain on social cohesion and encouraging out-migration. Often, agriculture serves as a safety net for much of the population. Thus, any water security strategy for Kosovo needs to reflect the need to provide more jobs for more people, particularly the women and youth. In this context, water allocation decisions must explicitly factor in social as well as economic factors in terms of employment need and poverty reduction, so that job creation and viability of the rural space for water-based livelihoods is a key objective, in addition to maximizing economic returns on water.

Both the rural and urban livelihoods depend on water services and water for their economic activity. Irrigation and careful rural watershed management are important for all agriculture activity and will become more so in future with increasing climate stress. Urbanization and urban service provision provide new challenges to the existing infrastructure, water quality and the nation's ability to supply secure water for energy and industry. New sectors such as tourism, and higher value agriculture will shift the types of services demanded from water in both the rural and urban space.

Education is identified as a key sector for revitalizing the economy and ensuring long-term sustainability. Around 30,000 new jobseekers enter the labor market ever year, but current economic growth generates no more than 15,000 new jobs per annum. 2017 was an exception, when 25,300 people found employment. Especially long-term unemployment remains high. More than a third of young Kosovars do not have a job or training. Apart from the much wider employment that is dependent on proper water management (in all economic sectors), there is also a specific need for water professionals, at all levels, from planning to operations in the different subsectors. This requires a strategic process of (re)training.

Kosovo has signed a Stabilization and Association Agreement (SAA) with the EU, within the framework of the EU pre-accession strategy. The SAA has three objectives: stabilization and swift transition to a market economy; promoting regional cooperation; and the prospect of joining the EU. As lessons are learned from EU accession processes in the region and as Kosovo is behind some of its neighbors, it is important that the country learns lessons on both timely and pragmatic planning of its alignment, particularly with the environmental chapter 27 of the acquis.

CHAPTER 3

WATER RESOURCES IN KOSOVO

3.1 Diagnostic of the Water Resources Baseline

Kosovo's water availability is largely shaped by its topography and geographic location. Kosovo is a landlocked country (area: 10,877 km²). Its landscape is dominated by relatively high mountains (highest peak is 2,656 m) surrounding two plains (Kosovo Plain from 510-570 masl; and Dukagjini Plain from 350-450 masl). The climate is mid-continental, whereas the Dukagjini Plain has a more Mediterranean climate due to its lower elevation and the valley of the Drini I Bardhe river. The climate is continental with cold and snowy winters and hot and dry summers. The annual average rainfall is 596 mm; Temperatures can range from -27 °C in winter to +39 °C in summer.

Overall, Kosovo is relatively water scarce and has modest precipitation which generally falls in winter, and majority in the south-western part (see Figure 1). Compared with other countries in the region the levels of rainfall and the renewable resources per person are much lower. It is estimated that Kosovo has about 1,600 m³ total renewable water resources per person per year, which is about 16 percent of the regional average (*Source: FAO Aquastat*).

The relatively dry summers are also hot, particularly in the Dukagjini Plain (see Figure 2). Winters are particularly cold in the Kosovo Plain and the mountains, where most precipitation falls in form of snowmelt (see Figure 3).

Figure 1 - Monthly average precipitation in Kosovo

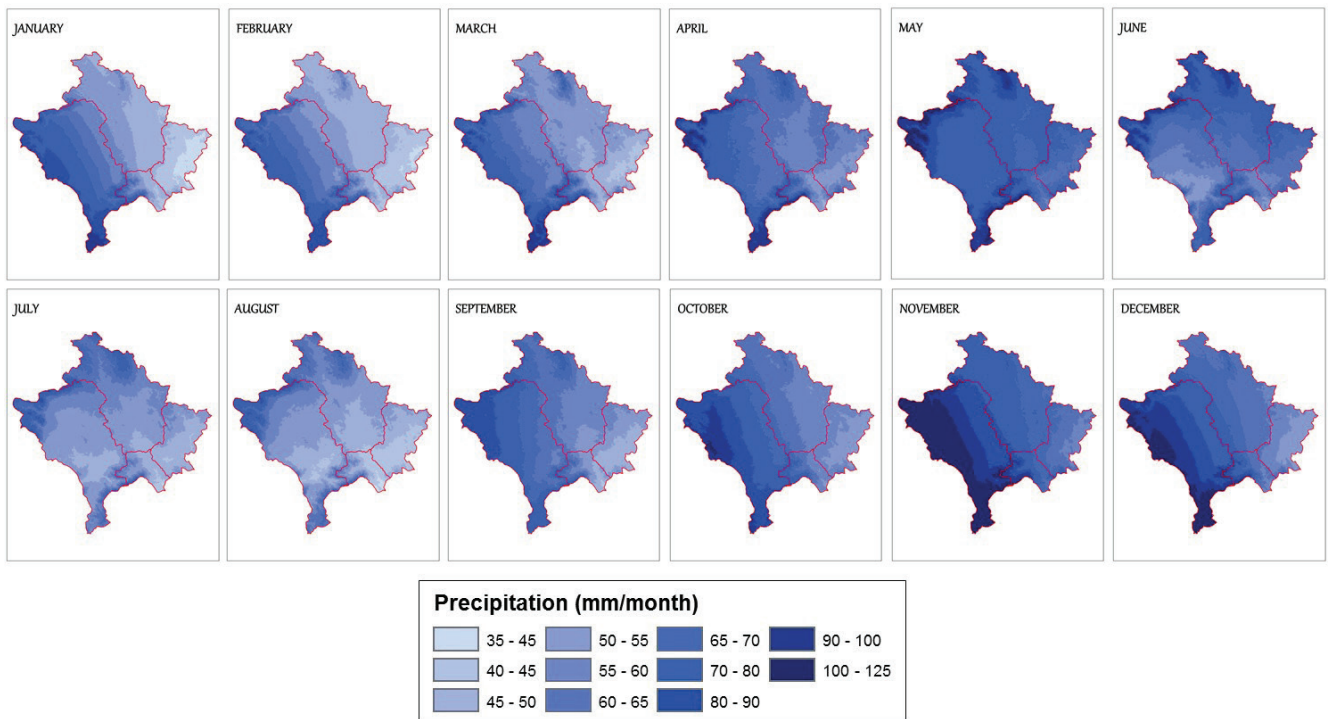


Figure 2 - Monthly average temperatures in Kosovo

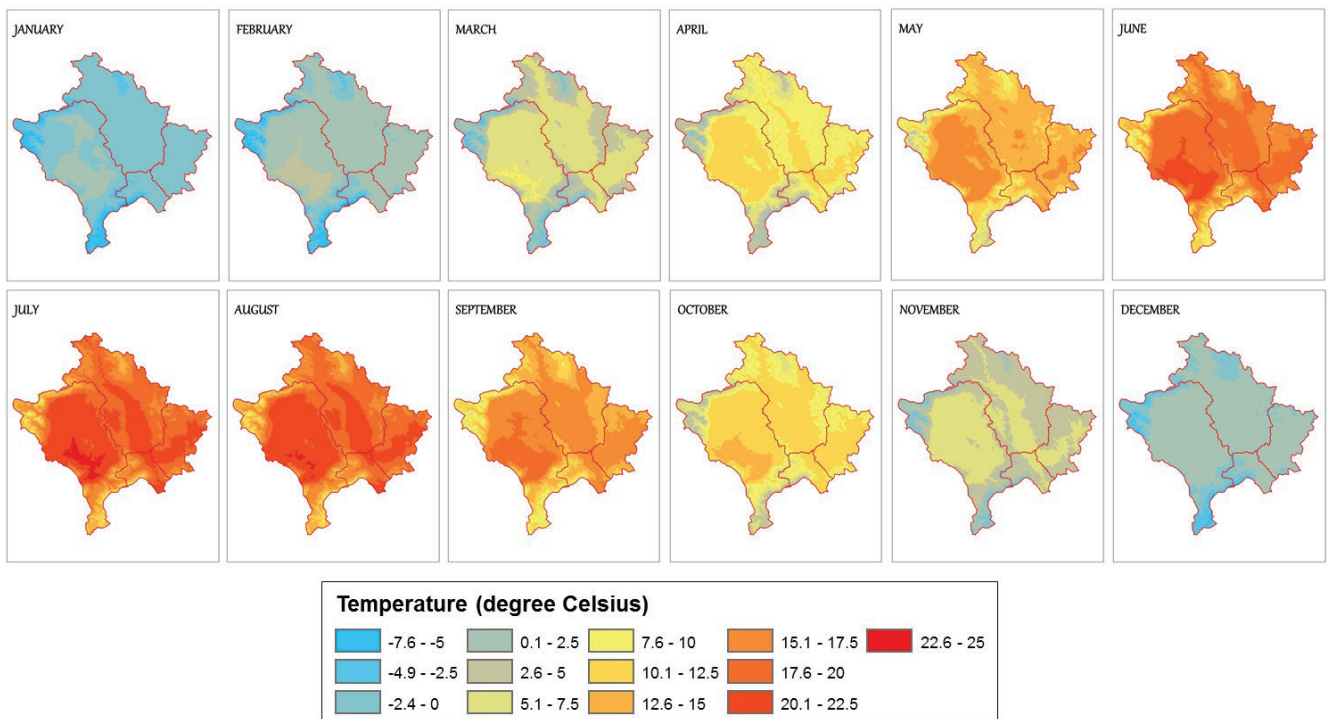
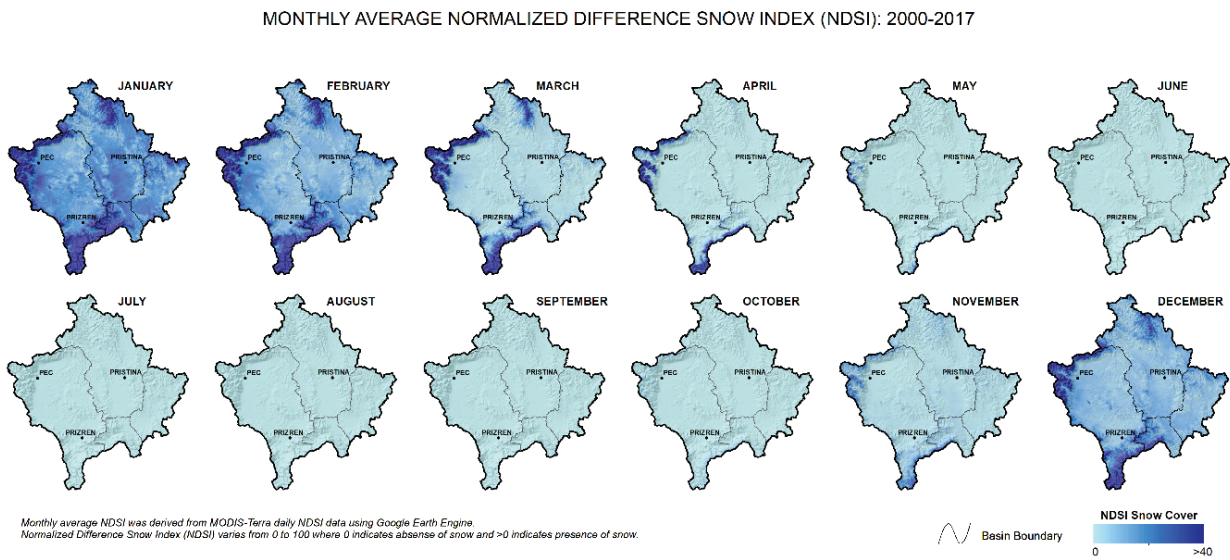
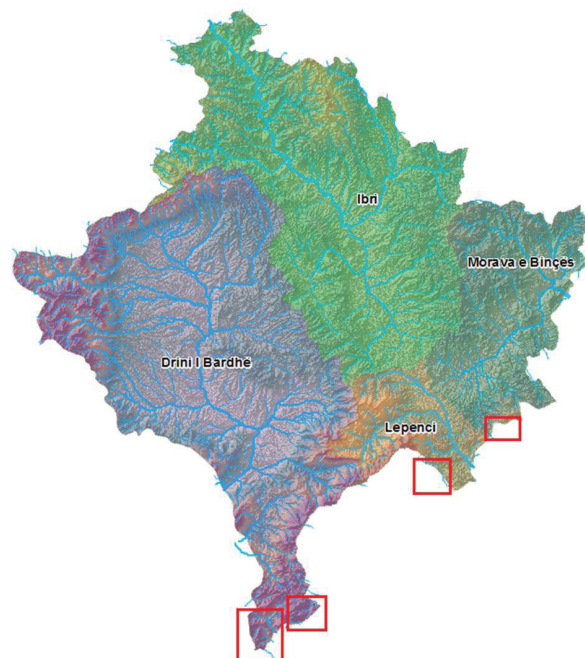


Figure 3 - Monthly Average Normalized Difference Snow Index (NDSI)

The country has limited water resources divided into four main water basins (see Figure 4) and they are set to represent a constraint to the country's socio-economic development in light of rising demand for water. All rivers and smaller watercourses belong to the four main river basins: The White Drin (Drini i Bardhe); the Iber; the Morava e Binces; and the Lepenc. Kosovo rivers empty into three seas: The White Drin belongs to the Adriatic basin; the Lepenc belongs to the Aegean basin; and the Iber, Sitnica and Morava e Binces belong to the Black Sea basin. All rivers in Kosovo have a slow flow rate, typical of lowland rivers, and land use is determined by the location in the basin (see Figure 5)

Figure 4 - Map of the four river basins of Kosovo. (The area in red squares are Plava Basin, hereinafter included in Drini I Bardhe basin)

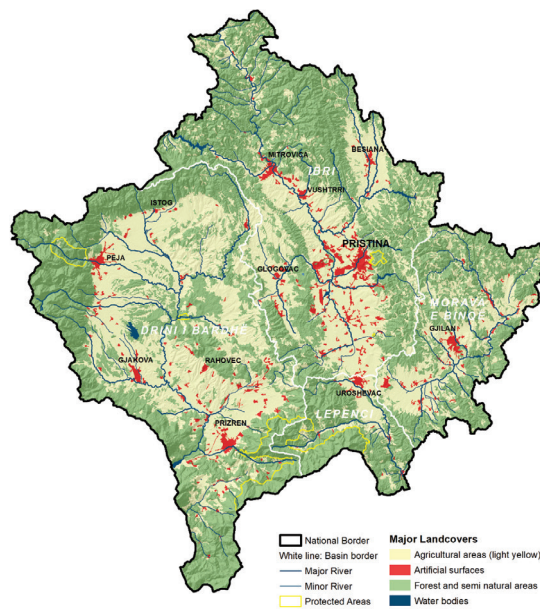


The White Drin is the main river in the Dukagjini region, and all other watercourses and rivers of the region run into this river. The basin covers an area of 4,829 km². Ecologically, the upper reaches of the river can still be considered quite clean and are rich in fish. The White Drin is used not only for fishing and domestic needs, but is also an important source of irrigation through the summer period. The White Drin crosses into Albania, where it merges with the Black Drin (Drini i Zi) and then flows into the Adriatic Sea.

Iber Basin. The Drenica region and Kosovo Valley mainly have a number of smaller rivers and brooks, most of which are polluted and hold much less water than the Drin basin. The eastern part of Kosovo is drained by the Iber River basin (covering an area of 4,369 km²) and the **Morava e Binces** (1,564 km²), tributaries of the Danube, which flows into the Black Sea. The longest and most important rivers are the Iber (172 km) and the Sitnica (94 km).

Lepenc Basin. The southern part of the territory is drained by the Lepenc river basin, which covers an area of 685 km² and discharges into the Vardar River in the former Yugoslav Republic of Macedonia and then into the Aegean Sea.

Figure 5 - Map with main land use types in Kosovo



This Basin features a unique natural phenomenon in Europe, it has the only river bifurcation where the two rivers flow to two different seas. The bifurcation is located in the Nerodime River in the Jezerc Mountains. The Nerodime rises in the village of Nerodime e Ulte and then divides into two river systems that flow in different directions and discharge into different basins. The northern stream flows into the Black Sea (via Sitnica, Iber), and the southern stream continues to the Lepenc and Morava and thence flows into the Aegean.

Water is stressed and unevenly distributed in time and space. This distribution means that currently adequate resources are available in the Drini I Bardhë and Plava basins, the other three basins indicate water stress (see Table 2, Table 3, Figure 6). Drini I Bardhe – about 41 percent of the country's territory has more than half of the country's water resources. This

stress is most severe in the Iber basin, where available resources are close to the scarcity level. This basin only has some 28 percent of the country's resources and much higher demands. At the same time, rivers with the greatest annual flux are in the basin of Drini I Bardhe in the Dukagjini Plain. It should be noted, however, that this is not an absolute scarcity with the current levels of abstraction. Actual water exploitation levels are low, and in many cases lower than the developed water resources, mainly because of the demise of major industry and irrigation in the country during the war.

Table 2 - Estimated Current Water Resources by Basin

River Basin	Area	Drini i Bardhë	Plava	Lepenci	Morava e Binçës	Iber
Surface	(km ²)	4,519	252	582	1,546	4,009
Population ⁶	no.	670,000	35,000	160,000	190,000	725,000
Population Density	/km2	148	139	275	123	181
Water Balance						
Annual precipitation	(mm/y)	839	1,076	842	677	693
Annual precipitation, P	(Mio m3/y)	3,791	271	490	1,046	2,778
Mean annual outflow ⁷	(m3/s)	61.01	4.71	8.70	10.80	32.60
Runoff, Q	(Mio m3/y)	1,924	149	274	341	1,028
Runoff/Precipitation Q/P	%	51%	55%	56%	33%	37%
Minimum Flow Requirement ⁸	(Mio m3/y)	443	34	63	78	236
Available Resources per person	m3/c/a	2,211	3,268	1,320	1,380	1,092

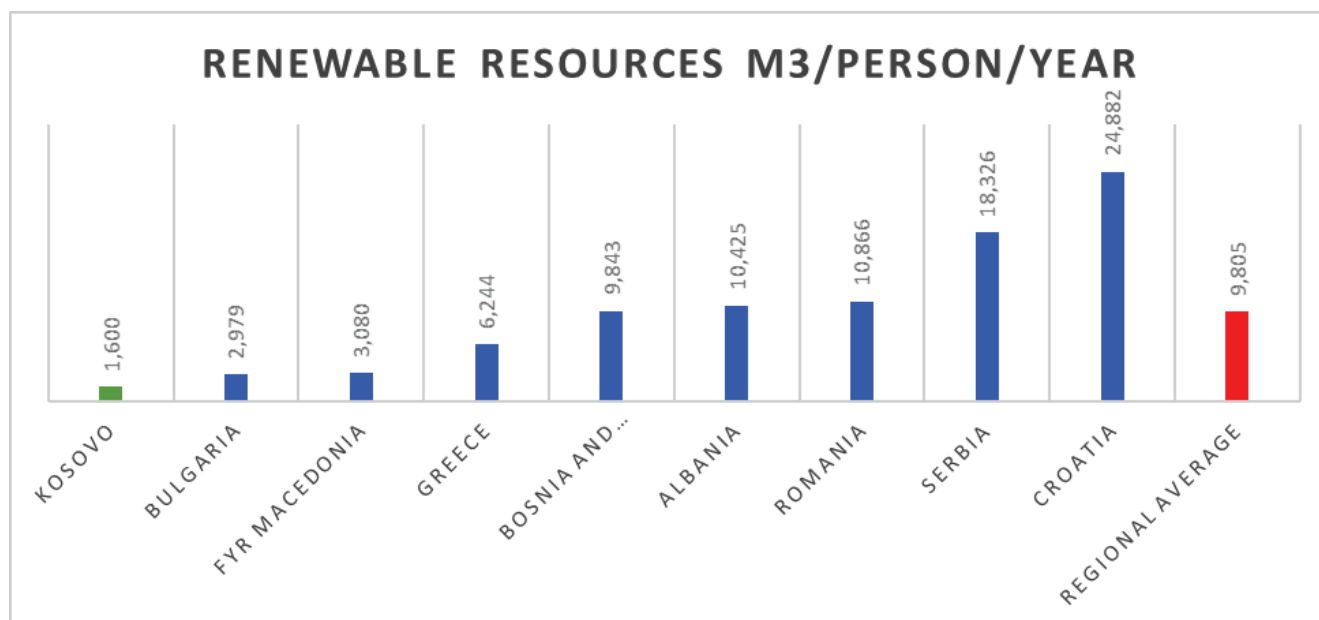
Source: National Water Strategy 2017 - 2036

Table 3 - Estimated Water Resources Indices

River Basin		Drini i Bardhë	Plava	Lepenci	Morava e Binçës	Iber
Falkenmark Indicator Estimates						
No Stress, > 1700	m3/c/y	2,211	3,268			
Stress, > 1000 - 1700 <	m3/c/y			1,320	1,380	1,092
Scarcity, < 1000	m3/c/y					
Water Exploitation Index Estimates						
Exploitation per person	m3/c/y	237	-	185	154	177
Water Exploitation Index	%	11%	0%	14%	11%	16%

Source: National Water Strategy 2017 - 2036

Kosovo Compares Poorly Against Regional Benchmarks in Terms of Water Availability

Figure 6 - Renewable Resources M3/Person/Year

Furthermore, Kosovo is uniquely dependent on internal water resources with a very low dependency ratio. The only water that enters the country other than in form of precipitation is the water that enters Gazivoda Lake from Iber river. This is around 300-400 MCM/year, or around 9 percent of total water resources in the country. The combination of low internal and externally produced water resources contributes to water scarcity.

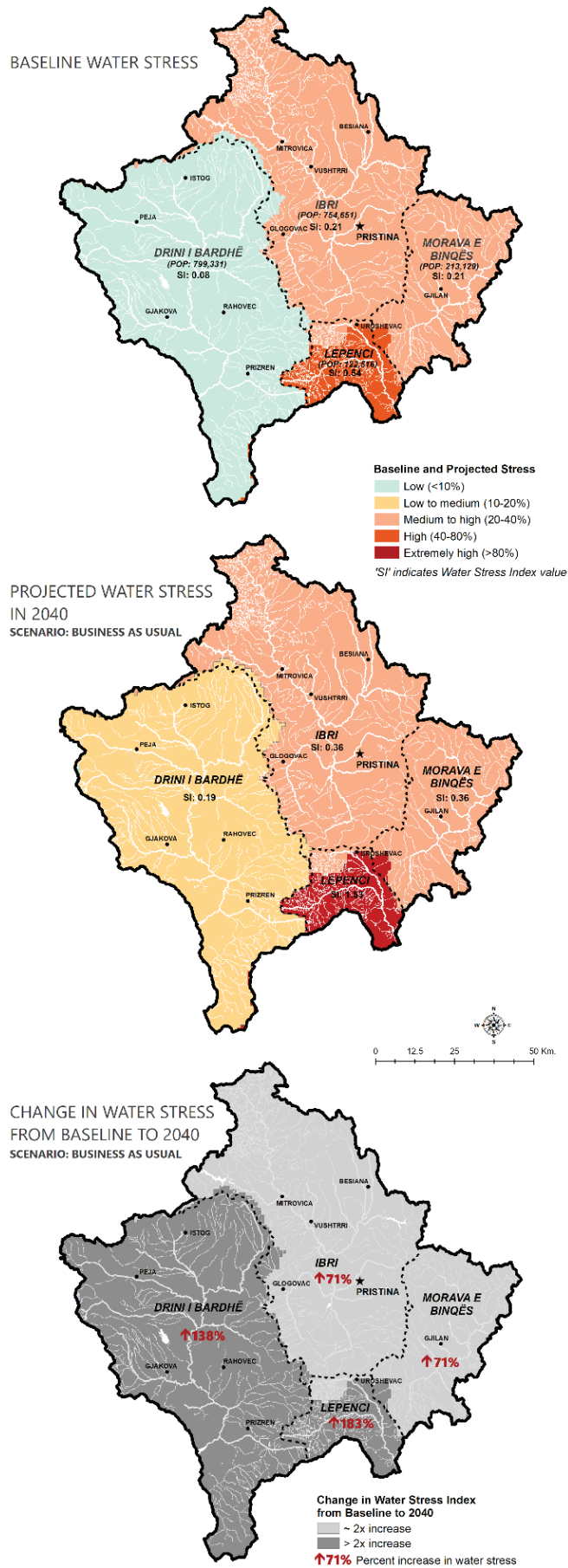
Table 4 - Comparing dependency on external water resources.

Country	Internal (10 ⁹ m ³)	External (10 ⁹ m ³)
Albania	26.9	14.8
Bosnia and Herzegovina	36.0	2.0
Bulgaria*	21.0	0.3
Croatia	37.7	33.7
Macedonia	5.4	1.0
Romania	42.3	169.6
Serbia and Montenegro	25.1	164.5
Kosovo**	3.3	0.3

Source: AQUASTAT, FAO (2002) Balkans Chart

Figure 7 - Map with Kosovo's main hydrological network map with relief and main rivers and main reservoirs

Figure 8 – Map of baseline and project (2040) Water Stress in Kosovo, and rate of change



These maps measure the ratio of total annual water withdrawals to total available annual renewable supply, accounting for up-stream consumptive use. Higher values indicate more competition among users. Climate scenario is based on the IPCC 5th assessment report.

Data Sources

Water stress grid: WRI Aquaduct 2014, FAO Aquastat 2008-2012, NASA GLDAS-2 2012; Shiklomanov and Rodda 2004; Flörke et al. 2012; Matsutomi et al. 2009

Population figure by basin: Estimated using population grid from European Commission, 2015

Kosovo's water storage is underdeveloped. The combination of limited renewable water resources and limited storage is making Kosovo very vulnerable to climate variability. To partly address hydrologic constraints, several medium to large reservoirs were developed (see Figure 8), which are used for water supply, irrigation, industry, and hydropower generation. Total storage in Kosovo in five large dams is about 539 Million m³, or 300 m³ per person. This, too, is much lower than the regional average of 799 m³ per person (37 percent of average, see Table 5 and Table 6). The only two countries with lower storage per capita are Serbia and Croatia, both countries have the highest natural endowment per capita. Most reservoirs are in the Iber Basin. The Gazivoda feeds the Iber-Lepenc canal. Iber-Lepenc canal is part of the never completed Iber-Lepenc hydrosystem, which would have had an additional dam in Lepenc and be an interconnected system for irrigation, water supply for multiple sources and environmental services. Only the Iber part of the plan was developed, including its irrigation system. The Lepenc Dam is currently studied again for its current potential. The Liap and Gracaniqa sub-basins feature the Batllava and Badovc reservoirs, respectively, and currently both supply the Prishtina Regional Water Company with water for the population of Prishtina and smaller communities in the capital's neighborhood. This situation is unlikely to change in the future as the maximum supply capacity of these catchments has been reached and the reservoirs are likely to rather experience capacity reduction in the future due to expanding, unregulated land use and increasing pollution pressure. Radoniqi is in Drini e Bardhe region and supplies drinking water to the city of Gjakova and neighboring areas and irrigation in the region. Perlepnica, Livoc, Ruboc, and Tropoje are small drinking water reservoirs for smaller towns, mainly in Morava e Binces. The smaller drinking water reservoirs, as well as Batllava and Badovci have been heavily affected by droughts with reductions in inflows.

Table 5 - Main Water Storage Reservoirs

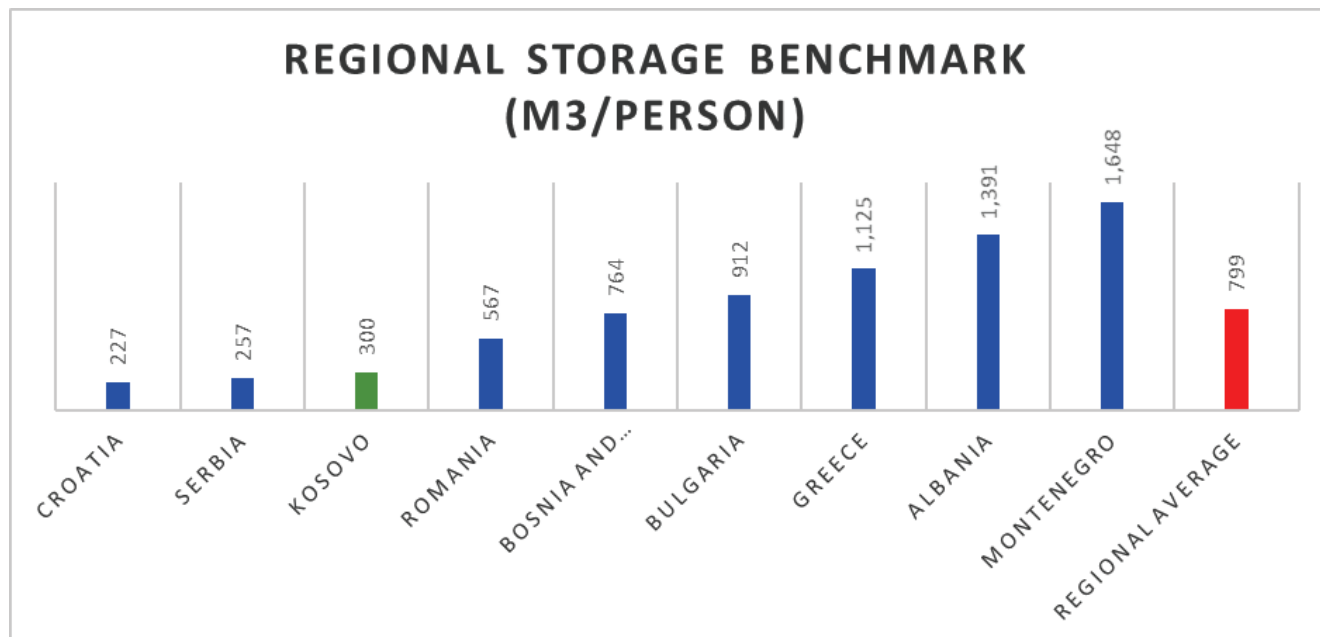
Reservoir	Water flow (River)	Catchment		Volume (Million m ³)
		km ²	Live Storage	Total Volume
Gazivoda	Ibër	1,060.0	350.0	390.0
Batllava	Batllavë	226.0	25.1	30.0
Badovci	Gračankë	103.0	20.0	26.4
Radoniqi	Lumëbardhi i Deçanit	130.0	102.0	113.0
		1,572.6	500.4	563.6

Source: National Water Strategy 2017 - 2036

Table 6 - Regional Storage Benchmark (Data)

	Total Dam Capacity (km3)	Dam capacity per capita (m3/person)
Croatia	0.96	227
Serbia	2.27	257
Kosovo	0.54	300
Romania	11.06	567
Bosnia and Herzegovina	2.91	764
Bulgaria	6.52	912
Greece	12.32	1,125
Albania	4.03	1,391
Montenegro	1.93	1,648
Regional average		799
Kosovo % of average		37%

Figure 9 - Regional Storage Benchmark (M3/Person)



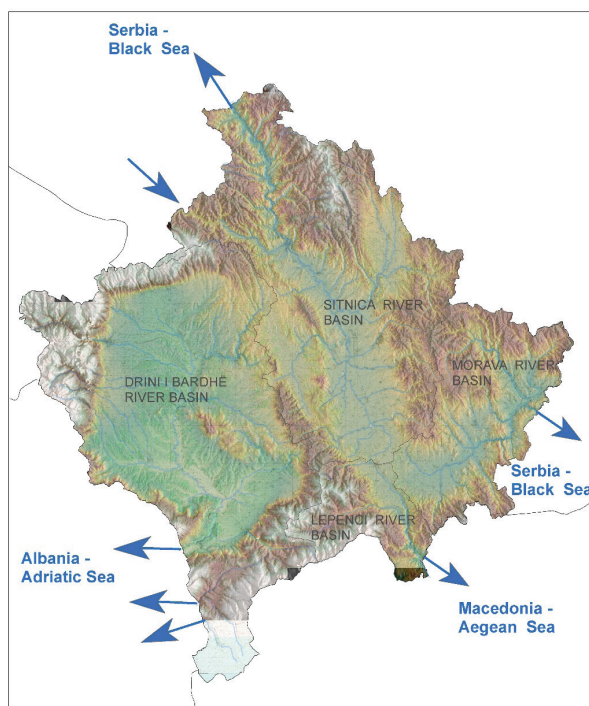
Groundwater reserves are limited and are found mainly in the Western part of Kosovo, where surface water reserves are also larger compared to the Eastern part. There is no precise information on groundwater extraction capacity. Because of unfavorable hydrological conditions, underdeveloped water resources, and increasing service demand, the country faces quantitative shortages (MMPH 2014). In the alluvial plain of the Sitnica river affluent of the Ibër River the groundwater is abundant, partially also from return flows from Iber Lepenc, and very vulnerable to local pollution.

The central/northern high-lying plateau that covers about half of the country holds the country's largest development potential because most of the mining, agricultural, and industrial activities are located here. It is precisely this part of the territory has limited water resources (Iber basin). This is the only basin where there is inflow (The Iber originates in Montenegro and flows through Serbia before reaching Kosovo). The Ujmani (Gazivoda) reservoir in the north of Kosovo is the country's most important reservoir, bringing water to the central plateau through the Ibër-Lepenc canal. It brings water to the area with the highest population density and the commercial and administrative center of Kosovo.

Water shortages are far more likely to arise in the East of the country than in the West. Since 2004 80 percent of Kosovo municipalities have suffered from water shortages due to hydrological drought and the misuse of water resources, ecosystem degradation and reduction of ecosystem services, increase and new forms of pollution and water-related diseases.

The Dukagjini Plain is warm in summer and wet in winter and with adequate water storage and irrigation is Kosovo's prime agricultural area (Radoniqi-Dukagjini Irrigation Scheme and Drini e Bardhe irrigation scheme are in this plain). This area also faces flooding issues in winter.

Figure 10 – Map: rivers flow out of Kosovo



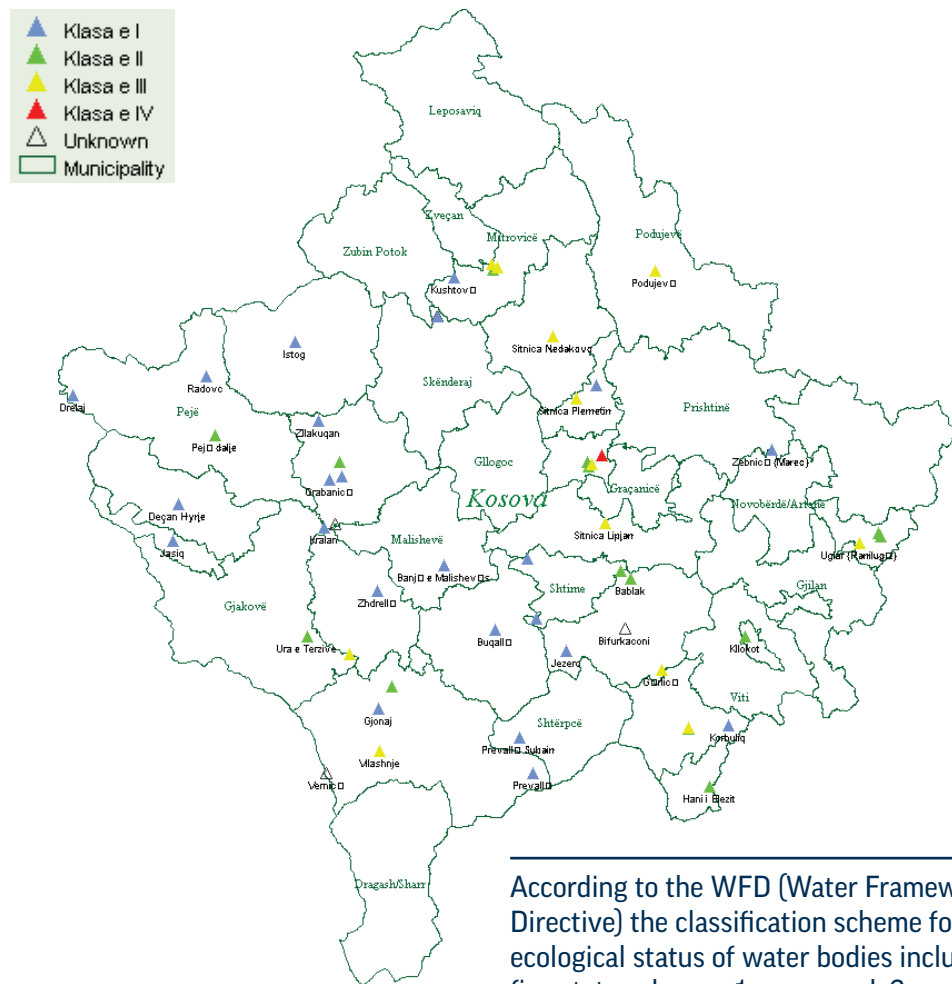
Source: Ministry of Environment and Spatial Planning, Water Department

Although all rivers flow out, Kosovo is a major importer of “virtual” water. This refers to the hidden flow of water if food or other commodities are traded from one place to another. This is mainly water used for production outside the borders which would otherwise have been required inside the country. It takes a lot of water to produce a ton of food for instance. In terms of exploitation per person, the current rate represents about 200 m³ per person per annum – for all uses combined. The reported specific use in other countries in the region ranges from about 200 m³ per person per annum at the lower level, to as much as 800 m³ per person per annum at the upper level. This means that Kosovo has a rather suppressed overall water use. If all uses are combined, it is considered that EU citizens actually use almost 1,800 m³ per person per annum, but this includes “virtual” imports through agricultural produce (which represents around 40 percent of the total) (EU Science for Environmental Policy, 2013). While not easily quantifiable, in Kosovo, this share of virtual water is even much higher given the large imports of agricultural produce.

Protecting Watersheds is Important Since all Rivers (Except Iber) Originate in Kosovo and flow out. Most storage in Kosovo is in form of snowcaps. With changing climate these will be less and melt earlier in the year, creating not only flooding, but also changing hydrographs in the rivers and reducing water availability in the dry season. Coupled with ongoing deforestation and land degradation the risk on flash flooding and water scarcity in summer is increased. Watershed protection is important for environmental functions as well as for ensuring satisfactory quality and quantity water throughout the year.

3.2 Water Quality

All major river basins are recognized and reported as moderately or heavily polluted. Water use and pollution are expected to grow with economic development. The Drini I Bardhe is the healthiest river as it has fewest pressures and highest water flows, but this river also gets severely polluted in its lower reaches from industrial and urban wastewater, but also agricultural nitrates and phosphates. Iber is the most polluted basin due to its high economic and population pressures and its low flows, particularly in the Sitnica river. This places a high environmental and health burden on the population and causes large areas of degraded land to be out of productive use. Due to the drastic reduction of production from pre-1990 levels, pollution from the industry and mining has been reduced, but some of the environmental problems from the past are still present: lack of wastewater treatment and old technology and equipment, massive amounts of mining and metallurgy waste from the past, continue to be permanent sources of environmental pollution. Current industry and power plants are still polluting.

Figure 11 - River Water Quality – Kosovo Environmental Database.

According to the WFD (Water Framework Directive) the classification scheme for the ecological status of water bodies includes five status classes: 1: very good, 2: good; 3: moderate; 4: poor and 5: bad.

Source: Kosovo Water Strategy - Summary

Some water sources are reportedly polluted or potentially endangered by organic contamination. The quality of raw water from surface water in Kosovo is generally moderate, since the water is abstracted from artificial reservoirs. Some water sources are reportedly polluted or potentially endangered by organic contamination due to lack of wastewater treatment, neglected maintenance of the sewerage system, intensive deforestation, or agriculture. The main rivers downstream of big municipalities and industry, especially Sitnica downstream of Prishtina, the capital, are so polluted that the water cannot be used as a source of water supply, and in some places, not even for irrigation. The main polluters of surface waters are untreated wastewater from municipalities and industries.

Those that drink groundwater from the public water supply and their own private wells may be drinking water that is contaminated with heavy metals (cf. Sweeney, Prishtina Insight, 2017: <https://prishtinainsight.com/kosovos-looming-water-security-problem/>). UNICEF reports that elevated levels of heavy metals – lead – has been found in children’s blood streams, particularly in Mitrovica municipality (UNICEF: “highest blood lead levels in the world”? https://www.unicef.org/kosovoprogramme/children_3427.html). Where there is gold mining, there are usually even more serious heavy metals found, like cyanide, mercury, cadmium, arsenic, etc.

Environmental concerns started to get attention from the government, which resulted in investments in the construction of waste water treatment plants (WWTPs). The most important WWTP are for Prishtina (French), Gjakovë (SECO KfW); Peja (SECO-KfW) and Prizren, KfW. (see chapter 4)

3.3. Transboundary water management

The Ibër River Basin and Gazivoda reservoir are located in the upper west Danube basin. Since Yugoslavia broke down, the Ibër River Basin and Gazivoda reservoir are shared by Kosovo, Montenegro, and Serbia. The river originates from springs in the mountains in Eastern Montenegro, flowing through rural Southern Serbia before entering Kosovo in the Gazivoda/Ujman Lake, the intake of Iber-Lepenc canal and hydropower plant. Near Mitrovica, the river enters the mining area and it is receiving the Sitnica its main tributary. Heavy loads of pollutants are discharged in the Ibër in Kosovo, primarily from mining, as well as from Sitnica since there is no wastewater treatment plant to date for the Prishtina agglomeration. Soon after this, the river turns sharply north and back into Serbia. The lower section of the Iber (Ibar in Serbian) flows through a long and deep gorge, where additional mining takes place. Serbia has been planning to develop further hydropower on this stretch. Severe water pollution on the river is posing problems for domestic water supply in cities, particularly Kraljevo, where the Ibar flows into the West Morava. From there it joins the Great Morava and eventually the Danube (east of Smederevo, Serbia).

The lack of international status agreement with Serbia complicates discussions on water management with Serbia, as well as in the northern Serbian populated part of Kosovo. Sharing information with Serbia on water issues is difficult. For instance, all groundwater documentation from Yugoslavian time is not accessible for Kosovo administration and partners. This hampers the development of river basin and ground water management. As for infrastructure operational management, however, rules which were established during the Yugoslavian period, (when the Gazivoda dam, hydroelectric and irrigation facilities were built), are still applied. These rules include the release of an ecological minimum flow in the Ibër River and Serbian experts still support specific maintenance operations, mainly mechanical and electrical works in the dam and HPP.

The Danube is Europe's second longest river and its basin is shared by 20 riparians. Kosovo's share of the basin is just 0.5 percent. Since two of its important basins (Iber and Morava e Binces) are part of the Danube basin, Kosovo would be expected to join the International Commission for the Protection of the Danube River (ICPDR). However, several ICPDR members do not recognize it. Kosovo has tried to pursue joining as an observer, but currently is not. This case shows how, on one hand, the political situation has a decisive impact on formal cooperation and how, on the other hand, collaboration between specialists is still practiced for operational matters.

Issues associated with the Gazivoda Reservoir are of the utmost importance in Kosovo's water future. It supplies, at certain points during the year, up to 600,000 people (one third of Kosovo's population) in Kosovo with water. Kosovo's two power plants, Kosovo A and B, which together produce almost all power in the country, depend on its water for cooling purposes. Trepca mine and other industries all depend on this resource for their water. Its hydro-power plant supplies energy to most northern municipalities of Kosovo. Gazivoda ownership

and management is contested, with Serbia having installed parallel management organization to the Kosovo set-up. The Gazivoda reservoir lays in both Serbia and Kosovo, with about two-thirds of it in Kosovo. Almost all the water in the Iber River that fills the Gazivoda originates in Montenegro and Serbia. Downstream from the reservoir, the Iber continues into Kosovo, splitting the municipality of Mitrovica into the north and the south. It then flows back into Serbia. If unresolved this will become a serious issue in future as the demand from the Iber-Lepenc system increases and operations need to be optimized. Issues related to Gazivoda are planned to be discussed as part of the Pristina – Belgrade normalization talks under the coordination of the European Union.

Figure 12 – Kosovo's four basins are headwaters of three international basins and drain into three seas.



The Drini River Basin is shared by Albania, Kosovo, Montenegro, Greece and Macedonia. The White Drin in Kosovo flows into the Fierza Reservoir, the uppermost lake of the Albania hydropower cascade on the Drin River. The White Drin is an important source of the Drin river, along with the Black Drin, which originates in Lake Ohrid. Prominent issues in the Basin are hydropower management, flood control in the lower reaches and the management of Shkodra Lake in northwestern Albania, a RAMSAR site. Most relevant issue in the Kosovo context has been the strained issue in recent years regarding the then planned development and riparian notification for Zhur HPP. International collaboration is driven by the process

of EU water Directives implementation and channeled through the Drin Basin Commission in which the five riparians participate. On 25 November 2011, all five riparians signed the [Memorandum of Understanding for the Management of the Extended Transboundary Drin Basin](#) (Drin MoU). The Drin MoU provides the political framework for and defines the context of cooperation among the Drin Riparians. The Parties to the MoU agreed to undertake concrete short-, medium- and long-term actions to address basin issues, and work towards the integrated management of the Basin. These actions include:

- Improving access to comprehensive data and adequate information to fully understand the current state of the environment and the water resources and the hydrologic system (including surface, underground and coastal waters) as well as ecosystems of the Drin Basin;
- Establishing conditions for a sustainable use of water and other natural resources;
- Developing cooperation and measures to minimize flooding especially in the lower parts of the Drin Basin;
- Improving management and appropriate disposal of solid wastes;
- Decreasing nutrient pollution deriving from untreated or poorly treated wastewater discharges and unsustainable agricultural practices;
- Decreasing pollution from hazardous substances such as heavy metals and pesticides;
- Minimizing effects of hydro-morphologic interventions that alter the nature of the hydrologic system and the supported ecosystems, resulting in their deterioration.

The Lepenc River Basin is shared by Kosovo and Macedonia. It originates in Southern Kosovo, and is a tributary of the Vardar River with a confluence near Skopje. The Vardar (Axios) then continues to flow as the longest and major river in Macedonia, and eventually enters the Aegean Sea near Thessaloniki in Greece. The plans to complete the original or updated Iber-Lepenc project with hydropower production and irrigation in an interconnected system would require riparian notification to Macedonia. The Lepenc basin is not currently as stressed as the other basins, but demand is growing and Vardar is a major source for irrigation, drinking water and other uses and also suffers from pollution. Greece and Macedonia have bilateral arrangements over the Vardar (Axios), to which Kosovo is not a party.

The Morava e Binces (South Morava) is shared with Macedonia, Serbia and Bulgaria. Kosovo only has some catchment areas with small dams. The downstream river merges in Serbia with West Morava (of which Iber is a tributary), to form the Great Morava and flow into the Danube. This is thus a different sub-basin of the same overall Danube Basin and the issues are similar, although pollution in Kosovo is much less of an issue in this basin.

Legal limitations in becoming a party to many relevant agreements – Beyond basin forums, Kosovo can also not join the UNECE/Helsinki Water Convention on the Protection and Use of Transboundary Watercourses and International Lakes due to it not being a UN member. Neither can it join the Mediterranean/Barcelona Convention (for the protection

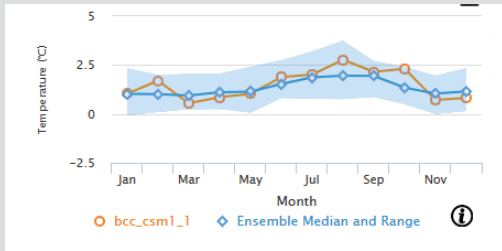
of the Mediterranean areas). It is suggested that Kosovo should undertake all preparatory work so that it is ready when opportunities for transboundary collaboration arise. In the meantime, it is understood that academic collaboration through the International Network for Water-Environment in the Balkans is open for Kosovo academia, and this could be an important opportunity to take. Due to above limitations, Kosovo has significantly less rights and obligations in this regard than other countries in the region. Still, for irrigation and hydropower development, conventions on EIA in a transboundary context, on access to information and the relevant basin conventions need to be applied and this is also part of the EU Acquis containing transboundary aspects (i.e. of the EIA, SEA).

3.4 Climate Risk

Kosovo is very vulnerable to summer droughts (a situation exacerbated by having no inflows except Iber and no storage). Kosovo has been struck by drought several times in the last two decades (1993, 2000, 2007, and 2008, 2014). The droughts of 2007 were particularly severe. Several rivers dried including the famous Mirusha Waterfalls. February 2014 was marked as the driest month ever recorded in Kosovo. The low snow and rain level led to depletion of reservoirs in 2014 which forced the state water supply company to institute water rationing in Pristina, the capital of Kosovo (USAID, 2017).

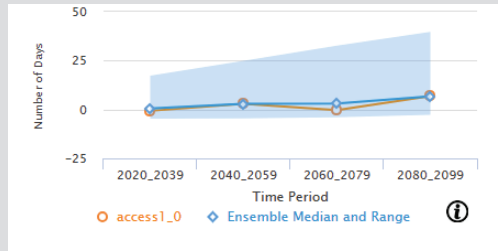
Worse, the likelihood of severe drought is expected to increase significantly (Figure 4). Climate change models project that Southeastern Europe and Kosovo will get drier and warmer. Kosovo is already prone to droughts. Although summer precipitation is expected to decrease further, the intensity may well increase. Future climate change is expected to exacerbate Kosovo's water scarcity condition. It is projected that Kosovo will experience higher temperature in the next decade (Figure 12), and climate change may lead to increase in annual days of consecutive dry spell in the long run (Figure 13). The Western Balkans region is expected to experience higher warming than the world average, especially mountain areas (USAID, 2017). It is also estimated that Kosovo will face a decline of 50 days per year of snow cover by 2050 (MESP, 2014; UNEP, 2015). The combined effects of these projected changes could make four of Kosovo's five water basins water stressed or water scarce by 2050 (USAID, 2017). Hence, there is a risk for enhanced occurrences of heat waves, droughts and forest fires, as well as floods.

Figure 13 - Projected change in monthl temperature for Kosovo for 2020-2039.



Source: WB Climate Change Knowledge Portal

Figure 14 - Projected change in annual days of consecutive dry spell for Kosovo for 2020-2099.

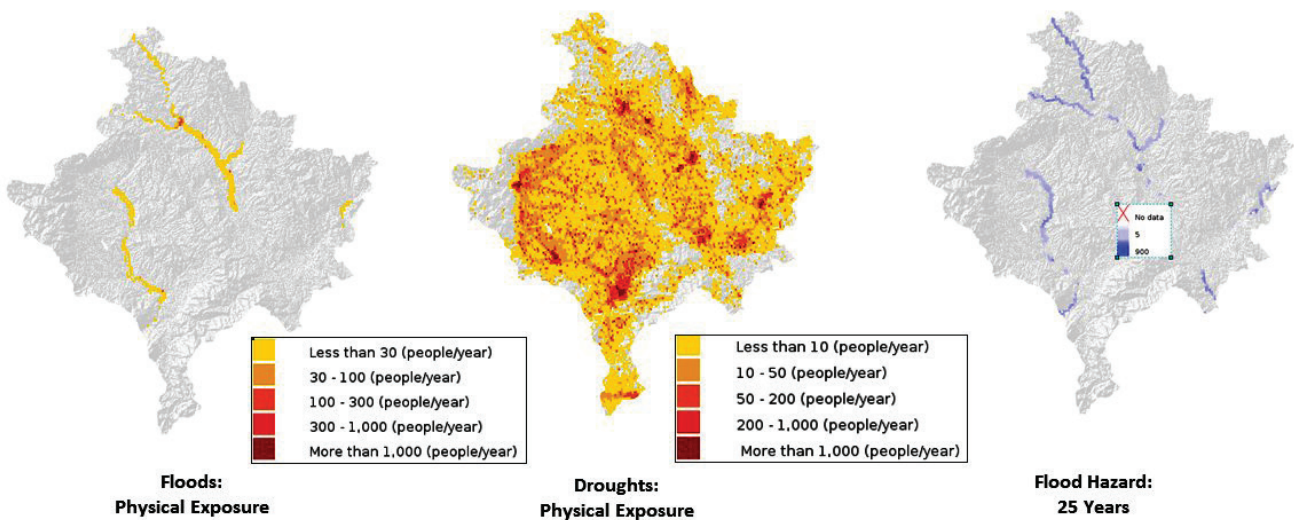


Source: WB Climate Change Knowledge Portal

Kosovo is vulnerable to flooding and floods happen often. Floods in Kosovo in November 2007 affected more than 3500 households, also causing considerable material damages. Almost all municipalities of Kosovo, more or less, are affected by flood risk. Drini I Bardhe River Basin in particular is vulnerable to flooding, as is Mitrovica municipality in Iber basin. Floods occur in different types:

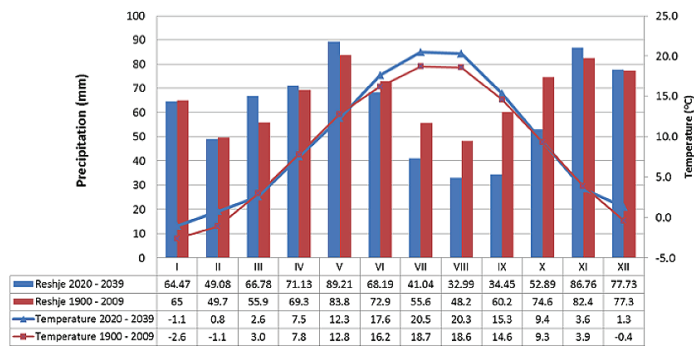
- Floods after storms in mountain areas (flash flooding),
- Floods after heavy rains in lowland areas,
- Floods after the snowmelt.

Figure 15 - Maps on Flood and Drought hazards in Kosovo



Source: National Water Strategy 2017 - 2036

Figure 16 - Historical and Projected Climate Indicators to 2039

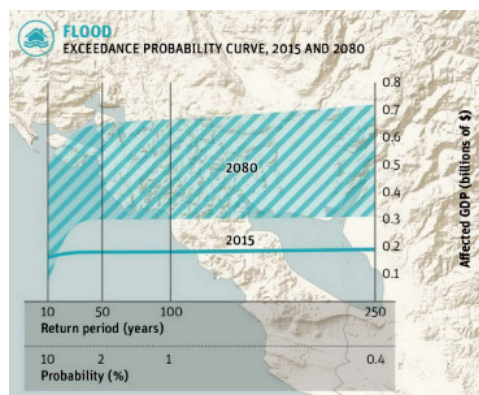


Source: National Water Strategy 2017 - 2036

Flood damage bring large toll to Kosovo’s economy. The country was affected by flood in 2010 and 2014. It is estimated that a 100-year flood may lead to damage equivalent to 3 percent of the country’s GDP (US\$200 million) in 2015, and affecting 50,000 people. Of the 491 km of rivers threatened by flooding in Kosovo, only 28 percent is regulated (MMPH 2014). The annual average population affected by flooding in Kosovo is about 10,000 and annual average affected GDP is about US\$50 million. With climate change induced increase in the frequency and intensity of flood events in the future, coupled with projected economic growth, the same type of 100-year flood event could lead to US\$300 million to US\$700 million worth of damage (Figure 6).

A few other factors may further increase the country’s flood vulnerability. Kosovo experienced an unprecedented urbanization and construction boom since 1999 which also led to unplanned and illegal construction in flood prone area without compliance to building codes. Some districts in urban centers also has no or deteriorated drainage network. Inadequate land use and municipal planning also increases population exposure to hazards. Illegal logging on public and private forests results in erosion and sedimentation which affect both the catchment’s absorptive capacity in protection against flood risk, as well as the capacity of the riverbeds to convey floods due to sedimentation.

Figure 17 - Flood exceedance probability curve, 2015 and 2080



The expected temperature rises and decrease in rainfall pattern will impact river flow and groundwater levels and recharge, which will also impact multiple sectors in Kosovo. The growth prospects of the agriculture sector will be hindered by the lack of adequate amount of water for irrigation. The hydropower potential will also be reduced despite the country’s need to diversify its energy supply sources and meet its peak electricity demand. Future water scarcity may also increase the probability of water-related disputes, critical among those the already contested management of Gazivoda/Pridvorica.

3.5 Water Resources Management Framework in Kosovo

The current institutional framework for water management in Kosovo involves many Government institutions and other stakeholders.

- **ASSEMBLY:** The Assembly of the Republic of is the legislative body directly elected by the people. There are two important functions related to the environment, namely:
 - the Committee for Agriculture, Forestry, Rural Development, Environment and Spatial Planning;
 - Advisory Board on Environment.
- **GOVERNMENT:** The Government of the Republic of Kosovo exercises executive power in accordance with the Constitution and the law. It proposes draft laws and amendments to existing laws and acts, and may give its opinion on draft laws that are proposed by other bodies.

The main responsibility for implementation of the environmental legislation rests with the MESP, but other ministries also have environmental related responsibilities (e.g.: MAFRD, MoE, MoH, etc.). Clear differentiation between the responsibilities is crucial to avoid overlapping mandates between governmental institutions. The Local Government level (municipalities) has specific responsibilities, such as local strategic planning, monitoring, inspection / enforcement, registration / licensing, data collection, reporting, and public information and consultation).

The Kosovo Inter-Ministerial Water Council, coordinates and supports the respective institutions in water management in the decision-making process, by harmonizing the diverse needs and interests, and proposing measures for the development, utilization and protection of water resources management in Kosovo. It gives support to the Government in the elaboration of its water strategy, water legislation and in general guide the overall sector reform and development. The Council is composed by five members and headed by the Prime Minister. The current members of the Council include the Minister of Environment and Spatial Planning, the Minister of Economic Development, the Minister of Finance and the Minister of the Local Government Administration, as well as the representative of the Swiss Cooperation Office (currently in the role of the lead water sector donor coordinator) and other active donors in the water sector that participate on rotational basis. The IMWC has its Secretariat that is supported by the Swiss Cooperation Office with long term advisors, and several short-term experts funded by Government and the donor community.

In line with the water law there is one River Basins Authority for all river basins. The Authority has an executive role for water resources, it is based in Prishtina and reports to the Minister (MESP).

The Inspectors employed directly by MESP (State and Regional Inspectors) refer directly to the Secretary General of MESP. Their main tasks are inspecting and deciding fines, if needed.

Kosovo Environmental Protection Agency (KEPA) is an institution within the MESP carrying out administrative, professional, scientific support and investigative tasks in the field of environmental protection. KEPA regularly reports on the state of the environment regarding

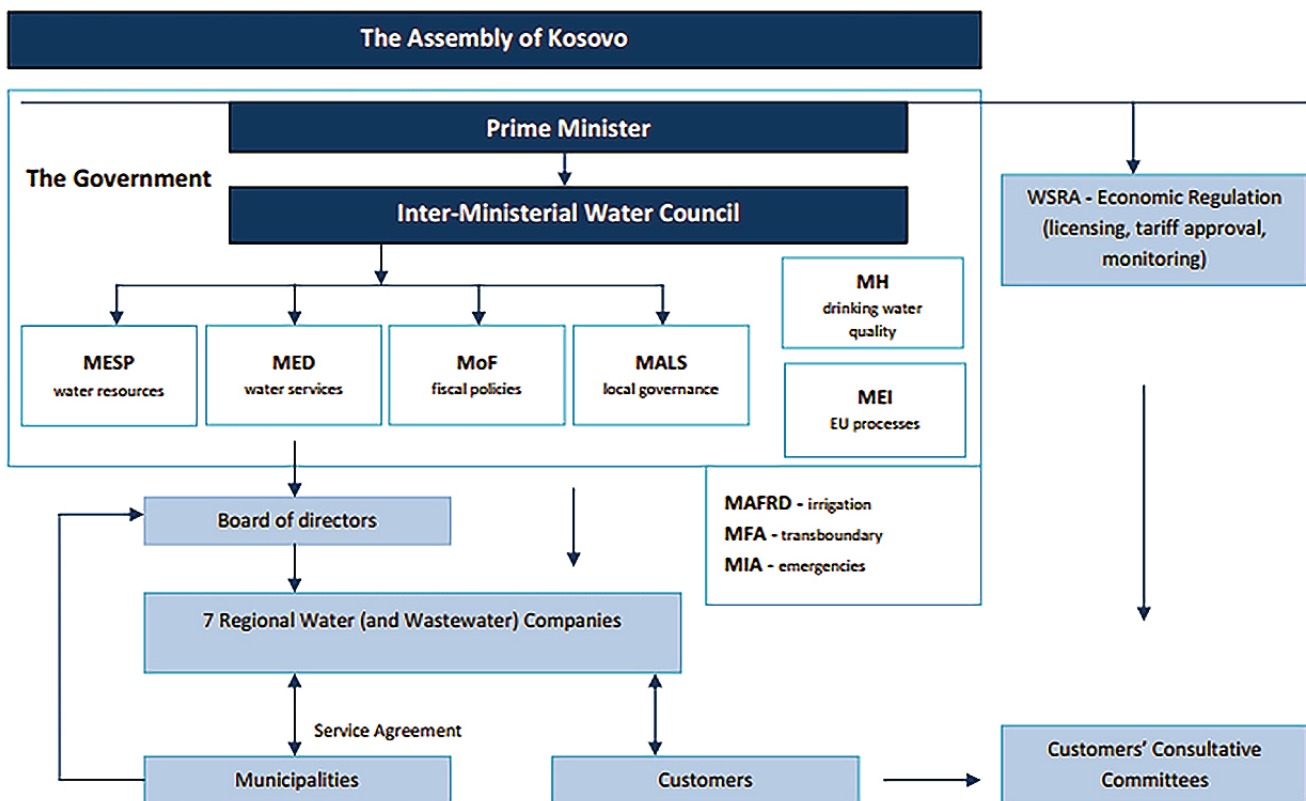
water supply, water pollution, untreated sewage disposal, eutrophication and surface water monitoring

The Water Services Regulatory Authority (WSRA) (previously Water and Wastewater Regulatory Office) is an independent regulatory body accountable to the Assembly of the Republic of Kosovo and is the key licensing and economic regulator for the water services sector. Thus, the key role of WSRA is to manage an effective regulatory framework, which encourages water service providers in Kosovo to ensure a high-quality service in the monetary value paid by customers.

The National Institute of Public Health of Kosovo (NIPHK) is a body within the Government of Kosovo with responsibilities for a wide range of issues related to public health, including the monitoring and implementation of standards of the potable water in Kosovo.

Kosovo has a National Water Strategy for 2017 – 2036 in accordance with the Law on Waters of Kosovo and EU Directives. It provides long-term planning, vision, mission, measures for water policy development in Kosovo. It provides for water policy from a multi-sectoral perspective to provide sustainable development and management of the resources, support water use and help protect from water. It sets out five strategic objectives and a set of measures. This water security Outlook references the strategy throughout as a core reference document for the water sector in Kosovo.

Figure 18 - The Assembly of Kosovo



As a potential candidate for EU Membership, it is important that further development of the water monitoring programs work towards WFD-compliant monitoring and assessment of the status of water bodies. In 2013, the new Water Act has been adopted which has ensured partial transposition of the Directive. Further transposition efforts are still required to achieve full transposition of the WFD. The Ministry of European Integration coordinates and oversees the institutional development of the implementation of the acquis and is part of the IMWC. Good progress has been made in many areas, but annual reports from EU reinforce the message that better implementation is needed as well as the better coordination with other planning processes. For instance, in the area of water quality, the level of alignment is limited. A strategy and action plan on water protection have still not been adopted and urgent efforts are required to ensure the functioning of the river basins authority, established in July 2017. Furthermore, improvements are needed in actual sewage treatment and discharge, groundwater and surface monitoring, and mapping of agglomerations and definition of sensitive areas. (EU Kosovo 2018 Progress report).

CHAPTER 4

WATER SECURITY PROFILE

4.1. People and Society

Table 7 - Quick facts: Socioeconomic indicators

Parameters	Indicators
Population	1.8 million
Kosovars living abroad (est.)	0.8 million
GDP – US\$ 7 billion (2017)	€ 5.7 billion
Unemployment	31.4 % (World Bank)
Underemployment (youth 15-24 - among highest in Europe)	~ 60% (WB)
Population below poverty (€ 1.55 / day)	34.5%
Extreme poverty (< € 1/day)	12%

Source: Statistical yearbook of the republic of Kosovo for 2017

The currently predominant abstraction of water in the country is to satisfy urban and rural demand, although that figure most likely masks irrigation uses from water supply networks. For drinking water, the largest amount of water used on a daily and annual basis as a principal source are accumulation reservoirs, then there are springs.

Table 8 - Sources of water supply and the amount of annual and daily used in m³

Water source	Amount of water used in [m ³ / day]	Amount of water used in [m ³ / year]	Percentage [%]
Springs (direct piping)	153.264	55.941.360	32.1
Spring water storage tanks	7.749	2.828.385	1.62
River	11.191	4.084.715	2.34
Lake (surface accumulation)	279.26	101.929.900	58.44
Wells	26.34	9.614.100	5.51
Total	477.804	174.398.460	100

Source: Kosovo Water Statistics 2017

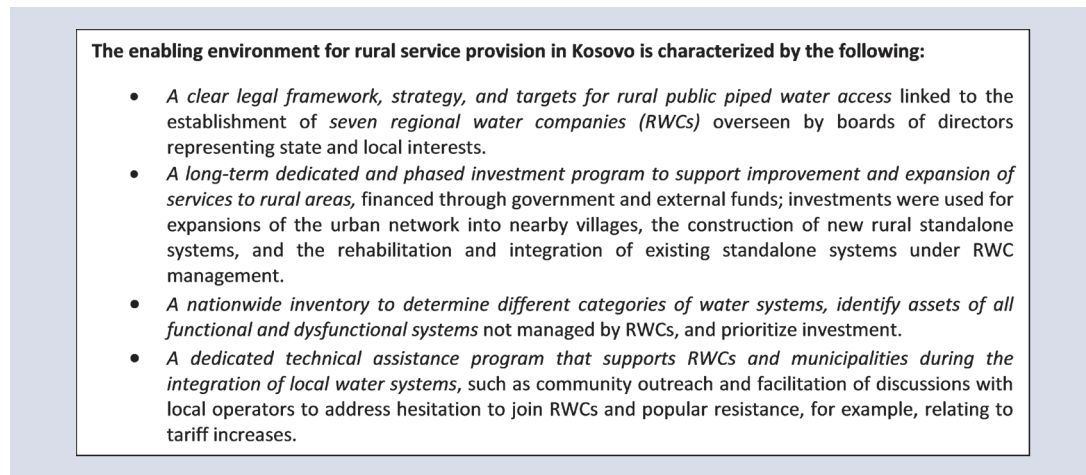
Table 9 - Quick Facts on Water Supply and Sanitation

Parameters	Indicators
Drinking Water Supply (country average)	92%
Water Supply (managed by Regional Water Companies - RWC)	84%
Non-Revenue / Unaccounted for Water (commercial and physical losses)	~ 58%
Sewerage connection (country average - untreated)	72.5%
Rural Sanitation (including rural sewer networks - untreated)	< 50%
Child mortality	35-49 / 1,00t0
Below age 5 (> half from diarrheal diseases - highest in Europe - UNICEF)	69 / 1,000

4.1.1 Drinking Water, Sanitation and Health

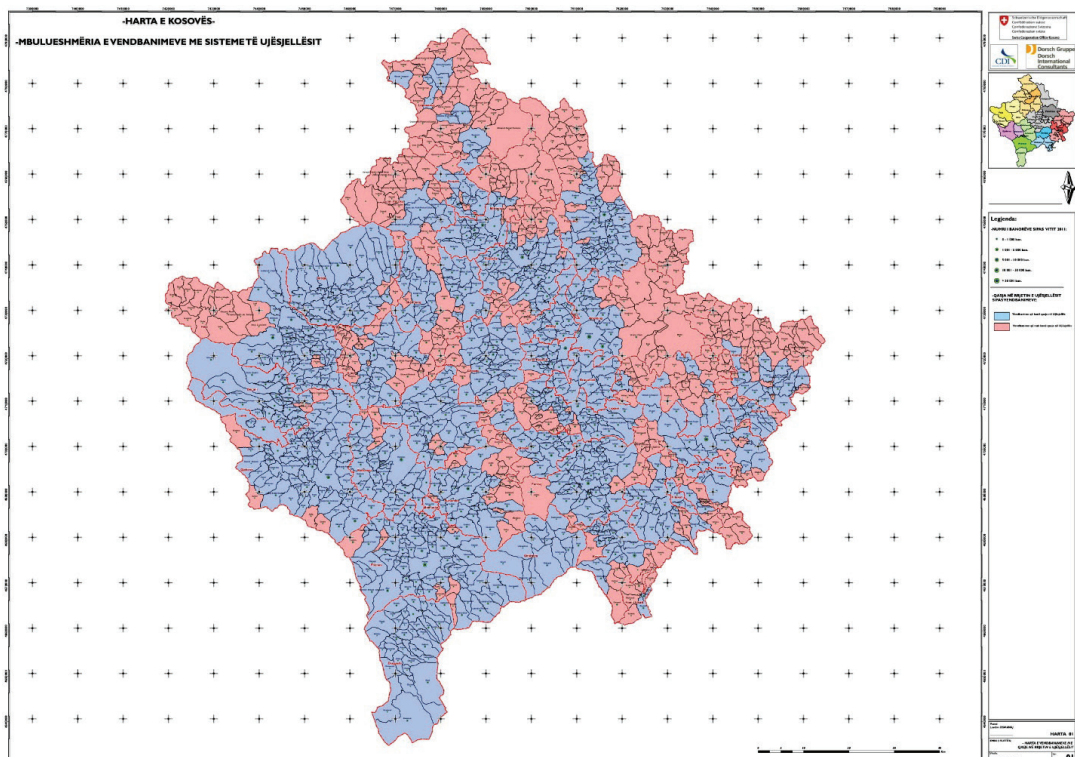
Most of the population of Kosovo has access to safe water and sanitation services. 92 percent of the population has access to piped water service within their dwellings. Only 8.42 percent of the population has no access to water service network. 84.32 percent of water service is provided by public network/public companies and 7.26 percent constitutes of local area networks that residents manage independently from the public network. 72.5 percent of the population is covered with sanitation, 11.6 percent have only partial coverage and 15.9 percent yet have no sewers. In terms of on-site sanitation, the figure is better with near universal access to flush toilets (97 percent), although much lower still (54 percent) for rural areas (MICS, 2014).

Kosovo has developed a sound enabling environment for drinking water service provision and is an example for other countries in the region in terms of addressing inequalities between urban and rural areas, as illustrated in box below.

Figure 19 - Lessons from Kosovo in closing the urban rural access gap

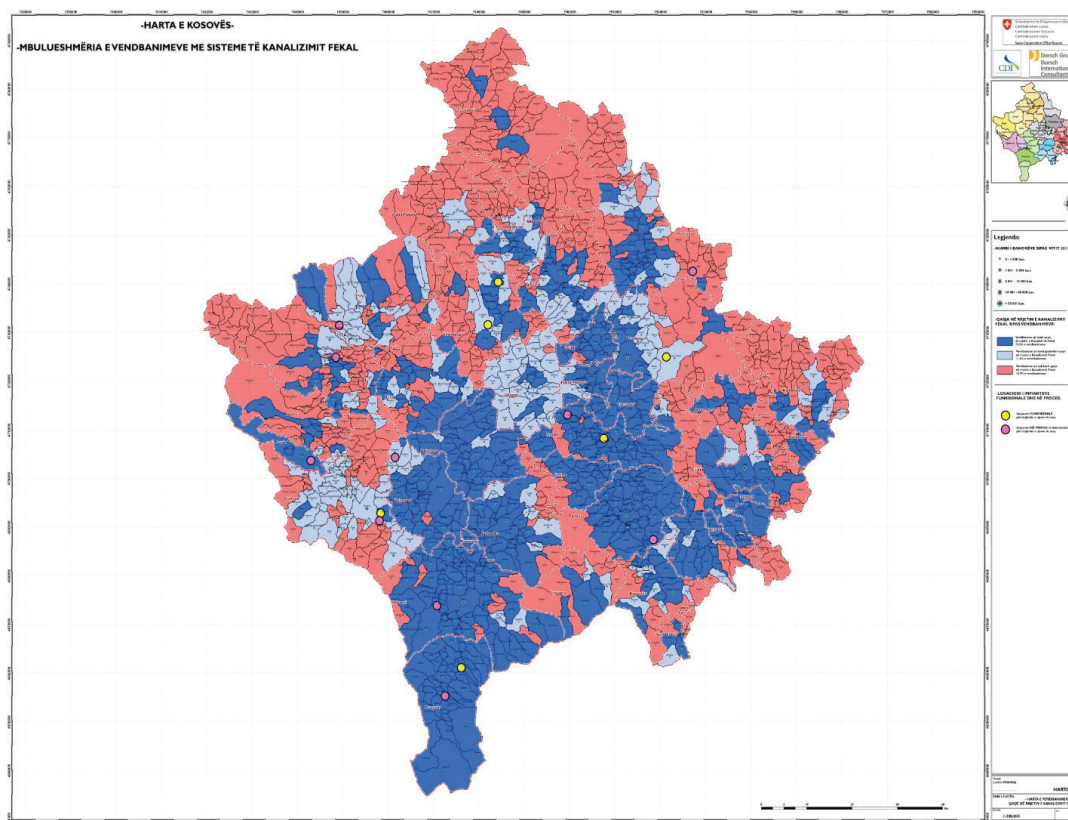
However, only one percent of the population is currently served with wastewater treatment. With three other planned and under implementation, soon this percentage shall increase significantly as the treatment plants are being constructed on high density locations like Peja, Gjakova and Prishtina.

Below is Kosovo map reflecting coverage by water and sewerage services

Figure 20 - Drinking water coverage in Kosovo

Drinking water coverage (pink is for areas not covered by water services, and although it looks a large area in fact these locations are mountain areas with few habitants thus small percentage of population appears with no access to water services) (source water situation report – IMWC).

Figure 21 - Coverage with sewerage (blue is for complete coverage)



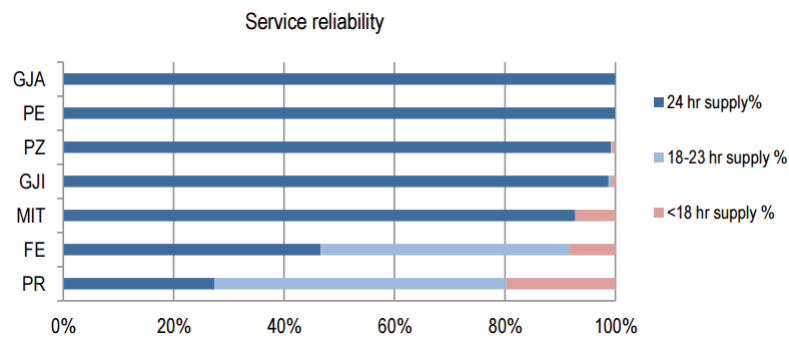
Source: Swiss Development Agency, Kosovo

Coverage with sewerage (blue is for complete coverage, light blue signals partial coverage and pink for areas not having sewerage system coverage). (source Water situations report – IMWC)

Reliability and Quality of water supplied is generally adequate. In bacteria and chemical testing of the water, the Water Services Regulatory Authority reports a 98 percent rate of purity, while the international standard is above 99 percent.

A large threat to water quality in Kosovo lies in the lack of sewage systems. Beyond urban areas, only 50 percent of homes are connected to any type of sewage system. The rest is disposed into downstream rivers which then contaminates the ground water as well. Kosovo's government has recognized these threats and is working to improve protection standards for the country's rivers.

Continuity of supply at sector level has improved while the rate of consumers subject to water reductions in 2016 has decreased to 28 percent of the total of consumers served. Average hours of water supply services per day from RWCs at sector level have increased from 22.00 hours per day in 2015 to 23.00 hours per day in 2016.

Figure 22 - Consumers supplied with drinking water

Source: Water Services Regulatory Authority

Water Services are considered affordable for the majority of Kosovo population. Water and sanitation services are affordable for a majority of the Kosovar population, except for poor households. The mean water and sanitation invoice potentially represents 2.3 percent of household average income. But this ratio amounts to 3.4 percent for households in the bottom 40 percent of monthly income connected to public. The situation is further aggravated for social categories that are not exempt from water bills and receive no supporting subsidies.

Compared to urban inhabitants, rural inhabitants have lesser access to public water and sewerage services, and poor households encounter hardships paying water bills. Access to public service in Kosovo is unequal between urban and rural areas due to historical reasons, though the situation is continuously improving thanks to sizable infrastructure investment. Moreover, 84 percent of the poorest segment of the population (living on less than US\$2.50/day) has access to piped water supply and 76 percent to flush toilets (Authors' elaboration). Affordability remains a concern for the poorest segment of the population, however. There is no statistical information available regarding access to water and sanitation for marginalized minorities. The 17.6 percent of the population that lives below the national poverty line of Euro 1.83/capita/day (2015 figures) faced an average of Euro 2/capita/month, or 3.6 percent of household consumption at the national poverty line; and 5 percent for those living at the extreme poverty line. Where tariffs are rising above the affordability of the poorest segments (e.g. more than 3% of household income), some type of targeted assistance may be needed. This might be channeled through cross-subsidy, national systems (different EU countries apply different concepts), and should be part of the broader financing strategy for the (sub) sector.

The main funding for investments comes from donors, international financial institutions, and the government, with modest contributions from utilities. Since 1999, more than €250 million has been invested in the water and wastewater sector, representing €17/capita/year and 0.3 percent of GDP per year. Seventy-four percent of those investments were funded by international donor institutions and 26 percent by the central government budget through taxes. Since 2009, the funding scheme has been more balanced, with a noticeable increase in the government's contribution to 54 percent, a decline in donor grants to 42 percent, and water company funding of 4 percent of all investments.

Kosovo utilities perform well in terms of cost recovery of operating cost with a ratio of 1.40 of billed revenue over operating expenses in 2016, and overall trends of cost recovery,

total cost per volume sold, and overall coverage are simultaneously positive, which is a commendable achievement. However, this positive ratio does not include the total cost recovery which would include all the needed depreciation, debt service and other financing costs, and for this reason operating costs need to be carefully controlled and budgets drawn for longer term sustainability.

Figure 23 - Cost Recovery and Affordability

Cost Recovery and Affordability

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Cost Recovery						
Average residential tariff [incl. water and wastewater] [€/m ³]	2013	WWRO 2013	0.48	0.57	1.32	n.a.
Operation and maintenance unit cost [€/m ³]	Authors' elab.		0.22	0.45	1.20	n.a.
Operating cost coverage [billed revenue/operating expense]	2013	WWRO 2013	1.49	1.01	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income [%]	2010	Authors' elab.	2.3	1.6	2.5	n.a.
Share of potential WSS expenditures over bottom 40% income [%]	2010	Authors' elab.	3.4	2.5	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income [%]	2010	Authors' elab.	3.8	1.6	14.1	n.a.

Source: World bank,2015. Water and Wastewater Services in the Danube Region: A State of the Sector.

Water services are regulated by local legislation in force. Tariffs are set by the Regulatory Authority and State of sector report (May 2015) considers them affordable for a majority of the Kosovo Population, except for poor households. Tariffs fully cover O&M expenses but the sector relies on external funding for capital investment. Water and wastewater utilities are organized according to self-financing principles (application of cost recovery tariffs). Yet due to inefficiency, some service providers cannot recover O&M expenses, which must be complemented by subsidies.

Under Article 20 of the Water Law (no. 2004/24), duties and responsibilities of municipalities in water management are to manage sources for important water supply at local level such as natural water springs, public springs, public wells and ditches. While, by the Law on Local Self-Government in Kosovo (no. 03/L-040), municipalities are responsible for providing public water supply. This competence in the case of water and sewerage services should be realized through Service Agreements that municipalities make with respective regional companies that offer their services in the municipality concerned.

According to the Law on Public Enterprises (currently being revised) (Law 03/L-087), public enterprises dealing with drinking water and irrigation water are classified into three groups:

Table 10 – Classification of public enterprises dealing with water service delivery

Central Public Enterprises:	Regional Water Companies	Local Public Enterprises
Public Company: • Hydro-system Iber-Lepenc JSC	• RWC “Pristina” JSC, Pristina • RWC “Hidrodrini” JSC, Peje • RWC “Hidroregjioni Jugor” JSC, Prizren	• Water and Waste Company “Iber”, Zubin Potok • Water and Waste Company “24 Nentori”, Leposaviq
Regional Irrigation Companies: • Irrigation Company “Drini i Bardhe JSC • Irrigation Company “Radoniqi-Dukagjini” JSC	• RWC “Mitrovica” JSC Mitrovica • RWC “Hidromorava” JSC, Gjilan • RWC “Radoniqi” JSC, Gjakova	• Water Company “Bifurcation”- JSC, Ferizaj / Kaçanik

Source: Law on Public Enterprises (currently being revised) (Law 03/L-087)

Central and regional Water companies are under monitoring of Ministry of Economic Development, while the local companies report to Municipal Government.

4.1.2 other social outcomes of water

Social impacts of pollution are severe. As will be described in Section 4.3.2 (on environment), all rivers in Kosovo are classified as polluted sources of water due to untreated sewage, inadequate waste disposal and other forms of waste dumping (as per State of Water report 2015, Water Polluters Cadastre). As with air pollution, industrial polluters, including KEK, Ferronikeli, Trepca and other industrial complexes, play a leading role in water contamination by releasing heavy metals such as lead and cadmium, a toxic chemical element that is listed in the European Union’s Restriction of Hazardous Substances. Apart from industrial polluters, agriculture also plays a role in polluting water sources where management of manure is largely absent. Livestock manure, for example, contributes to approximately 19,000 tons of nitrogen per year, with most of it ending in water streams. While not as detrimental as Kosovo’s air pollution problems, water pollution has direct and indirect health impacts. Indirect impacts are through the deterioration of important ecosystems, groundwater and the impacts on fish. More directly, the contamination of water resources leads to various waterborne diseases, the most serious of which is diarrhea — and children are especially vulnerable to the disease. Using methodologies created by the WHO, the World Bank’s Country Environmental Analysis estimated that in Kosovo about 13 children under the age of 5 die every year because of water contamination and poor hygiene. The total impact of water contamination and poor hygiene and water supply costs Kosovo over 30 million euro, but more accurate measures of long term public health and environmental consequences are unknowable.

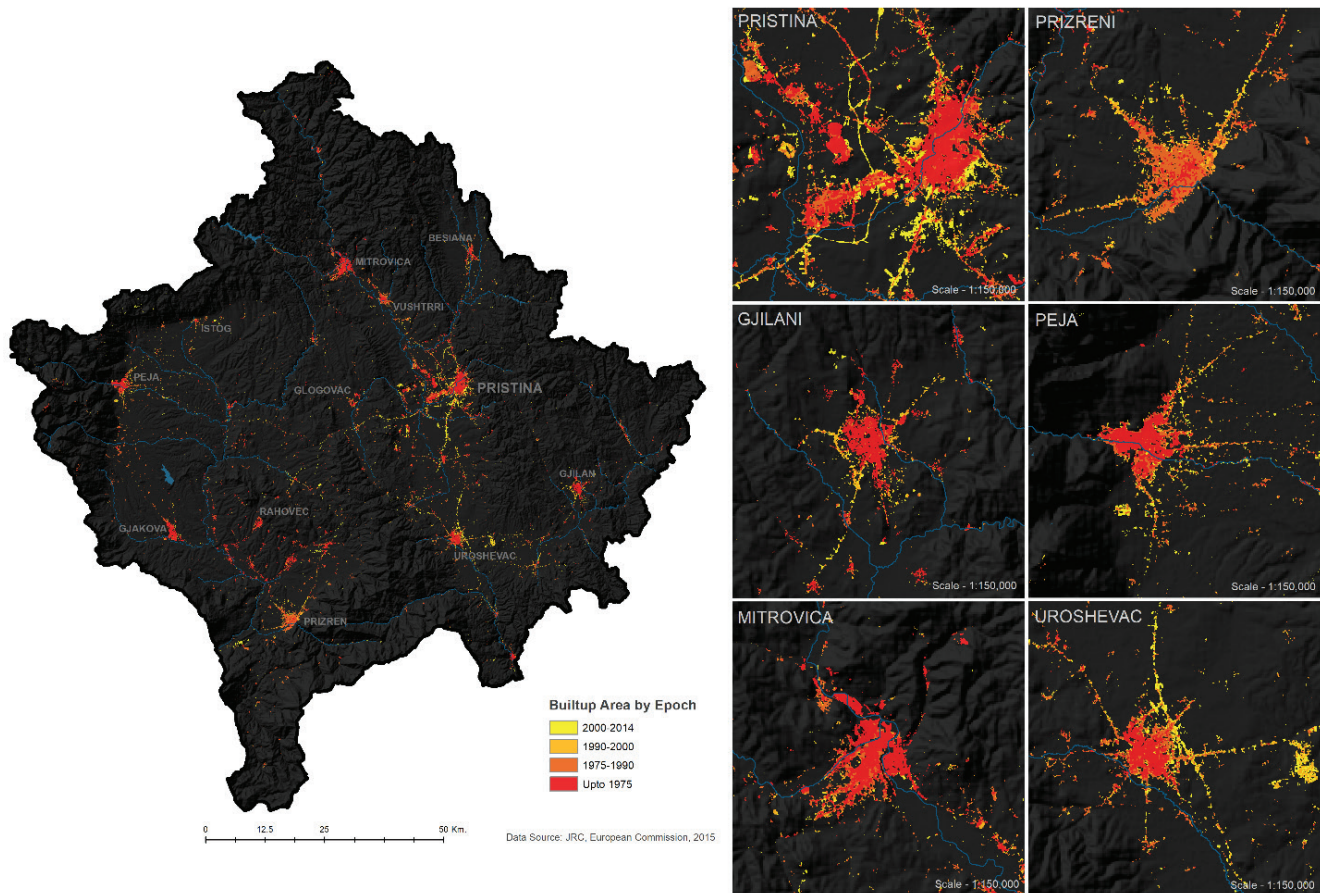
Gaps in access to economic opportunities by gender remain one of the challenges for Kosovo, and the water sector is no exception. Equal access for employment opportunities will help address this, as well as targeted outreach. Kosovo has a fairly comprehensive legal framework and mechanisms towards gender equality, political participation, and non-discrimination on the basis of gender. There are still some challenges to women’s unequal access to economic and environmental resources. Discrimination against women and girls still exist and there are still barriers to women’s political participation and women continue to carry a disproportionate burden of unpaid work. These factors hinder women’s economic and politi-

cal empowerment, and restrict overall development (UNDP, 2014). Despite a gender-neutral inheritance law, women own 4 percent of land, own 6 percent of SMEs, and female formal labor participation is just 19 percent, contrasting with 58 percent for males. Nevertheless, informal and unpaid family employment for women in rural areas in agriculture is widespread. A recent analysis on roles of male and female producer in irrigated agriculture revealed that women play a key role in horticulture and value addition, including using modern irrigation methods and modern farming and processing techniques. However, irrigation companies almost exclusively deal with male heads of households as customers. Women have limited access to information on irrigation services, extension and advisory services, and face more barriers to successfully apply for grants or loans to secure investments in on-farm improvements. Hence, with a trend towards higher value agriculture, measures need to be taken to ensure this development strengthen women's economic opportunity and voice in decision making.

Service in the north of Kosovo. The first agreement on the normalization of relations between Belgrade and Pristina, known as the Brussels Agreement, was signed in April 2013 in Brussels with the European Union as the mediator. At that time, among other things, the Agreement initiated the integration of Serbian institutions in the municipalities of North Kosovo into the legal and institutional system of Kosovo, and the first step in this process was to organize local elections in those municipalities in Kosovo. There are many challenges in the implementation of the Brussels Agreement, and five years after the signing, all 15 points of the agreement have not yet been implemented. The legal and institutional system of the Republic of Serbia has remained in some institutions in North Kosovo. This includes the water related institutions. Four northern municipalities in Kosovo have established nine public companies that operate according to the laws of the Republic of Serbia. The municipality of North Mitrovica is the founder of four public companies that manage water supply, waste disposal, construction land and housing activities in this municipality. Public Utility & Water Supply Company "Ibar" provides water supply and deals with water treatment and disposal of atmospheric and wastewater.

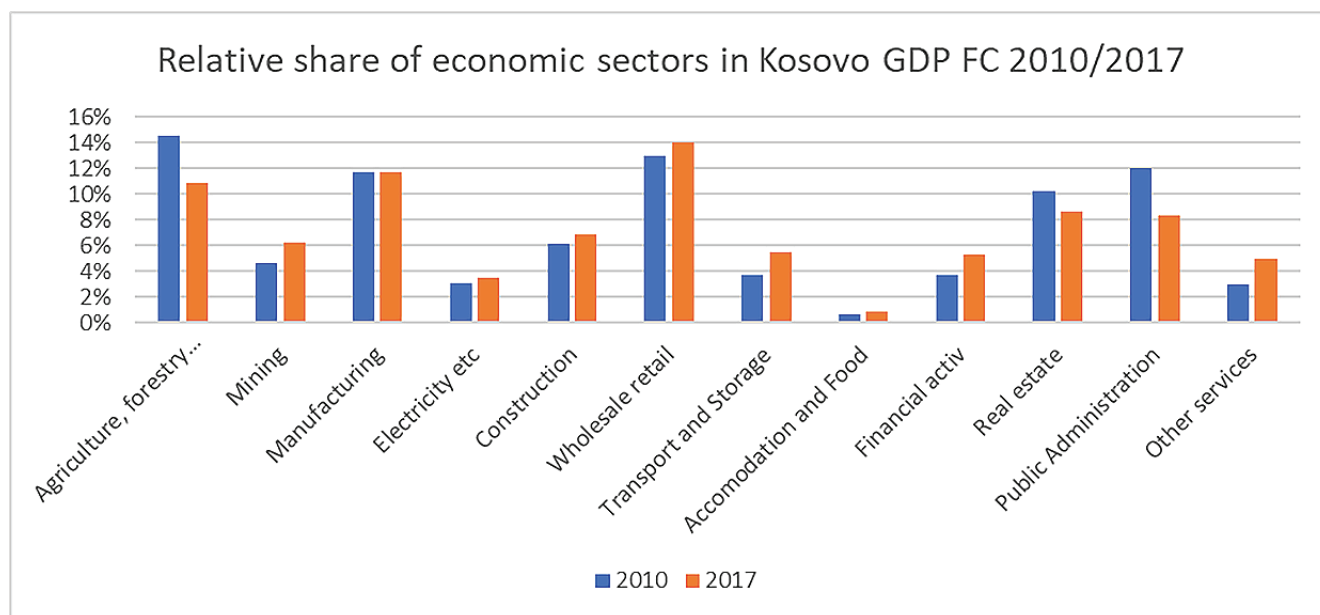
The Public Enterprise for Water Supply and Production and Distribution of Electricity "Ibar" is located in Zubin Potok, and it was established by the decision of the Government of Serbia in 2002 with the intention to manage the Iber-Lepenc hydropower system. The Public company "Ibar" operates according to Serbian legislation and it is not recognized by the legal system of Kosovo. It manages Gazivoda Dam and the intake of Iber-Lepenc Canal and the HPP. Simultaneously, the Iber-Lepenc hydrosystem is operated by the Public Company "Iber Lepenc" with headquarters in Pristina.

Rapidly expanding cities have put strains on social services, including water services and since expansion has been unplanned ribbon development it has also encroached on valuable agricultural land, in particular irrigated agricultural land, and cut up rural infrastructure such as irrigation schemes and further complicated service delivery. While service delivery has been able to provide near universal access, the impacts both on urban water management (storm drainage, protection from floods) and rural water management (landscape approaches, contiguous irrigation service areas) are significant.

Figure 24 - Builtup Area by Epoch – National Map and main urban areas

4.2. Economy

Kosovo's economy is not using natural and labor resources optimally. As described in Chapter 2, Kosovo is one of the poorest countries in Europe. Its economy has been growing robustly over the past 7 years with average growth figures above 3.5 percent. This growth has largely been inclusive, but poverty remains a key issue. Agriculture modernization is happening only slowly and this has major impacts on water security, rural economy and employment. Other sectors are also bouncing back. From a water security perspective this requires higher water productivity in a more integrated way to support a broad economic base, improving reliability of service delivery and better protection from current and future hazards.

Figure 25 - Relative share of economic sectors in Kosovo GDP FC 2010/2017

Public spending on environment in Kosovo comes from four main sources: central government, municipalities, donors, and publicly owned enterprises, such as water and waste management companies. While data on budget-financed expenditures seem to be comprehensive and reliable, complete information on donor-financed projects and expenditures of publicly owned enterprises is lacking as these have been largely pushed implemented outside the budget framework.

Water security affects all above sectors in different gradations. The largest amount of water is used by public water supply companies for drinking water supply, for household and other consumer needs of public water supply companies and sanitation. This supports directly and indirectly all service sectors, and importantly construction, mining, manufacturing and other industry. Agriculture is another large user, currently suppressed in its water usage due to the dilapidated infrastructure and lagging investment in modernization of the agriculture sector. Much of this water use is in rainfed agriculture, which is highly dependent on variable climate. In the irrigation sector, abstraction and productivity are higher. With intensification of agriculture, the uptake of irrigation will increase. In the energy sector, there is some water use for hydropower, and an important contribution to thermal powerplant cooling for most of power generated in the country. In industry, water is used for production and cooling the equipment. The quantity of water used in a sector is not correlated to its impact on water security. A very demanding inefficient irrigation scheme may contribute little to overall GDP, and have a large footprint, whereas a highly productive intensive system has major positive impacts on imports, jobs and overall GDP. Hydropower consumes no water but poses large demands on flows in rivers. Optimization of water use requires understanding and optimization of water resources to maximize social, economic and environmental services.

Table 11 - Estimated Current Water Resources Consumption by Sector

	Volume 000 m3 per annum	Proportion %
Urban & Rural Water Supply (including unaccounted for water)	178,118	52%
Irrigation	140,193	41%
Industry	25,916	8%
Total	344,227	100%

Source: National Water Strategy 2017 - 2036

4.2.1 industry

Industrial demand is rapidly growing and its impact on water resources is felt in form of pollution and increased demand for stable satisfactory quality water supply. Main industrial polluters are the Kosovo Energy Corporation (KEK), Ferronikeli, and Sharrcem, as well as Trepca, Kishnica, Artana, and other mines. Many smaller industries discharge their wastewater into public wastewater collection systems. Some larger industries also discharge their wastewater to sewers and through sedimentation ponds, but many also discharge directly to the environment. Growth in industries is also increasing the demand on the water resources and water services. Industrial use requires high security of supply (non-interrupted) of high water quality, and will therefore increasingly compete with other water users and increase demands on the system.

Larger industrial installations are governed under EU law by the Industrial Emissions Directive (2010/75/EU). This requires such installations to apply best available technology throughout their operations including water consumption and wastewater generation and treatment. As such, costs will be incurred in meeting the requirements of EU legislation, but these costs will fall on the private sector entities which discharge to sewer or to the environment.

4.2.2 Agriculture

The agricultural sector currently is by far the largest consumer during the growing season (summer / autumn), although overall it uses less than the urban water supply sector on an annual average basis. This demand is likely to grow drastically if irrigation is revitalized in existing schemes and expanded in other areas, and is already shifting to a longer growing season with introduction of new varieties and greenhouse production.

Agriculture plays a significant role in Kosovo's economy. It is an important contributor to GDP, accounting for about 11 percent of GDP in 2017. Over 62 percent of the country's population lives in rural areas and depends, directly or indirectly, on agriculture for its livelihood. The sector faces several diverse and inter-related challenges that prevent it from meeting its

productive potential. Before the 1990s, Kosovo was largely food self-sufficient with large quantities of agricultural products exported to the region. However, after the war, this trend was reversed so that today, agriculture is largely subsistent/semi-subsistent in nature and Kosovo has become the largest importer of food per capita in Europe. The sector is characterized by small, fragmented land holdings, with average land holding size ranging between 1.5 and 2.0 ha, often spread across an average of seven smaller plots. Lack of and/or limited access to, *inter alia*, modern technologies, good quality inputs, irrigation, post-harvest management and processing infrastructure, credit, and markets pose serious challenges to the development of the sector. Poor standards and land fragmentation add to current low level of productivity. There are good opportunities for the development of Kosovo's agricultural sector, primarily in high value horticulture production and livestock. Horticulture, and commercial agriculture in general require high investment and risk reduction strategies, and climate variability is a challenge that all farmers face, with a generally dry and hot summer season.

Thus, to harness the potential of priority subsectors, especially the horticulture subsector, there is a need for irrigation. Although total rainfall in Kosovo is on average sufficient to ensure reasonable yields for most staple crops, rainfall patterns show high inter and intra-seasonal variability. Uneven distribution of precipitation throughout the year, especially during critical growth periods, has affected agricultural productivity and supplementary irrigation is crucial. For fruits and vegetables, irrigation is essential for increasing yields as well as for ensuring produce quality and timely production. It is expected that with irrigation small farmers would move to more high-value crops and specialized markets and away from near-subsistence agriculture. Beyond reducing risk, provision of irrigation services also allows optimizing other inputs, such as fertilizer and help improve phytosanitary conditions.

Ageing irrigation infrastructure and lack of maintenance are reducing the level of irrigation use and impacting development of agriculture. Most of the irrigation schemes were built in the 1970s and are showing signs of deterioration. Moreover, the war of the 1990s damaged or destroyed large sections of country's irrigation infrastructure. The area equipped for irrigation fell from approximately 71,000 ha before the war to about 43,900 ha in 2014. The expansion of urban and industrial areas in recent years, has also sharply reduced actual irrigable area so that the area of irrigation use is far lower today than in the past. The lack of integrated spatial planning and the ribbon development mentioned earlier affects good agricultural land, in particular irrigated agriculture which is dependent on conveyance canals. Particularly Iber-Lepenc and Dukagjini have suffered from unplanned encroachment onto the equipped irrigation area, and destruction of infrastructure, as well as urban waste affecting water quality and conveyance in the canals. Between 2006 and 2012, the average area irrigated was only about 12,000 ha - 4,000 ha in small schemes and 8,000 ha within the areas serviced by the country's three regional irrigation companies: Iber-Lepenc, Radoniqi-Dukagjini and Drini i Bardhe, which is much below the equipped area, let alone the irrigation potential in the country. It should be noted that most likely there is much higher irrigation use that goes unreported, from small wells, diversions and also from domestic water systems, largely for use in private farms and often with small pumps and pressurized irrigation systems.

Table 12 - Irrigation Scheme Coverage by Scheme

Scheme	Irrigated area in 2004-2012 (ha)	Irrigable area (equipped)
Iber Lepenc	2,500	14,500
Radoniqi	4,700	5,000
Dukagjini	800	2,500
Drini Bardhe Peja	1,300	2,500
Istog	1,350	2,000
Lumi Bardhe	1,650	3,000
Total	12,300	29,500

Source: National Water Strategy 2017 – 2036

With the current low levels of utilization and consequently declining revenues, the irrigation service providers are struggling to sustainably finance irrigation management. Like in the water supply sector, the large irrigation schemes served by the three regional water companies operate as independent utilities and must meet all annual O&M costs and debt services from water charges. Water pricing is based on hectares and determined by the users' ability and willingness to pay. The ageing system and diminished utilization are generating high operational costs and low fee collection rates. The *Radoniqi-Dukagjini Regional Irrigation Company* is the only company that has been able to break even. Irrigation utilization is much higher in the Radoniqi-Dukagjini scheme and the cost recovery rates are better than other schemes. This is because the scheme is in the Dukagjini Plain, an area highly suitable for horticultural production, with most of the farming community engaged in production of high value crops and participating in irrigation. It also has a reliable water resource in the Radoniqi Reservoir and a robust well-designed distribution system. Drini e Bardhe irrigation scheme suffers from water shortages and dilapidated open canals. Iber Lepenc is closest to the industrial areas which makes pollution a major issue for crop production. Also, cost of irrigation water delivery is high as large infrastructure serves fewer people, and much of the area is out of production here. In the area of Iber Lepenc irrigation is also suppressed due to alternative employment opportunities in industries. Yet, here too, there is a lot of private initiative in irrigation with people using water from the system without payment.

The Kosovo National Water Strategy (2015-2034) highlights the importance of managing the use of water including irrigation and recommends efficiency improvements, steady irrigation expansion and greater value addition to irrigated production. It also calls for increasing financial sustainability of irrigation service provision. An inter-ministerial task force has been established to support inter-sectoral collaboration. MAFRD's role is to develop policy and strategy on irrigation in line with the water resources policy of the Ministry of Environment and Spatial Planning (MESP).

Future trends in agriculture include the dual trend of fewer farmers and more intensive agriculture. For the medium term the social aspect of agriculture will remain important and

over time economic importance in absolute terms may increase again if key obstacles in the sector are overcome. Increasingly there will be local surges in irrigation water demand and water stress in agricultural areas. With warmer temperatures and more dry spells, and higher precision demands from irrigation the demands on irrigation service will expand. This is already happening with farmers supplying their greenhouses with pumps to be able to extend the irrigation season beyond the scheme operation period (earlier start and longer season to allow double cropping and fetch premium prices). It is likely that this will also go hand in hand with higher demands on reliability of service and general improvement in service orientation by state enterprises and a shift to more independent exploitation of groundwater which will require careful management. Drainage water quality will need to be managed in future.

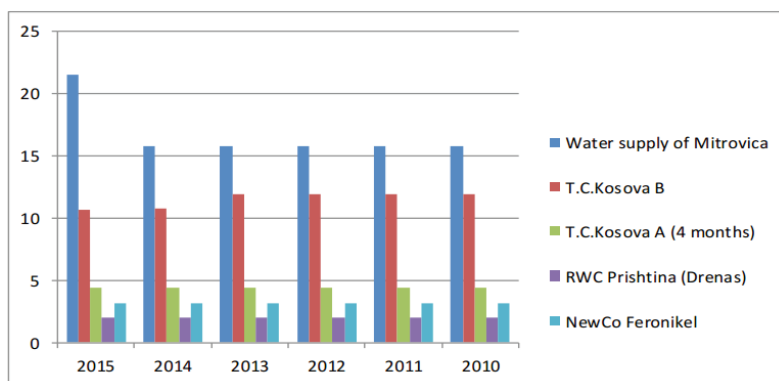
The fisheries sector in Kosovo is not very developed. However, Kosovo has a considerable potential of fresh water, which can ensure great employment opportunities, profits and other opportunities for the country's economic development.

4.2.3 Energy

Most of Kosovo's energy comes from thermal power plants Kosovo A and Kosovo B. Kosovo A is using water for cooling towers from Iber Lepenci during July and August (the rest of the months depending on water from Sitnica river) while Kosovo B is using raw water from Iber Lepenci system permanently. Any disruption in water supply for the cooling towers of Kosovo B would imply the need to stop the operation of Kosovo B within hours (Kosovo B is a lignite-fired consisting of 2 units with 340 MW).

Water use for cooling energy is a top priority in water management. Demand has gradually increased over the years. The amount of water used during the years 2002-2015 from Kosovo A and B power plant has changed: in 2003 water use was 8 million m³, while in 2015 this amount reached 17.3 million m³. The planned new power plant replacing Kosovo A would also be drawing its cooling water from Iber Lepenci canal, further increasing demand for cooling near Obliq.

Figure 26 - Water supply from "Ibër Lepenci" (unit=106m³), 2010-2015



Source: Kosovo Water Statistics 2017

Table 13 - Water supply from “Ibër Lepenci” (unit=106m³), 2010-2015

Years	2010	2011	2012	2013	2014	2015	2016	2017
Unit	Mil. m3 / . year							
Consumed water	15.83	15.10	15.21	15.64	13.78	16.72	16.60	15.49
Water for cooling	13.79	12.75	12.93	13.65	12.09	14.79	15.31	12.251
Discharged wastewater	6.51	6.23	6.99	7.56	6.16	12.77	5.48	3.582

Source: Kosovo Water Statistics 2017

All sources combined, power production is much suppressed in Kosovo. Low power generation capacity is a binding constraint on the economic growth and FDI attractiveness.

The lack of adequate energy supply is exceptionally pronounced, with generating capacity not exceeding 0.8 Kw per habitant, which is less than half of that in Slovenia and about one-fourth of that in Austria. While actual consumption is particularly low, the very high energy intensity (six times higher than in the EU)—calculated as consumption over the GDP—is a clear sign of poor energy efficiency.

Kosovo’s hydro-energy potential is not large. Only three large HPP candidates have been studied in Kosovo Zhur I, Zhur II and Vermica (EU Regional Study on Sustainable Hydropower, 2017). The others are small HPP. The current priority of Kosovo’s government in terms of energy is the development of a new lignite power plant, utilizing existing large reserves of lignite, as part of a diversified energy strategy using more renewables, increasing energy efficiency and reduction of energy consumption through extension of district heating services. Currently, the country has some 52 MW of installed capacity in small HPPs and intends to grow this with about 160 MW.

In the recent past, Zhur HPP (with a potential of some 305 MW installed capacity) on the Drin river has been studied. The validity of that documentation and any future progress is questionable due to significant unresolved transboundary issues with Albania. The waters that were to be allocated towards HPP Zhur are already being used in several HPP projects that have recently been licensed and constructed in Albania. At this moment, its realization is not likely until countries can agree on environmental impacts and coordinated management of the cascade and the shared resources; and it is questionable if the endeavor will be economically justified as originally proposed. It is currently no longer proposed in Kosovo’s energy strategy.

There are considerable differences between western Balkan countries in terms of both the available hydro potential and in the amount of hydro development that has taken place in the past. For example, per initial estimates, there is no more than 57 MW (0.7 percent of total in Western Balkan 6 Countries) installed in hydropower generation capacity in Kosovo, 610 MW (7.2 percent) in the former Yugoslav Republic of Macedonia, 676 MW (8.0 percent) in Montenegro, 1,824 MW (21.6 percent) MW in Albania, 2,139 MW (25.4 percent) in Bosnia and Herzegovina, and 3,122 MW (37.0 percent) in Serbia.

The table below shows the presently utilized technical potential (UTP), additional (remaining) technical potential (ATP) and the total technical potential (TTP) by country.

Table 14 - Technical potential (UTP), additional technical potential (ATP) and total technical potential (TTP) by country.

Country	Total technical potential (TTP)	Used technical potential (UTP)		Additional technical potential (ATP)	Share in ATP
	(GWh)	(GWh)	(%)	(GWh)	(%)
Albania	10,273	5,940	58	4,333	10
Bosnia and Herzegovina	24,351	6,535	27	17,816	39
The former Yugoslav Republic of Macedonia	9,786	1,443	15	8,343	18
Kosovo	423	203	48	220	1
Montenegro	6,648	2,000	30	4,648	10
Serbia	20,489	10,507	51	9,982	22
Total	71,971	26,629	37	45,342	100

Source: Regional Strategy for Sustainable Hydropower in the Western Balkans 2017

Hydro and renewables can provide (only) some of the required new firm capacity. Of a potentially requirement of up to 1500 MW in new generation capacity in 2025, hydro and renewables can provide only some of this firm capacity; it is assumed that 230 MW of firm capacity can be supplied by small hydropower and a total of 470 MW from other renewables (in order of magnitude: small hydro, wind, photovoltaic, biomass and biogas).

The Government has set a target of 25 percent Renewable Energy for gross final consumption in the Action Plan for Renewable Energy 2011 – 2020 and to achieve this development of new HPP is crucial. Currently, the following hydropower plants are in operation, with a total installed capacity of around 52 MW:

Table 15 - Development of HPP capacities in Kosovo

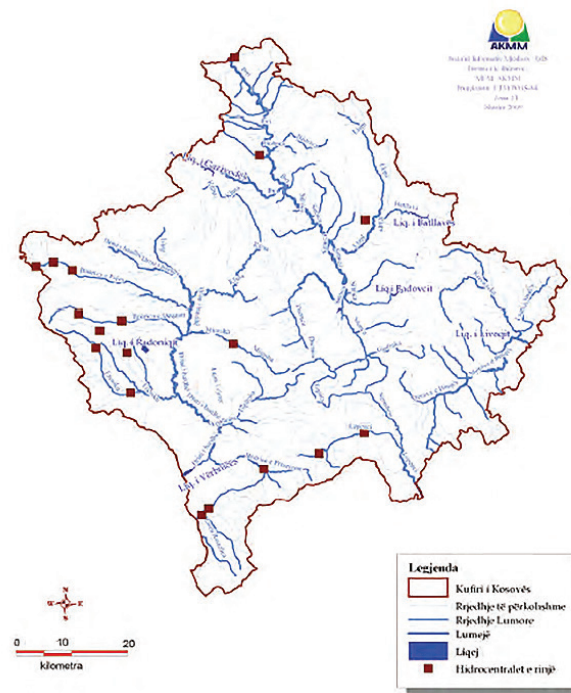
Plant	Installed capacity (MW)	Year of commissioning
HPP Ujmani	35	1983
HPP Lumbardhi	8.08	2006
HPP Dikanci	3.34	2010
HPP Radavci	0.9	2010
HPP Burimi	0.86	2011
HPP Eurokos Lumi	3.89	2015
Total Hydro power	52.07	

Source: Barrier Analysis Report HPP, Ministry of Economic Development

The Energy Strategy 2016 – 2025 foresees different strategies and the most aggressive scenario foresees 160 MW coming from new Hydro PP in the period 2017 – 2026, by and large from a set of small scale run of the river HPPs, mostly in Drini e Bardhe basin.

However, small HPP present a considerable environmental risk, which need to be carefully assessed. The desirability of a large number of small HPP needs to be assessed carefully. Overall, the power generation capacity is not very large; and the environmental impacts can be severe, as they create interruptions in water flows, deteriorate habitats, and have to be connected to the grid. Currently, MESP informed that all water permits of new Hydro power plants have been suspended until a new review is done of the different water resources development scenarios. This has been done in response to the feasibility study of Lepenc Dam, which showed that several planned small HPPs are mutually exclusive from the larger Lepenc Dam and a prioritization of investment decisions is required, based on river basin planning modeling. Also, micro-hydro development needs to take account of multiple use and environmental flow requirements and cannot be planned in isolation in the energy sector.

Figure 27 - Distribution of planned hydropower plants.



Source: Report on the State of Water in Kosovo, 2015

4.2.4 Mining

Kosovo has an enviable endowment of natural mineral resources. At more than 12.5 billion tons, Kosovo possesses the world's fifth proven reserves of lignite, which supplies around 95 percent of the country's overall electricity production. Other significant minerals reserves are: lead - zinc, nickel-cobalt, magnesium, bauxite, marlstone, chromite. As well as mineral resources and occurrences of; gold, aluminum, copper, manganese, REE uranium, asbestos, halloysite, marbles and industrial minerals, etc. Kosovo has more than 60 million ton of lead and zinc tailings with potential of metals recovery including; Au, Pb-Zn, Cd, REE etc.

Open pit coal mining requires large amounts of water for the coal processing plant and dust suppression. These water resources (once separated from their original environment) are rarely returned after mining, which often leads to a permanent degradation in local water resources. Water is used daily in coal mining operations to cool and lubricate mining machinery, wash haul roads and truck wheels to reign in airborne particulates, and to suppress underground coal dust that otherwise could ignite. In addition, large quantities of water are frequently needed to remove impurities from coal at the mine, i.e. washing the coal.

Kosovo is also rich and a significant number of non-metallic deposits, industrial but also of thermal mineral water and geothermal energy sources. Rational management of these resources is the basis for a more rapid and sustainable economic and social development.

The Republic of Kosovo has important thermal water resources, which are mainly used for healing and recreation purposes. Research to identify and study the value of these resources and the amount of such water in Kosovo has been scarce. Data point out that there are about 30 identified sources of thermal and mineral water in Kosovo. Detailed research has only been conducted for the sources of such water in Peja, Klllokot and Banjska, which function as thermal treatment spas. These thermal water sources may also be used for thermal energy production. The overall temperature of thermo-mineral water in the Republic of Kosovo ranges from 17 to 540 C, with a mineralization scale of 2-5 g/l. Sources of thermal and mineral water in the Republic of Kosovo contain sulfates, hydrocarbon, calcium and Magnesium.

4.2.5 Tourism

Kosovo's potential in tourism is closely related to the country's geographical position. The country's natural resources include mountains, lakes, historical monuments and cities, and rivers and represent tourism opportunities. Kosovo's still much unexploited potential in tourism is closely related to the country's geographical position. The mountainous south offers good opportunities for winter tourism and the most important sites are the Mountains of Sharr, Cursed Mountains where Brezovica and Rugova are distinguished as skiing and recreational centers, Luboteni Peak, and Gjeravica Peak which is the highest peak in Kosovo. Wellness tourism has a potential for development. The numerous thermal springs are renowned in the region for their healing effects and the most famous ones are Klllokoti spa and Peja spa. Current tourism is mainly from within the region and from the diaspora, but it is slowly growing and spilling over from neighboring tourism destinations.

However, one of the major threats to tourism in Kosovo is water pollution. Water pollution is increasing with domestic, agricultural and industrial activities. Industries are dumping chemicals and waste into the rivers and lakes. But also, general waste management and overall natural resources and land use planning (plastics, rubbish dumps) negatively impact tourism potential and water services (domestic water and sanitation) need to improve, particularly for rural agro- or nature-based tourism.

Tourism need to be planned and regulated in such a manner as to not jeopardize the other objectives of water security. For example, the use of drinking water reservoirs for recreation activities in the summer months is potentially attractive, but these activities needed to be managed in such a way as to avoid contamination of the reservoir.

4.2.6 Construction

It is assessed that total sand and gravel resources, lying in riverbeds, amount to around 331 Mm³. The gravel business is growing due to the millions invested in road construction. According to the Ministry of Environment and Spatial Planning all these businesses create a lot of environmental problems, starting from damaging river beds, erosion and also a lot of dust and noise. This is often unlicensed and uncontrolled. Since the environmental impacts of sand and gravel processing are severe, this should be a key effort in enforcement of rules. Alternatives are available, and win-win situations if gravel mining is well planned and combined with improving overall river conveyance and flood risk reduction.

4.3. Environment

4.3.1 Waste Management

There is no proper waste management for any type of waste. The lack of adequate environmental protection measures has resulted in serious environmental impacts from industrial waste due to former mining and mineral processing activities. There are 28 potential environmental hotspots evidenced in Kosovo; Some of them, such as sanitary landfills, with a better management, might be minimized the environmental impact, and removed from the list of hotspots. They run the risk of – and most likely do – further contaminating the groundwater.

4.3.2 Water Quality and Pollution

The annual pollution load from urban wastewater from inhabitants and commercial enterprises from the whole of Kosovo is estimated at: 52,000 Tons per Annum of BOD₅; 73,850 Tons per Annum of COD; 52,000 Tons per Annum of TSS; 10,400 Tons per Annum of N; 2,100 Tons per Annum of P.

Most existing landfills are at the end of their storage capacity and pose considerable long-term environmental risk, especially groundwater contamination. This is particularly the case at the Mirash landfill in Obiliq.

Polluted water from industry and mining is mainly acidic, with heavy metals such as cadmium and lead in the wastewater. Spring water quality is good.

Surface water quality deteriorates tremendously after discharges of urban and industrial wastewater, but the annual average environmental quality standards for the priority substances (heavy metals) defined by the European Union (EU) for inland surface waters and other surface waters are in general not exceeded, except for cadmium, lead, and nickel.

Plants use large quantities of water and have no wastewater treatment. Working activity in these plants results in water pollution which after discharge into water causes environmental impact. Polluted water discharged from these plants into the Sitnica river results in pollution with significant impact on local and regional level. The discharge of polluted water from coal mines, thermal power plants and existing ash landfills is a result of disregarding the environ-

mental legislation. The obtained results from the samples taken at different locations before they discharge into the Sitnica river revealed that they are polluted in quality aspect from mines and in quantity aspect from power plants. Advanced wastewater treatments such as classification, treatment, flocculation and filtration of the discharged waters would enable their re-use and minimization the pollution of the river Sitnica which further discharged into the Iber river. There is a seasonal element to this pollution as water quality parameters are linked with overall flow in rivers. River Basin plans need to carry out careful water balances and show water quality parameter trends throughout the year to understand these interactions better.

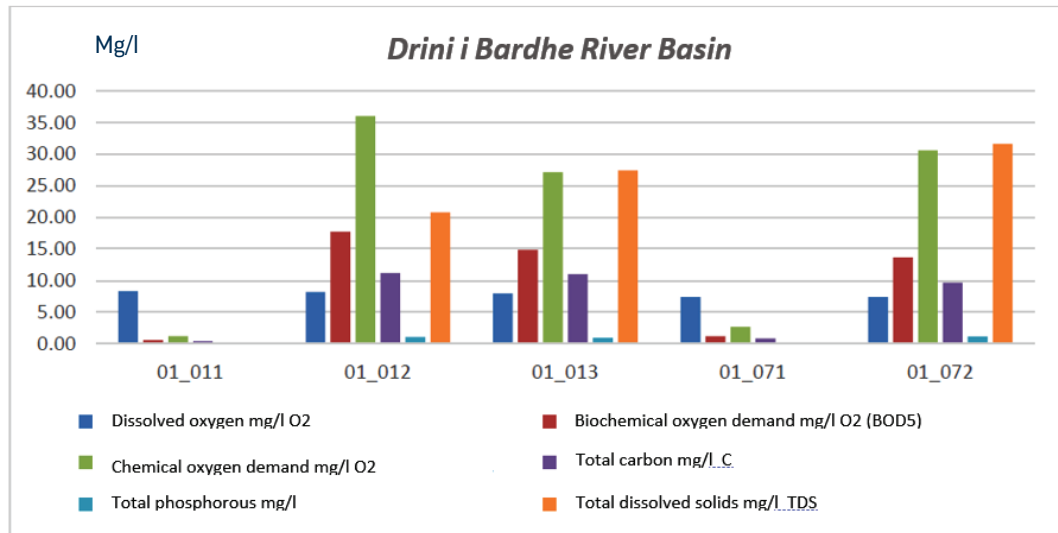
This has important transboundary implications as well. Iber gets polluted in its short stretch in Kosovo and also on the Drini there are quality concerns by Albania.

Table 16 - Surface Water Quality of the main river basins in Kosovo

River basin	Drini i Bardhe	Ibri	Lepeneci	Morava e Binçës	Water quality classification	
Monitoring stations	24	17	6	5		
Sanitary-biological water quality(mg/l)						
BOD ₅ —highest registered value	6.74 (2007)	19.8 (2007)	15.67 (2007)	approx. 6 (2007)	Pristine rivers	< 1 mg/l
	7.22 (2008)	18.43 (2008)	11.97 (2008)	approx. 5 (2008)	Moderately polluted	2–8 mg/l
	7.22 (2009)	15.1 (2009)	6.8 (2009)	approx. 5 (2009)	Municipal sewage ^a	20 mg/l
Dissolved oxygen—lowest registered value	6.6 (2007)	4.2 (2007)	6.1 (2007)	5.8 (2007)	No aerobic aquatic life	0–0.2 mg/l
	5.8 (2008)	2.2 (2008)	6.0 (2008)	6.0 (2008)	Problematic for aerobic aquatic life	0.2–6 mg/l
	5.7 (2009)	1.8 (2009)	7.0 (2009)	7.0 (2009)		
Highest heavy metal pollution of priority substances (mg/l)						
Cadmium	0.01	0.02	0.01	0.01	0.00045–0.0015 ^b maximum allowable concentration depending on water hardness	
Lead	0.1	0.1	0.07	0.07	0.0072 ^b annual average	
Nickel	0.9	0.2	0.2	0.2	0.02 ^b annual average	

Source: Country Environmental Analysis 2013 (WB)

Figure 28 - Surface water quality of the main river basins in Kosovo – Drini I Bardhe



KEPA - Kosovo State of Environment 2016

Source: Country Environmental Analysis 2013 (WB)

Figure 29 - 2016 Surface Water Quality measurements in main river basins in Kosovo (numbers refer to hydro-metric stations) – Iber River basin

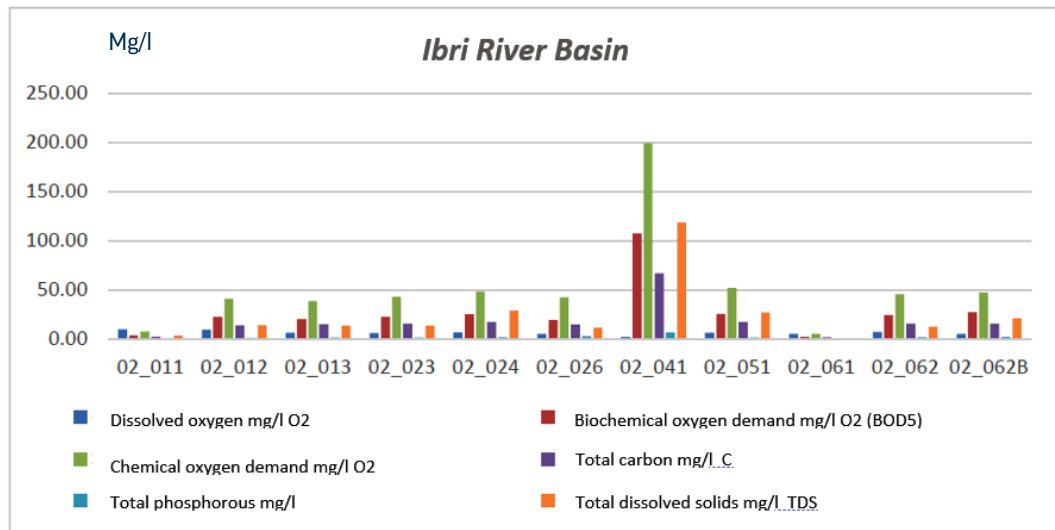
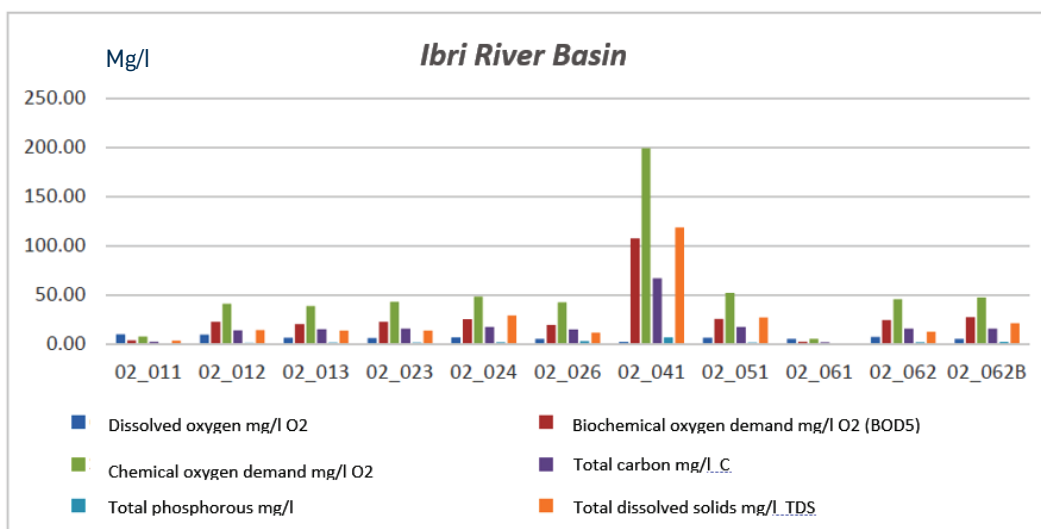


Figure 30 - Surface water quality of the main river basins in Kosovo Moraca e Binces and Lepenc River Basins

The Kosovo Energy Corporation is pumping millions of tons of ash produced by its coal plants each year into a former mining pit, resolving an urgent air pollution problem, while creating a potentially hazardous chemical pond. In 2006, KEK decided to replace the old ash transport and disposal system of Kosovo B power plant, which constituted a public health threat due to the massive amounts of ash particles left in the air. Since then, the million tons of ash produced each year by the plant are mixed with clean water and the sludge. This system has been associated with the creation of the so-called Blue Lake. This pond has very high pH levels of 12 which is extremely high and there are significant hazards if not well managed and if it interacts with the nearby Sitnica River. The precise origin of the pollution and high pH levels needs to be better understood to manage potential impacts, sampling and testing of surface water, sediments, groundwater and soils/ash should be carried out, all potential pollution sources should be analyzed and the environmental and health risks should be assessed. Certainly monitoring and treatment of discharges are critical for riverine ecology and to protect groundwater. Separately, sludge from Kosovo A is transported through pipes to the discharge area in an old open pit mine in Mirash. It would not be expected that there would be excess water to infiltrate into the environment from this system.

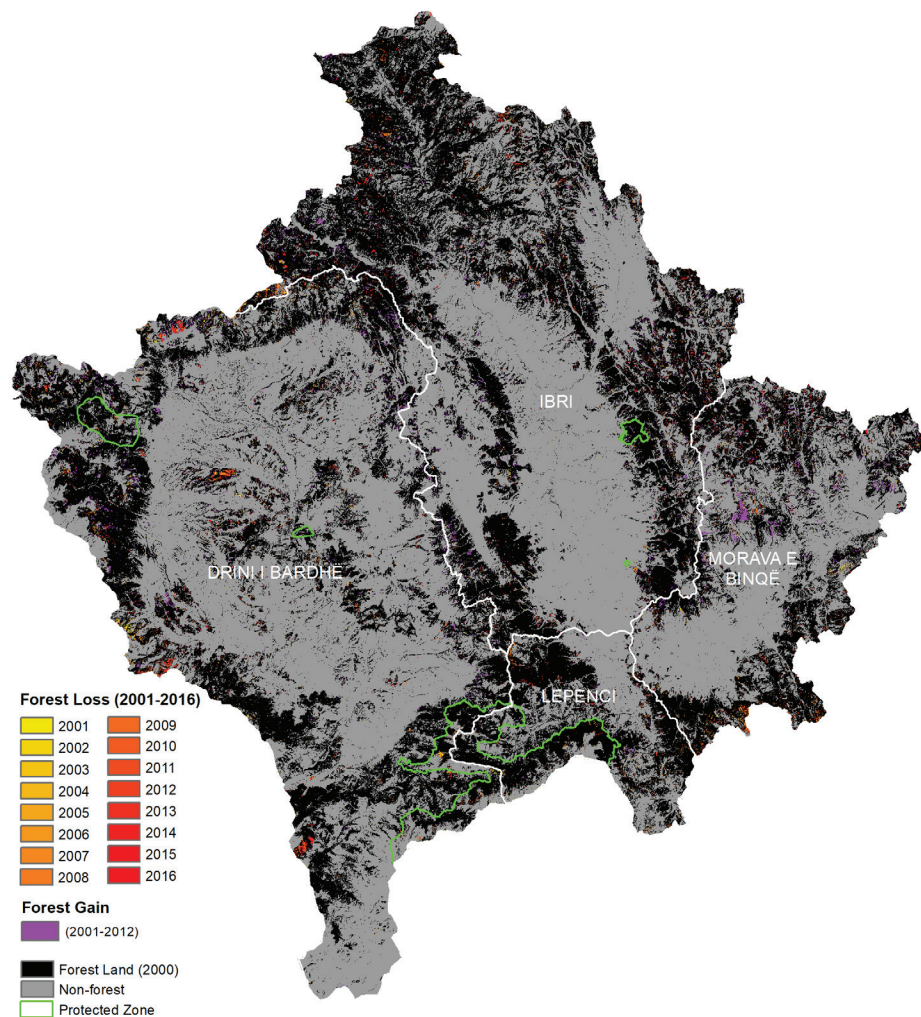
4.3.3 Protected area management

Significant areas of Kosovo are also subject to the risk of erosion. Kosovo is rich in forests, about 40 percent of its area is covered with forest, and necessarily so, as its lush vegetation (see figures below) protect the steep slopes on the mountains from erosion, landslides, maintain baseflows in the rivers and harbor rich biodiversity. Erosion also causes sedimentation, which leads to alterations in flooding behavior. No clear management of erosion exists in the country.

Forest area in Kosovo are stable overall, but have been under pressure and there are locally severe impacts. Overall, between 2001 and 2016 Kosovo lost about 2.7 percent of its forests. These losses occur throughout the country, including in Protected Areas. Thus, no

swathes of forests are being lost, but there is a gradual process of receding forest lines and thinning. There is natural regeneration; between 2000 and 2012 Kosovo had a net loss of about 3,000 ha in forested area. FAO (2003) estimated that Kosovo needed around 1 million cubic meters (m³) a year of fuelwood to meet heating needs. Generally, around 8–10 percent of the population earn income or make their living from the forestry and timber sector. Contribution of the forestry sector in GDP is approximately 1.8 percent-2.6 percent, (REC, 2009).

Figure 31 – National map of forest loss and gain from 2001 to 2016.



The majority of illegally harvested timber is used for firewood, as this is the main source of heating, even in some urban areas. Further, heavy harvesting occurred after the war, where many houses were burned down. For rebuilding these houses, raw materials were taken from the forests, mainly illegally. FAO (2003) estimated that some 40 percent of public and 29 percent of private forests had been subject to illegal harvesting, and that many young and middle-aged forests urgently needed management interventions, including cleaning and thinning (both precommercial and commercial).

Illegal activities are concentrated in the most valuable forest areas with the thickest and oldest trees. During illegal harvesting, the best part of the tree is taken while the rest is left in the forest, causing problems due to it being a source of insects and other diseases and a source of forest fires. In steep terrain, overharvested areas are sensitive to erosion.

Figure 32 - Forest Loss inside Sharr Mountains National Park

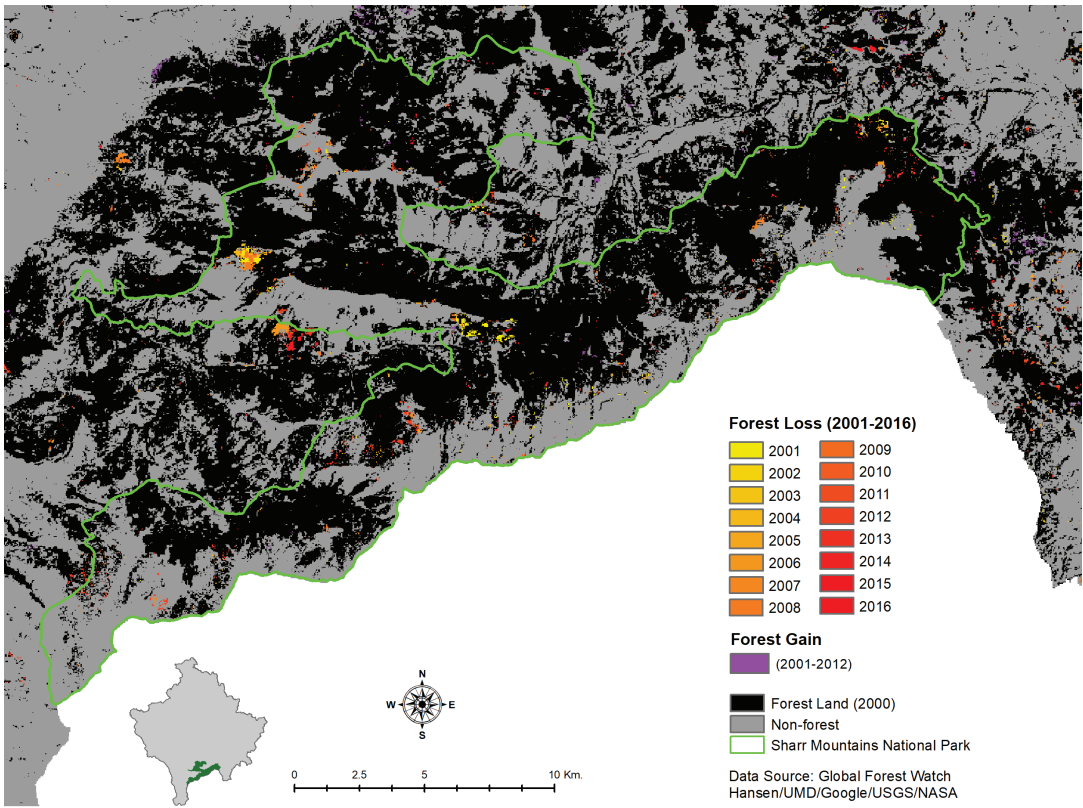
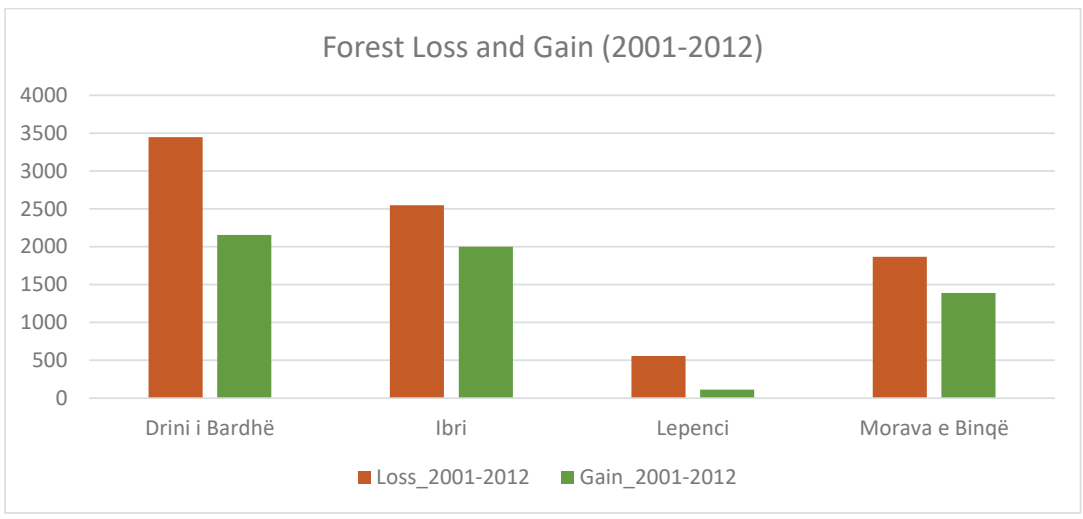


Table 17 - Forest Loss and Gain (2001-2012)



Forest loss includes any kind of absence of forest including managed harvest, illegal harvest, destruction by natural disasters, natural death, change in land use, etc. These statistics do not cover thinning of the canopy. Evident upper basin deforestation and illegal land use at all 4 main river basins in Kosovo increases the risk of flash floods and increased sediment loads in rivers, while industrial and urban development in the lower reaches of flood plains diminishes storage and drainage capacity and exacerbates flooding.

Table 18 - Land Surface of Kosovo – Erosion Categorization

Category	Surface km2	%
Category I, II and III	5,973	55.6%
Category IV (low erosion)	3,680	34.2%
Category V (very low erosion)	1,970	10.2%
Total	10,750	100 %

Source: National Water Strategy 2017 – 2036

Further steps are needed for the designation of protected areas and vulnerable zones, and the introduction of implementation arrangements and monitoring programs. This requires joint efforts between MESP, municipalities and other stakeholders. Even more so than for other water resources functions, mandates for implementation and coordination are not clear and human resources limited. Specific measures required are protection from illegal tree cutting and regulation of the same, protection of river banks and river beds from illegal exploitation of their gravel; and the rational use of groundwater in those areas.

Figure 33 - Monthly Maximum NDVI (2013-2017)

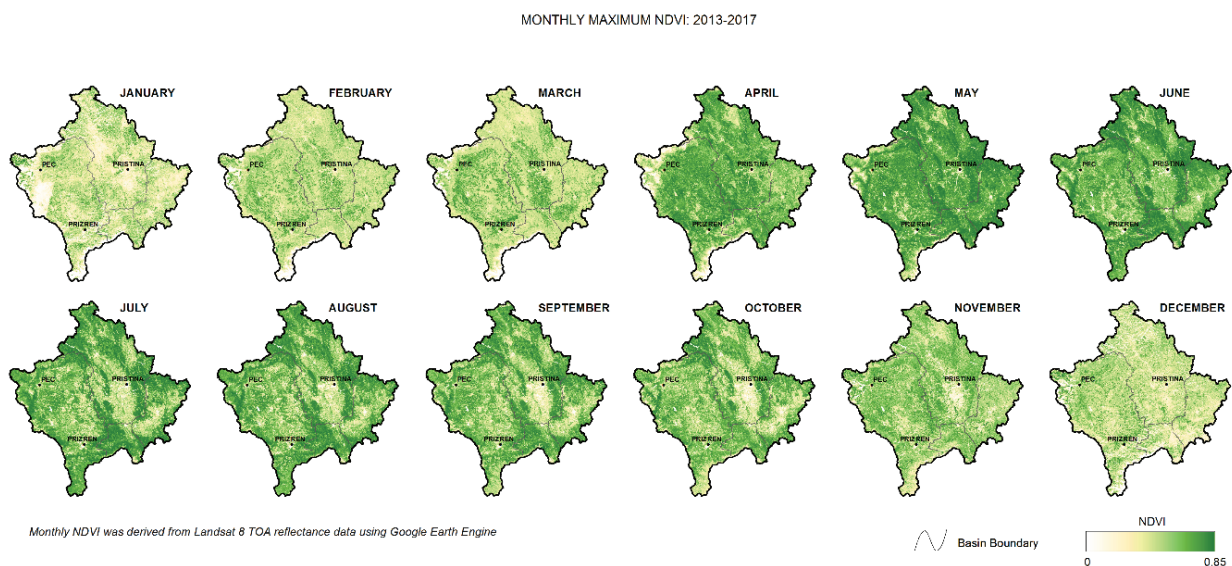
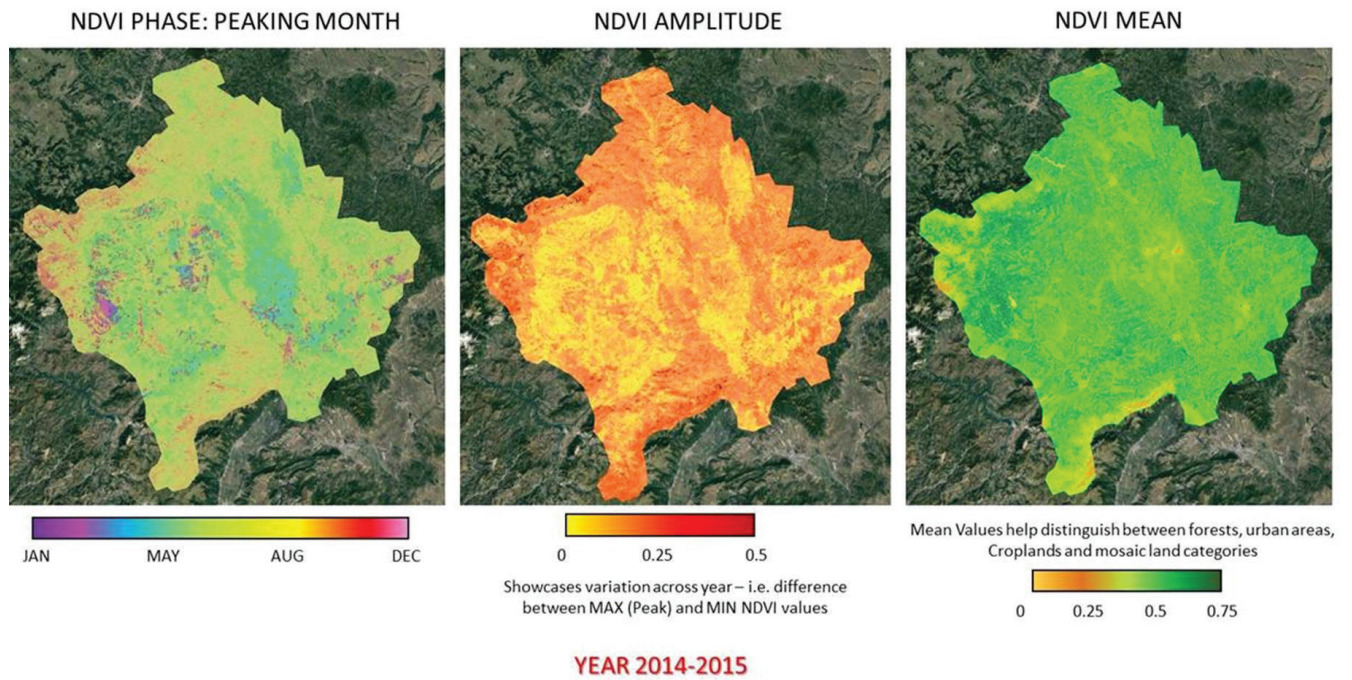


Figure 34 – NDVI Peaking Month, NDVI Amplitude, NDVI Mean for entire Kosovo

New Innovative Ways to Track Land Use and Land Cover



CHAPTER 5

WATER MANAGEMENT CHALLENGES

This chapter will highlight key water management challenges that emanate from the discussion on overall water resources diagnostic (Chapter 3) and specific topics on water security from sector perspectives (Chapter 4). This chapter will structure these around general water resources management functions (5.1), delivery of water services (5.2) and mitigation of water related risks (5.3). Within these, it focuses both on managing risks as well as seizing opportunities. This chapter, responding to the overall water security context (Chapter 2) will provide the basis for definition of priority actions for water security (Chapter 6).

5.1 management of water resources

Water resources management is a polycentric endeavor, impacted by and impacting many different stakeholders, sectors, environments. Still, management of water resources has a set of core functions and activities that relate to resource investigation, planning, allocation protection, regulation of the country's water resources for the different environmental, social and economic functions that water supports. Water resources need to be managed to sustainably, efficiently and productively manage all surface and groundwater resources. This can be broken down into information, infrastructure and institutional functions.

5.1.1 Institutional challenges

Kosovo has made tremendous progress and in general has a good policy, legal and strategy framework in place. As described, acts are in place and are largely transposing EU requirements. The strategy (2018-2034) is well informed, well targeted and provides sufficient area for practical action. Intersectoral coordination is relatively strong through the Inter-Ministerial Water Council, although its composition and function could be strengthened to be more

encompassing of the key sectors and have more clout in requiring de facto alignment. Specific sector acts are by and large harmonized and supportive of sustainable resources management and mutually aligned. There are several areas of law where further transposition is required, or laws need to be updated, but generally this is a strength of Kosovo.

The key challenge therefore lies with the operationalization, i.e. implementation and enforcement of this framework and the practical development of integrated development plans based on national level coordination. River Basin Planning is only happening in one basin (Drini), and water resources considerations are not integrated with spatial planning processes at watershed level. Hydropower, irrigation and municipal water supply development need to be weighed for their cumulative impact on the basin and their development potential. Currently, the ambitions for hydropower development and irrigation development are both very high and joint watershed/landscape based planning is required to optimize investments for both. This requires careful addressing through the mechanisms of participatory planning, citizen engagement, and permitting. Recent planning for small hydropower production has not sufficiently taken environmental flows into account.

Such integrated approaches require a lot more than optimizing the coordination and optimizing the modeling (though both are important). They require an integrated planning and management approach at the local level that identifies multipurpose/multi-use/multi-agency investments, optimizes operating rules of infrastructure. Iber Lepenc is a good example of such joint infrastructure and management, and at different scales and including different sectors: notably tourism and environment, these joint area-based interventions have been seen in the region to generate benefits larger than the sum of the individual parts, and support new ways of learning and solution-orientation that is currently difficult in a compartmentalized planning environment.

The new institutional setup in MESP (River Basins Authority, inspectorate) is promising, but needs to build capacity for delivery of core functions and for sustainability of operations. Water allocation (licensing), regulation, and protection (water sources, dam safety) functions are well defined, but the agency is new and has an enormous backlog in licensing, does not have adequate means to analyze license applications (see 5.1.2), collect water charges, and carry out basic dam safety functions. These are significant challenges that require an outcome-oriented capacity strengthening program and the political will to sustainably finance operations and enforce regulations. These agencies need newer tools (databases, decision support systems, analytical tools) and equipment (for monitoring, maintenance), and importantly municipal, MESP (and RWC), Ministry of Health inspectors require more enforcement powers.

The monitoring and the maintenance of the dams were partially suspended in recent years. Five large dams exist in Kosovo. They are the backbone of the water supply in Kosovo. Visual inspections of the existing dams and brief review of drawings and the existence of documentation (drawings, documents on material properties and analysis) undertaken during the WTF review and World Bank Project preparations show that the dams are currently in stable conditions, but much knowledge and updated calculations are missing. In the context of the Agricultural and Rural Development Project, which is supporting Radoniqi irrigation scheme rehabilitation; and in the context of the Water Security and Canal Protection Project, which is supporting, Gazivoda and Pridvorica rehabilitation, the government is currently employing dam safety panels of experts and is commissioning hydrological, seismic and hydraulic studies as well as instrumentation. These are the largest dams and reservoirs in the

country and these will bring dam safety analysis up to current requirements. It would be advisable to build on this momentum to strengthen a more permanent panel of experts and dam safety operations.

A specific area of weakness relates to technical capacity and the level of staffing, particularly at local implementation level. Kosovo has a relatively small population and economy. Necessarily the institutions for water management are also comparatively small. However, each institution is faced with similar technical challenges to those faced by larger countries and EU Member States. The difficulty arises that the institutions do not achieve “the critical mass” to afford high levels of technical specificity in the assignment of staff positions. Therefore, there is a strong logic behind the notion that a “center of technical expertise in the water sector” supporting all the other sub-sector institutions would be a feasible means of addressing this difficulty. This approach is developed conceptually in the water strategy as an “Institute of Waters”. Whether a new organization is required or whether this center of excellence can be part of the Authority is again a question of optimizing limited human resources.

Beyond the existing government institutions, attention is to be paid to the need for vocational skills training and academic development to support the augmentation of technical expertise in the sector in years to come. As part of the Danube Learning Partnership (DLEAP)¹, Kosovo’s utility association SKUKOS is an active participant and promotes a variety of capacity development programs, ranging from asset management, NRW reduction, commercial management, water safety and business continuity, etc. Similar initiatives would be highly beneficial to the irrigation and overall water resources management sectors. Although Kosovo has high numbers of highly skilled job-seekers, they often lack necessary skills in the water management sector and a specific training, internship program can build the necessary cadre, and if done in close collaboration with local training institutes this can sustainably enhance capacities in both public and private sector.

Kosovo has a specific challenge regarding transboundary water management. Cooperation on use of the resources shared across the border is necessary for most of the Western Balkan territories in many aspects. Kosovo, due to its legal limitations in becoming a party to many relevant agreements, could have significantly less rights and obligations in this regard than other countries in the region. There is scope to improve the legal basis for cooperation, to clarify the roles and responsibilities of basin institutions and to develop their capacities. The most important yet most difficult of those from Kosovo’s perspective is the Iber basin, but coordination and cooperation is required is also required in other basins, where no effective mechanisms exist, such as in the Drini River Basin which is shared by Kosovo, the former Yugoslav Republic of Macedonia and Albania.

5.1.2 information challenges

While information provision in the Water and wastewater sector is relatively well organized and available in the public domain through annually performance reports issued by the national regulator and on platforms as IBNET and Danubis², such systems are not yet in place for water resources overall and irrigation. General intentions exist on open data sharing for improving management, but the data is not routinely collected, stored and

¹ <http://www.iawd.at/info/activities/d-leap/>

² <http://www.danubis.org>. latest data available for seven regional water companies are for 2016.

shared. Information on water resources is of paramount importance for all water resources functions and decision making by the water resources agencies, but importantly also for all stakeholders that have a stake in water security. It is one of the core objectives in the water strategy to *“establish and maintain a system of water governance that is equitable, transparent, efficient, coordinated and of such professional and technical capacity as to be able to effectively support the achievement of the strategic objectives for water use, water protection and protection from water including the implementation of a water information system to monitor, assess, interpret and inform stakeholders on all aspects of this Strategy.”*

The hydromet system in Kosovo is incomplete, dysfunctional and data is not routinely stored and disseminated. Water quality data for drinking water is monitored, but more general water quality monitoring data, flow data and groundwater data are scarce. This is a major obstacle to serious water resources management as most water resources management decisions depend on accurate, reliable and timely data provision. And not only water resources management decisions: The construction industry needs to be informed on water hazards, return periods of flows for design of storm drainage, bridges, roads. Service providers and farmers need this for their planning, communities may want to monitor pollution levels. Civil society and academia can support further analysis and help monitor and build a transparent water sector. The cost of not having these data is many times larger than the cost of providing the data.

MESP is currently developing a Water Information System, which will address a number of data gaps. It is important that this information system is linked with appropriate modeling, (GIS) visualization platforms and as a principle open to the public. The WIS then becomes a repository for tools in permitting of both abstractions and discharges; seasonal, and full flow forecasting, infrastructure operations (dams, canals, WWTP), early warning systems, etc. Global tools based on earth observation are becoming increasingly powerful tools to complement local data management and need to be integrated and Kosovo should implement its data policies and monitoring programs in line with global practice and EU directives (open data standards, INSPIRE, WMO, etc.). Such work should be complemented by a modernization of the monitoring network, enabling it to provide (near) real-time monitoring at strategic locations in all basins, as well as with updated databases of main polluters, hotspots, and main water users to enable efficient and effective deployment of monitoring and enforcement resources in those areas.

Data and water resources info are valuable assets and their management requires a dedicated organization. This requires investment in training selected MESP staff and other data providers in maintaining the information system, from data collection (instrumentation management), transmission (telemetry upkeep and inter-agency linkages, serving global data, crowdsourcing), storage (water information system), dissemination (open data, data and knowledge products, visualization, state of water reporting), and overall adjusting it to user demand. Such a system requires stable financing, clear mandates, and all parts should ideally be designed for easy maintenance, low recurrent cost and where appropriate, data services can be outsourced to local IT companies.

Water data management should inform analysis against standards, detect trends and support further water analytical services and operations. As reported, water quality parameters require robust standards as well as reasonable improvement targets in low flow and high flow scenarios. Water quality monitoring and analysis needs to identify point source pollution but also other forms of pollution, including sedimentation as a result of catchment

degradation for instance, and analysis is needed to distinguish baseline (resulting from physiological characteristics of the basin) from disturbances. Beyond the data collection, there is also a need to strengthen the environmental inspectorate in its monitoring and enforcement mandates.

Data Management and Environmental Information promote transparency and positive engagement. Granting access to environmental information is an important principle for the entire environmental legislation. To promote Environmental Awareness access to environmental information should be guaranteed to the stakeholders, other authorities and the wider public. This will require visualization, active outreach and citizen engagement. It is equally important to raise awareness and education levels on protection and sustainable use of water resources.

5.1.3 Investments challenges

Kosovo requires a bold fresh look to its water resources infrastructure planning and management processes. As indicated in chapter 3 its bulk water storage is already severely restricted, its snowcap storage will reduce with climate change, and although little information is available, it is anticipated that groundwater replenishment will be increasingly hampered by changing rainfall intensities and catchment degradation. Storage values of existing storage (in reservoirs, groundwater, snow) will become much higher in future.

Such infrastructure investment plans are ideally part of the river basin management planning process. It is obvious that Kosovo requires more water resources infrastructure, primarily storage and diversions for drinking water, irrigation and hydropower. However, old plans (Lepenc Dam, Zhur HPP) may need modification if they are to be implemented in future, since not only have on-the-ground realities changed that affect their feasibility (economics, regional integration, urban development in reservoir footprint), it would also be important to review whether such investments can be enhanced to serve multiple purposes and in case of Zhur be optimally integrated in the overall cascade. It goes beyond this report to recommend on specific investments and feasibility studies have been and are undertaken, but it is clear given Kosovo's topography and spatially diverse water demands, that in addition to these large iconic centralized infrastructures, there is ample scope for exploring small and medium sized storage, which would fit well in abovementioned local watershed planning exercises.

Water security in a very direct sense relies on adequate maintenance and modernization of existing infrastructure. First and foremost, it is imperative that routine monitoring and reporting on dam safety is restarted, with updated tools on seismic risk, dam breach and updated probably maximum floods and flood routing. Beyond dams, this includes backbone infrastructure on Iber Lepenc. The World Bank-supported Water Security and Canal Protection Project provides for part of these urgent repairs and improvements as well as increases within system storage to allow future scheduled and emergency repairs, as well as create more operational buffer downstream to deal with issues along the canal and intake.

Given its lagging investments, and its overall good environmental framework, Kosovo is well placed to embrace environmental engineering and employ nature-based solutions to many of its investment challenges. There is global recognition that green solutions can often outperform and be cheaper than grey solutions in area of water quality management (through

strategic use of wetlands, flood risk reduction (through green barriers, creating room for rivers), urban drainage and storm water management (through decoupling, multipurpose green landscape elements), and even storage (through improved groundwater recharge, natural area protection). Importantly, this goes beyond the also highly needed measures to prevent streambank erosion from sand mining, protect riverbanks and improve overall health of watersheds to reduce soil erosion and nutrient pollution. Nature based solutions require a different planning mindset, that not only conserves nature, but also builds with nature, addressing risks and building natural capital for enhanced water security at the same time. They often also add economic value in terms of climate adaptation benefits, organic produce premiums, etc. Such approaches will certainly not everywhere replace traditional engineering and often enhance them.

Municipal and industrial wastewater treatment as well as ambient environment monitoring is an investment priority to improve and protect status of water sources and flows–

Wastewater treatment remains very rare in Kosovo, and given its expansive sewerage networks, it is both a logical next priority for the sector to invest in and develop, as well as a requirement under the WFD. Sewerage systems are one source of pollution, but Kosovo has important point polluters in form of landfills, and heavy industry as well, as well as local mining operations. These require strong licensing and regulation and prohibitions on destructive actions. Besides addressing point source pollution this requires the conservation and protection of the aquatic ecosystems and the determination and enforcement of Ecologically Acceptable Flow.

5.2 Delivery of water services

5.2.1 Irrigation Services

To support revitalization of agriculture, support import substitution, and overall strengthen rural economies, it is both possible and important to expand the area under irrigation. This includes first and foremost the revitalization and intensification of current area where possible, as well as the expansion of equipped area for irrigation. The largest single expansion potential most likely lies in the Dukagjini Plain, but the fastest growth is most likely going to come from farmer-led investments in greenhouses, small diversions, and groundwater pumping. With only 17 percent of agricultural area irrigated (lower than the regional average) and the overall unfavorable water situation for rainfed agriculture this trend will continue. It will therefore be important to reinterpret how the government and private sector can enhance irrigation service delivery on and outside the current schemes.

Irrigated agriculture is a key sector in terms of potential for jobs and increased turnover. The markets are not the limiting factor, if farmers can improve quality and diversity of high value crops. Kosovo has less of a labor constraint than other countries in the region, and jobs can be created in a diversified rural economy centered around commercial agriculture (which by necessity is irrigated). The government can support a broad based rural development program that enhances productivity, diverse employment opportunities in rural areas and such landscape approach needs to be closely underpinned by a water resources and irrigation (and WSS) services angle.

Overcoming the serious current underperformance challenges the irrigation sector faces requires firstly short-term actions to revitalize the schemes that are currently in operation. Similar dynamics are at play at the sub-sector level as were identified for water resources management: lack of information for management, relatively weak institutions and oversight and poor cost recovery. At the same time, the situation is very context specific and for instance Radoniqi-Dukagjini can break even, supports a thriving farming community and does so with ageing infrastructure. Improving infrastructure as well as the institutional service orientation of the other irrigation companies are prerequisites for revitalization. Currently, these schemes are unable to provide adequate, reliable, let alone sufficiently flexible services to their clients. Drini-e Bardhe requires a more reliable water source as well as reduction of in-system losses. Iber Lepenc has a more complex problem of urbanization (with associated problems of lack of interest in agriculture employment, destruction of the system, pollution (reducing agriculture and certainly marketing potential), and high operating costs due to lift pumping (especially high since pumps were designed for large areas now serve few individual farmers).

For the mid-to longer term, there is need for a strategic plan for supporting a more economically, environmentally and financially sustainable irrigation sector. This is foreseen with the Irrigation Master Plan and Investment Framework that is currently developed by MAFRD under ARDP and which should provide a diversified support model for irrigation within the economic, water resources and land constraints. Kosovo has the not-unique challenge of reversing low utilization rates supporting a low productivity agriculture (with a large social/pension aspect) to a more market-oriented irrigated agriculture sector and making a generational change, while not losing sight of the social aspects in the transition. As a general principle, investments in irrigation should build on successes in private agriculture, rather than aim to restore or expand non-viable farm models and infrastructure. Future irrigation support most likely will complement infrastructure and management support through SOEs with a more diverse range of support programs, smart subsidies and regulation to support farmer private investments. Such investment planning and support program would need to address the broad spectrum of irrigation possibilities and be based on farmer's demands.

In the meantime, existing irrigation companies will need to improve their information systems, cost recovery rates and governance systems for transparency and customer orientation. Lessons can be learned from other Southern European experiences (Spain, Italy, Greece), as well as from the advances made in the water supply services sector. Enhanced regulation and oversight of the services delivered by irrigation companies is important. This can be achieved through a programmatic approach, focusing on improving reliability and adequacy of the service and cost recovery, e.g. through performance contracts with users and more technical oversight. Improving budgeting, tariff setting and cost recovery targets should be part of a broad sustainable financing plan for the (sub)sector.

5.2.2 Water Supply and Sanitation Services

Implementing capacity has improved significantly, but further enhancement is needed, especially in technical areas. Despite evident progress, further enhancement of capacities is needed, especially with respect to service providers and in the fields of efficiency improvement, capital investment planning, and service compliance. A high remuneration level combined with a high unemployment rate makes employment in water utilities attractive. The workforce reluctance to leave water utilities, and the limitations on new staff recruitment

for efficiency reasons, considerably reduce staff turnover. Despite positive developments in recruiting qualified personnel, many staff have only secondary education. Given the need to address imminent efficiency challenges, such as nonrevenue water (NRW) reduction, cost efficiency improvement, and sustainable asset management, enhancing the qualifications of utility staff is a necessity. For now, donor projects play the leading role in capacity building of utility staff. The water and wastewater association of Kosovo, SHUKOS, established in 2001, also aims at developing more structured training and capacity-building programs.

A key priority in addressing water security issues for Regional Water Companies is to reduce their non-revenue water, which currently stands at 58 percent. This is particularly important in the more water stressed basins and where operational costs of water distribution and water treatment are high. Water use efficiency as well as management attention to this issue is generally weak. This results in high running costs, poor service and current and future water stress and. Water supply is already the largest demand sector in Kosovo and should improve its demand management through various means prior to extending claims on other resources. This requires a programmatic approach to incentivize performance of RWCs, with specific attention to NRW reduction, e.g. through performance-based contracting.

The deliberately designed long-term process of regionalization has helped to close urban-rural service gap, as it is backed-up with substantial funds, has focused on expansion of urban networks and new rural schemes, and at a later stage addressed the inventorying and integration of local systems. Continued focus is required for targeting of social assistance for the poor and extreme poor. Complementary to the RWCs model, the enabling environment for self-supply needs to be developed, even if less than 10 percent will depend on this service in the future This can consist of awareness and communication activities, mobile water quality testing, risk assessments and grant schemes.

A comprehensive sanitation strategy (for appropriate individual systems) needs to be developed with decentralized solutions as well as on-site solutions and fecal sludge management to ensure proper management and treatment. The institutional and legal framework along the entire service chain should be enhanced and local implementation capacities for fecal sludge management put in place.

New source development and innovative waste water treatment will be important in the mid-term. This will help fill final service gaps, improve ambient environment and importantly can support wider functions. Currently, there are very few deliberately designed Multiple Use Systems (MUS) in Kosovo (joint storage and distribution systems), and rather single-sector investments that are adapted by users for both domestic and irrigation use. Modern MUS combine multiple sources (both domestic and productive) and multiple objectives of water provision in purpose-built investments, that have economies of scale, reduced footprint and increased benefits to communities rendering them more financially sustainable. This is an expression of water security management at the most local level.

Improving the efficiency of utilities to further enhance their sustainability. While, Kosovo's water utilities are regional top performers in terms of cost recovery, they are still limited by increasing operational expenses. Improving efficiency could significantly improve the sustainability of utilities by decreasing operational expenditures and providing additional funds for asset renewal and investment. B

5.3 Mitigation of water related risks

Managing current and future risks requires a dual strategy of doing things better and doing better things. One of the strategic objectives of the water strategy is to “Achieve acceptable levels of protection of population and property from the adverse effects of water including flood, torrent and erosion in an economically balanced and cost-effective manner.” It is clear from earlier chapters that water security risks arise from a multitude of factors, some natural and many man-made.

There is a set of measures to reduce hazards. These include the earlier mentioned embankments, green engineering, stopping sand mining, reforestation, protection of aquatic ecosystems and watersheds. Spatial analysis based on earth observation now allows much more precise determination of hotspots and analysis of impacts of interventions. This should be an integral part of river basin management planning. The other set of investments related to reducing vulnerability and required under the acquis are flood hazard mapping and flood zoning, but also improved land use planning and enforcement of construction codes. These are all well-known and need to be designed for specific identified river stretches. Droughts and dry spells require a different set of investments and shifts in planning. All risks need appropriate information and forecasting.

5.4 Investment needs

The investment needs are very large. The investment needs associated with the full achievement of the long-term objectives are very large, and priorities will need to set and innovative financing further investigated. The National Water Strategy (2017-2036) breaks down the investment needs as follows:

Table 19 - The Investment Needs Summary

Issue	Long Term Goal	Approximate Investment Millions Euros
Water storage - reservoirs	New reservoirs	250
Water Supply Services	Renovation and extension	430
Increase irrigation coverage	Increase coverage and efficiency	70
Wastewater collection and treatment	Renovation and introduction	680
Flood defence	Renovation and extension	100
TOTAL Potential Need	All Objectives	1530

Source: National Water Strategy 2017 – 2036

An innovative strategy for sector financing will be important. It is important to note that development of new assets entails significant addition management, operation and maintenance costs, as well as asset renewal costs. Such life cycle costs are often higher than the initial investment costs for specific types of infrastructure and overall financing for water security needs to take full cost into account, as well as the distribution of funding sources from tariffs, society in general or external partners. This applies to the services sectors of irrigation and WSS but also to the overall water resources management sector. Water Companies are financially relatively sustainable, but have large issues with non-revenue water, which presents a large monetary loss, especially for companies with large pumping and treatment costs. In other municipalities, where water is clean and operating costs are low, NRW is less of a priority. Two out of three irrigation companies are making losses on irrigation due to low utilization rate and low tariffs, reflecting poor level of service. The Irrigation Masterplan and Investment Framework should investigate where and how revitalization can lead to more financially sustainable companies.

Whereas there is the opportunity for external support for CAPEX investments in water infrastructure, OPEX will need to be financed from national budget (taxes) and water charges, sustainably. Many water resources management functions have no direct clients and/or have a public nature so a level of state financing will be required. At the same time, it is important to bring water economic valorization in line with EU practice: This includes the dual principles of “polluter pays” and “user pays”. Such financing options analysis and strategies for water resources and the water services sectors need to be included in river basin management plans as they are an essential part of scenario analysis. Capacity strengthening of RWC and RIC will be required to enhance sub-sovereign financing of these companies (as is currently the case with Iber-Lepenc).

Securing stable and long-term financing for compliance investments. Investments in the water sector are substantial, but are still insufficient to meet demand. In the Kosovo Water Strategy, just compliance investments needs are estimated to exceed €1 billion over the next 20 years, which represents a total effort of 17.3 percent of GDP and a yearly effort of 0.86 percent of GDP. To achieve long-term compliance with the requirements of European Union legislation in the water sector, as stated in the Kosovo Water Strategy, this investment represents an annual capital expenditure of €55 million, or at least twice the current funds dedicated to investments.

These figures are to be corroborated with additional analysis on investment assumptions, trends and through finding synergies between the different sectors. This requires further scenario development. These also do not reflect the recurrent costs for regular maintenance and incremental modernization that need to take place. This would be subject for further study, by subsector and for the overall water security as a whole, but it is evident that the overall investment needs are to be carefully prioritized and sequenced as they are significantly larger than current allocations to the water security agenda.

The National Water Strategy has an elaborate financing strategy and principles and contains a commitment from the Government of Kosovo to “ensure that capital spending in the water sector including contributions from central government, from municipalities from donors and from sector enterprises is commensurate with the achievement of these objectives”. It establishes the figure of 1 percent of GDP as the benchmark against which this commitment is to be judged in the short to medium term. This is an important commitment, and a doubling of current levels, but in itself not sufficient to achieve abovementioned objectives in the mid-term.

CHAPTER 6

KEY WATER SECURITY MESSAGES GOING FORWARD

The high level broad themes emerging from the assessment of Kosovo's general context, its water resources profile, its water security and demand assessment and the key water management challenges are summarized as the following ten points. They emphasize, as earlier reports and other observers have done, that the onus is on real-world implementation and practical coordination of intentions and strategies that have been developed over the years, and as such present the contours of priority areas of action and engagement with the water sector in the coming years. Some problems are currently being addressed, but many require new impetus and empowerment of Kosovo's professionals and institutions to seize the opportunities and address the water security challenges:

- 1) **Kosovo has the combined factors of low water resources availability, low storage and poor implementation of water resources management functions.** Because demand has been suppressed and people have grown accustomed to low level of service, this situation has been manageable, but will not be so for longer as climate changes, society and economy develop and with environmental values remaining in flashing red.
- 2) **Kosovo has adequate framework and strategies and high-level coordination, and needs to shift focus to on the ground implementation of its strategies, building the base for information, institutions and infrastructure in water management with real impacts and tangible outcomes.** This will need to go hand in hand with improved communication and sharing of information and the clarification of roles and responsibilities in actual implementation.
- 3) **There are enormous opportunities and requirements to embark on a more holistic and multi-sectoral programmatic approach on managing the country's water resources, both in the rural and in the urban space, that addresses optimization of**

resource utilization, improves multiple use services and infrastructure and manages hazards with a development perspective. This needs a breaking down of silos and an embrace of multi-tiered and multi-stakeholder planning process with tangible investments.

- 4) **Energy is an important agenda from a water security perspective**, and while hydropower opportunities are limited, the careful and secure management of water for cooling and the development of local mini-hydropower can help alleviate binding constraints, if planned as part of broader development objectives.
- 5) **Further improvement of services helps important economic and job agendas. Particularly rural development** (agri-food, irrigation and watershed interventions) based on well planned water resources interventions (storage, waste water management, irrigation, rural domestic and multiple use systems) has opportunity to reverse rural decline and job loss and can have important economic impacts.
- 6) **Integrated watershed management is critical to address environmental concerns and pollution management, including but beyond urban and industrial wastewater treatment.** Green engineering should become a more prominent factor in flood risk management, water quality management and storage, complementing the traditional grey infrastructure.
- 7) **Water Security is closely linked to national security in Kosovo, given its particular topography and history and its dependence on the Gazivoda/Iber-Lepenc system.** Rational and pragmatic management needs to continue in future, with water security going hand in hand with normalization and transboundary agreements. The Pristina-Belgrade normalization talks should aim to address this issue.
- 8) **Kosovo has the opportunity with recent and ongoing dam safety assessments to improve its national approach to dam safety.** While dams are in acceptable status, the impacts of dam failure are so high that a robust and regular dam safety program is imperative.
- 9) **Longer term adequate WRM require additional professionals in public and private sector, and this requires collaboration with training institutes and academia.** Civil engagement and participatory approaches in water resources management and service delivery are important in a small and densely populated country with scarce resources. Increased transparency and accountability is important to build credible institutions.
- 10) **Further analysis is important for selection of actual interventions. This must be done at a basin level in the context of River Basin Plans and investment programs,** which should address conservation as well as development challenges, at the basin and local level, much like this work has done, but a more detailed level. Such plans need to develop technical and economic scenarios that look at the same range of issues from employment to macro-economy and should lead to a prioritized set of investments that maximize such multiple returns on the investment. Further work is also required on assessing financing options for development as well as sustainable water resources operations.

These key messages are intended to shape dialogues on the intended outcomes of water security and inform the actions of water security. While this document analyzes the information, and provides a frame for discussion, it requires a multi-stakeholder dialogue to weigh the different outcomes, find synergies and manage conflicting demands. It also requires further discussion on how these outcomes and actions might evolve under different future conditions and potential decisions. At the same time, many of these actions merely re-confirm what is already enshrined at a strategic level in the country's key policy dialogue and legal framework; and point to next steps in implementation and the need for urgent action on legacy issues that need to be addressed.

Immediate areas of action that are identified in this document include:

- Embark on inclusive and comprehensive basin planning exercises, evaluating scenarios of different sets of measures and investments – in line with EU and national legislation, and with the aim of identifying concrete measures for the short- and medium term.
- In parallel, Identify and implement no-regret investments on water pollution, water source protection, water risks as well as water scarcity with investments at the national scale, acknowledging they are all hampering water security and need to be addressed in any development scenario.
- Set up a system for more accountability in performance in the overall water sector, based on better data and information, with the objective to improvements status of water.
- Expand access of services, but begin doing so at the local watershed level in an integrated manner, combining conservation, protection and development with the higher objective of developing a more vibrant and sustainable rural space for people and environment.
- Study in more detail the management options for water quality management, taking a broader water management perspective (quantity, quality, risk) and the multiple sources of pollution including non-point sources.
- Develop a formal sector financing vision for the water resources sector as a whole and its sub-sectors. In irrigation and in Water Supply such work would build on current initiatives. In water resources in general, this would require further understanding of the cost of services, and the possible financing strategies.

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KOSOVO WATER SECURITY OUTLOOK

