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REPORT ON
WB REGIONAL ISSUES
RELATED TO WRM

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University of Nis

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List of abbreviations

BOKU	University of Natural Resources and Life Sciences, Vienna
EACEA	Education, Audiovisual and Culture Executive Agency
HEI	Higher Education Institution
PWMC VV	Public Water Management Company “Vode Vojvodine”
SWARM	Strengthening of master curricula in water resources management for the Western Balkans HEIs and stakeholders
UNI	University of Nis, Serbia
UNMO	Dzemal Bijedic University of Mostar
UNS	University of Novi Sad
UNSA	University of Sarajevo
UoM	University of Montenegro
UPKM	University of Pristina in Kosovska Mitrovica
TCASU	Technical College of Applied Sciences Urosevac with temporary seat in Leposavic
WB	Western Balkan
WP	Work package
WRM	Water Resources Management

1 Introduction

Report on Western Balkan (WB) regional issues related to Water Resources Management (WRM) is a part of the work package 1 "Analysis of water resources management in the Western Balkan region" and activity A1.1 "Identification of WB regional issues related to WRM" of the Erasmus+ Capacity Building in the Field of Higher Education project „Strengthening of master curricula in water resources management for the Western Balkans HEIs and stakeholders" (SWARM).

According to a guideline of UNEP (2012) the Western Balkan partners have developed national reports on issues related to water resource management:

- Annex I – Bosnia and Herzegovina - Guideline for identification of WB regional issues related to WRM
- Annex II – Kosovo* - Guideline for identification of WB regional issues related to WRM
- Annex III – Montenegro - Guideline for identification of WB regional issues related to WRM
- Annex IV – Serbia - Guideline for identification of WB regional issues related to WRM

The following document gives an overview of these filled questionnaires and highlights topics with relevance for developing or strengthening master curricula in water resources management. The report concludes with a list of specific national issues in water resources management.

2 Policy, Strategic Planning and Legal Framework

The current status of key policy making, strategic planning and legal frameworks for the development, management and use of water resources have been indicated by each WB country. The comparison of main national instruments for water resources management (Figure 1, Question 2.I) shows that in Serbia the policy, laws and management are fully implemented on national level, while in Bosnia and Herzegovina the water resources management is mainly done on sub-national/provincial level. In Montenegro the legal framework in general is developed and the implementation has partly started. Additionally, the evaluation shows that water efficiency plans or the consideration of water efficiency in integrated water resources management plans are not implemented in any country. In Serbia, Kosovo* and Bosnia and Herzegovina this topic is even evaluated as not relevant.

Other national instruments that may incorporate water resources management are listed in detail in the filled questionnaires of each country.

The evaluation shows that international agreements on water resources management to which the WB countries are party are developed and implemented in most of the countries.

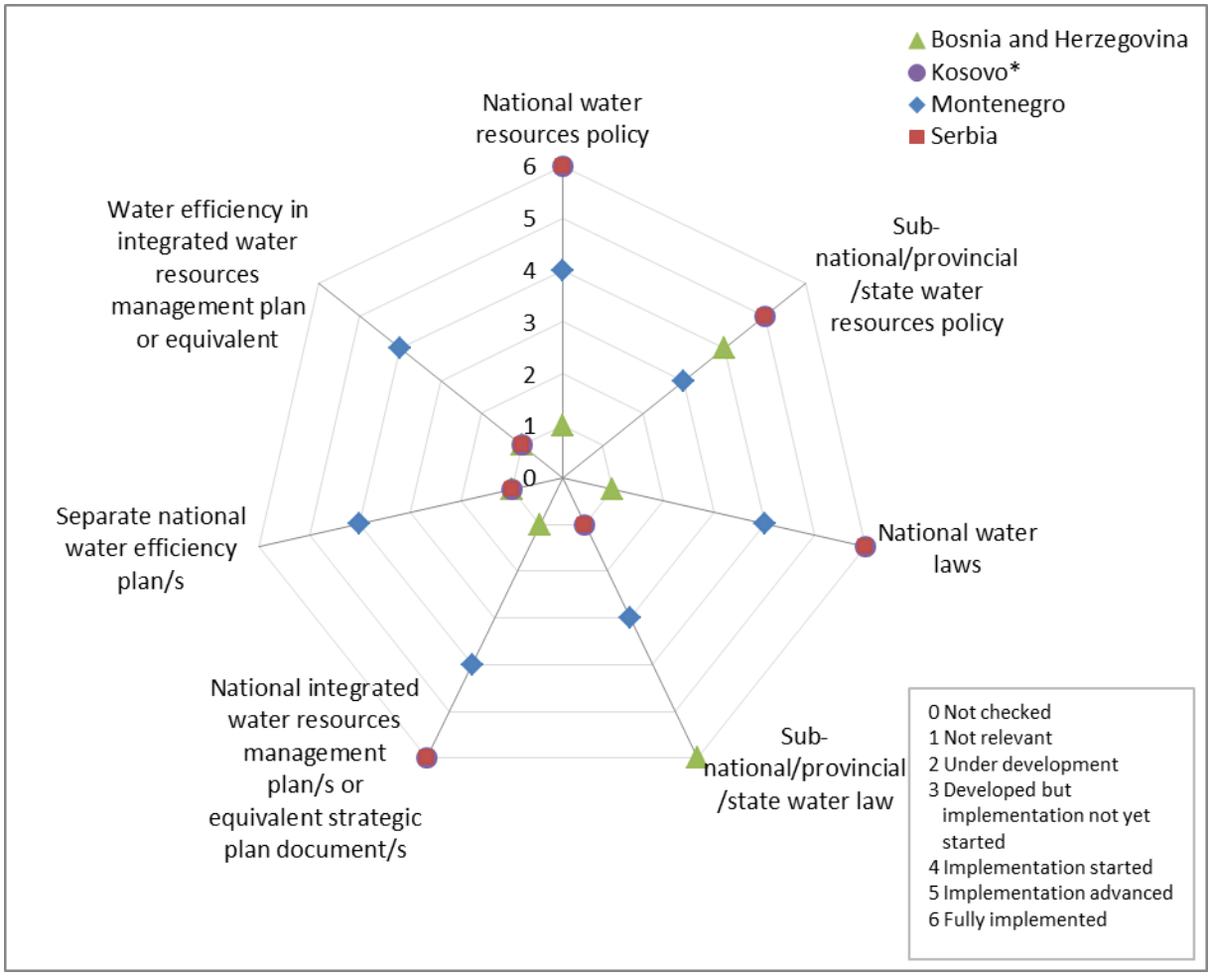

Figure 1: Main national instruments for water resources management (Question 2.I)

3 Governance and Institutional Frameworks

The current status of governance and institutional frameworks for the development, management and use of water resources have been indicated by each WB country. Question 3.III dealing with "capacity buildings in water resources management" is of special interest for the ongoing project SWARM. In general, the evaluation (Figure 2) shows that capacity building in water resources management is currently just under development. In none of the countries programs related to this topic are fully (or at least in advance) implemented or part of the higher education curriculum.

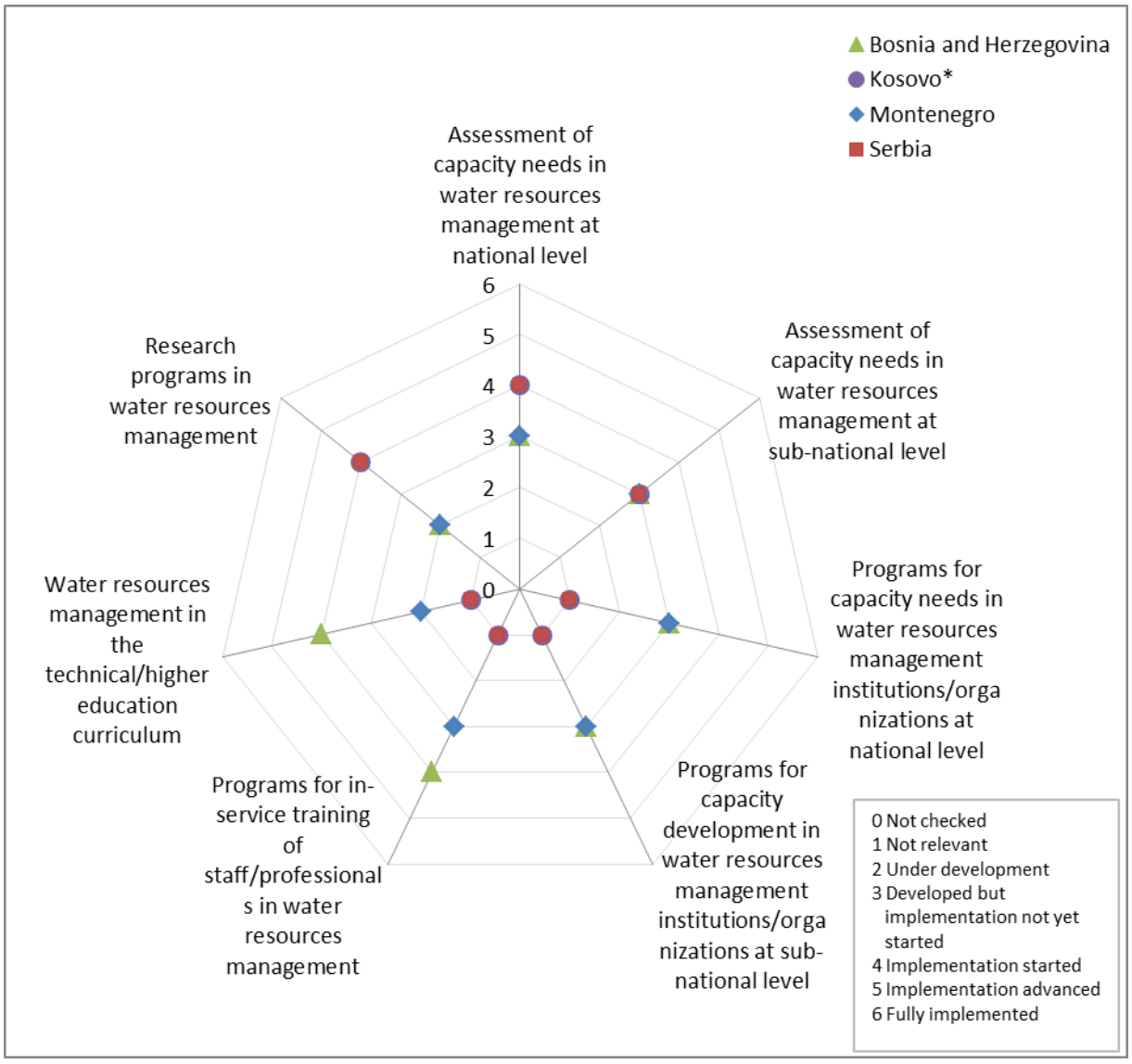

Figure 2: Capacity building for water resources management (Question 3.III)

The status of management mechanisms of different water sectors (river basin, groundwater, lakes, etc.) and the stakeholder participation in management are listed in detail in the filled questionnaires of each country.

4 Management Instruments

The current status of management instruments for the development, management and use of water resources has been indicated by each WB country. Figure 3 shows that the monitoring and information management in Serbia is quite well implemented excluding the monitoring of aquatic ecosystems, water use and water use efficiency. In Bosnia and Herzegovina as well as in Montenegro the implementation of the monitoring systems started or is in an advanced stadium (excluding the water use efficiency in Bosnia and Herzegovina).

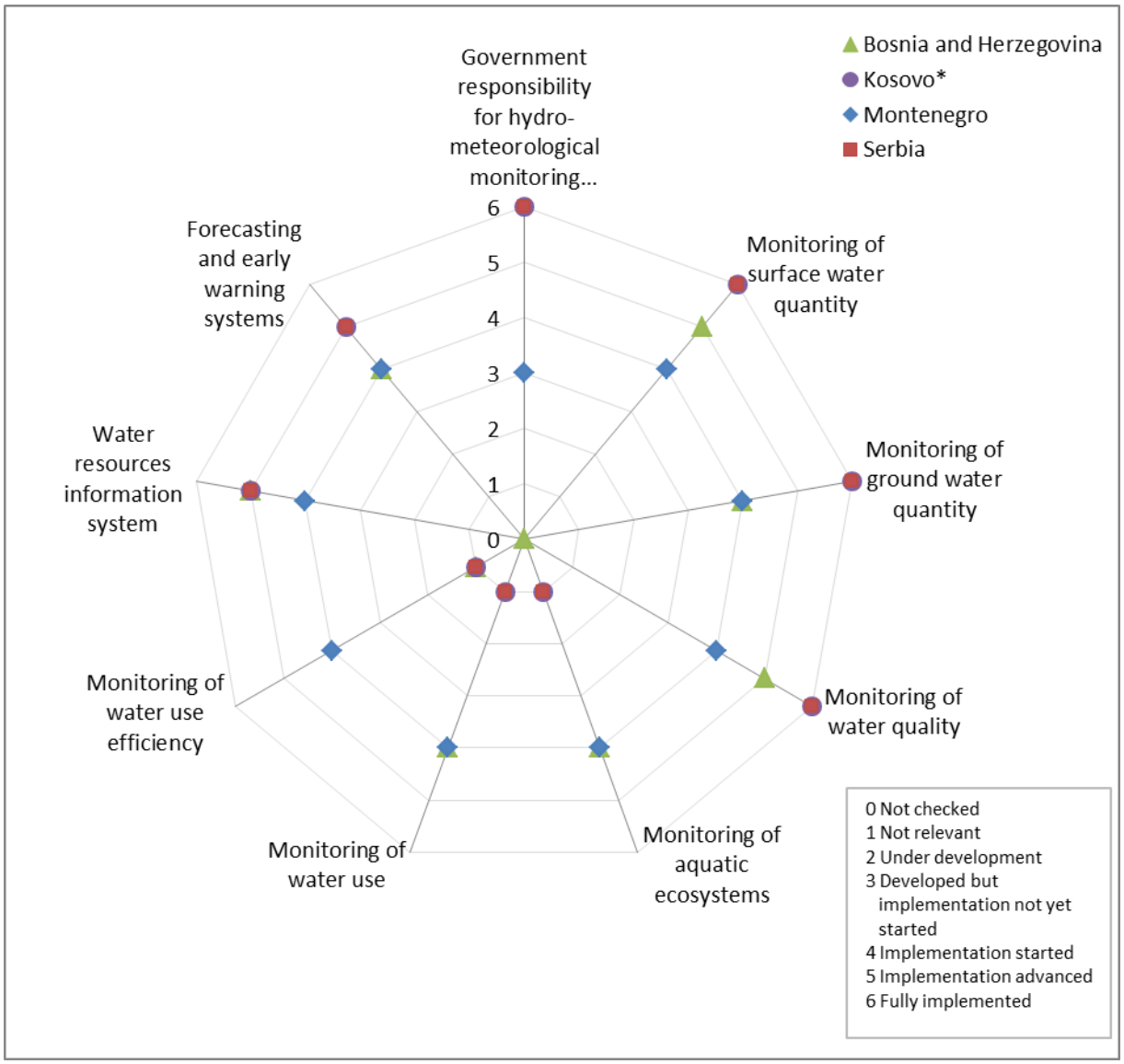

Figure 3: Monitoring and information management (Question 4.III)

Information on the development, management programs, knowledge sharing and financing of water resources management are listed in detail in the filled questionnaires of each country.

5 Infrastructure Development and Financing

The current status of investment plans and mobilized financing for infrastructure for the development, management and use of water resources has been indicated by each WB country. The evaluation (Figure 4) shows that investment plans and programs are mainly implemented in several water sectors in Serbia excluding sectors, which are not relevant (groundwater, rainwater harvesting and desalination) in this country. In Bosnia and Herzegovina as well as in Montenegro the investment plans in all water sectors are in the development status.

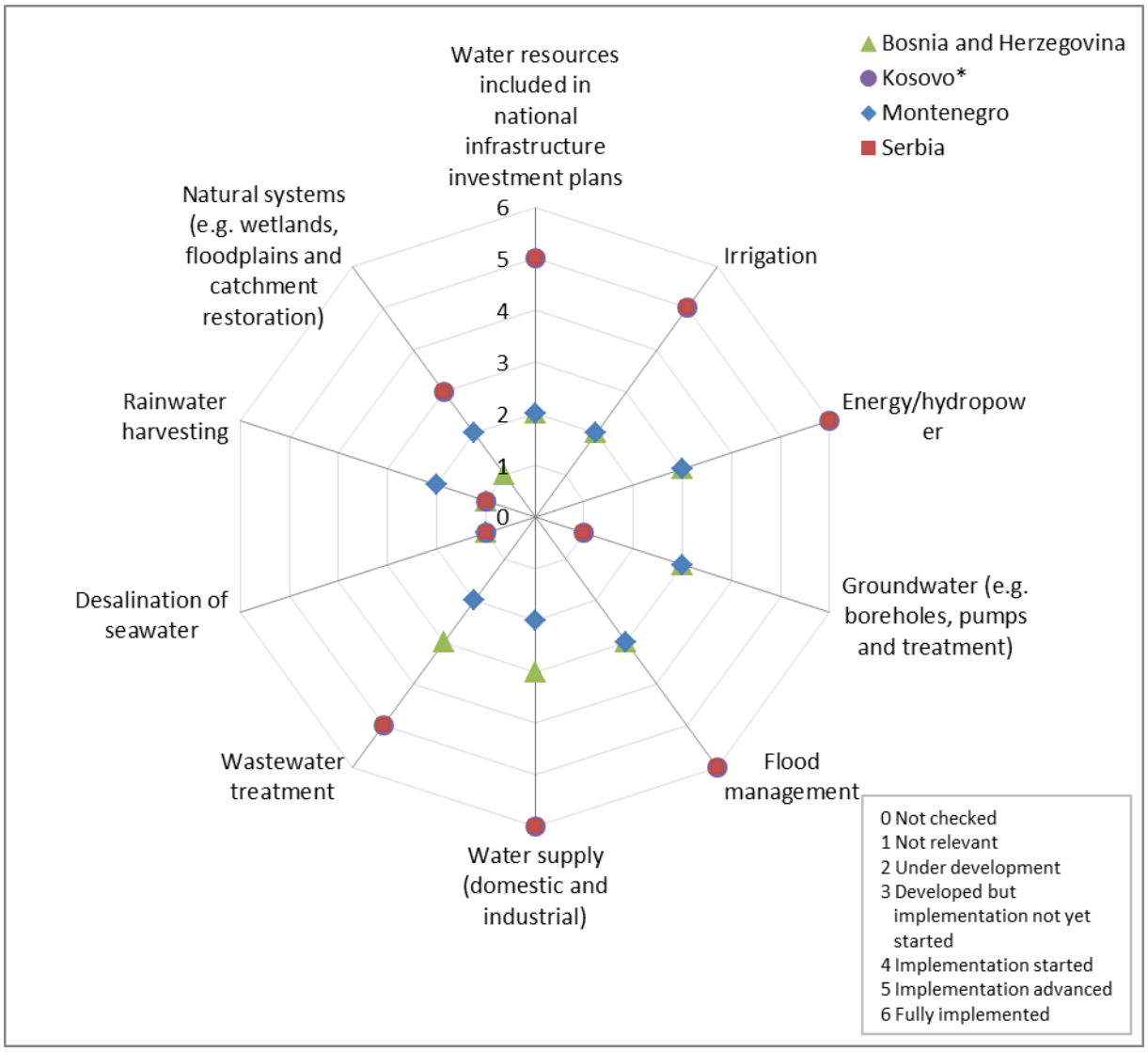

Figure 4: Investment plans and programs for different water sectors (Question 5.I)

Whether the financing of the investment plans is mobilized or not, is listed in detail in the filled questionnaires of each country.

6 Sources of Financing for the Development of Water Resources

Sources of financing as well as financing trends over the last 20 years for the development of water resources have been reported by each WB country (Figure 5, Question 6). In Montenegro an increasing financial trend in all sources of financing was recorded. The sources of financing in Serbia and Kosovo* are highly variable, whereby an increasing trend of the government budget allocation was indicated. In Bosnia and Herzegovina most of the financing sources are not recorded.

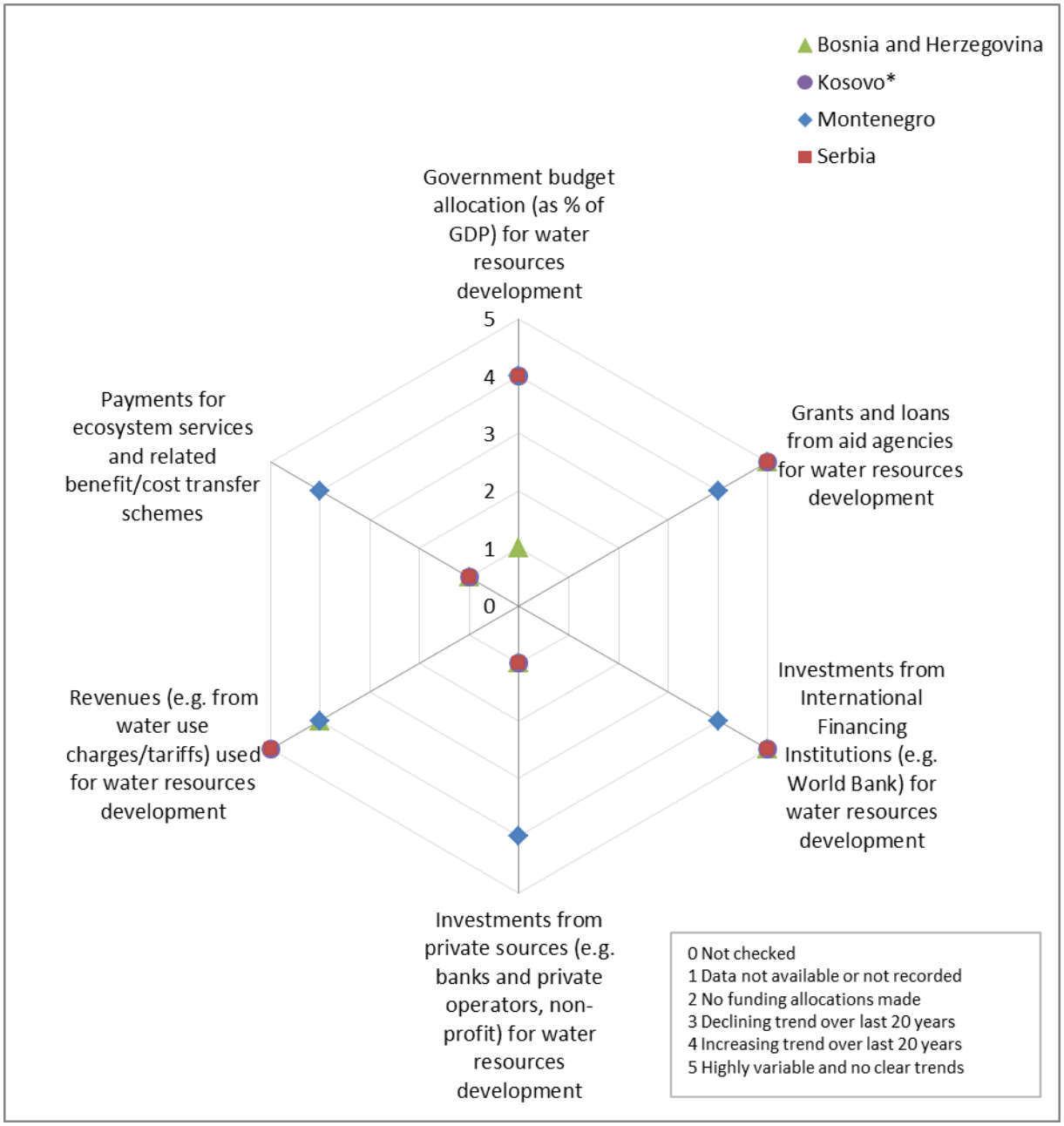

Figure 5: Sources of financing for the development of water resources (Question 6)

7 Outcomes and Impacts

To which extent improved water resources management has impacted economic, social, environmental and overall national objectives in the past 20 years has been reported by each WB country. Figure 6 shows that the overall national development impact in past years ranges independent of the topic between 2 and 4 and slightly differs between the countries.

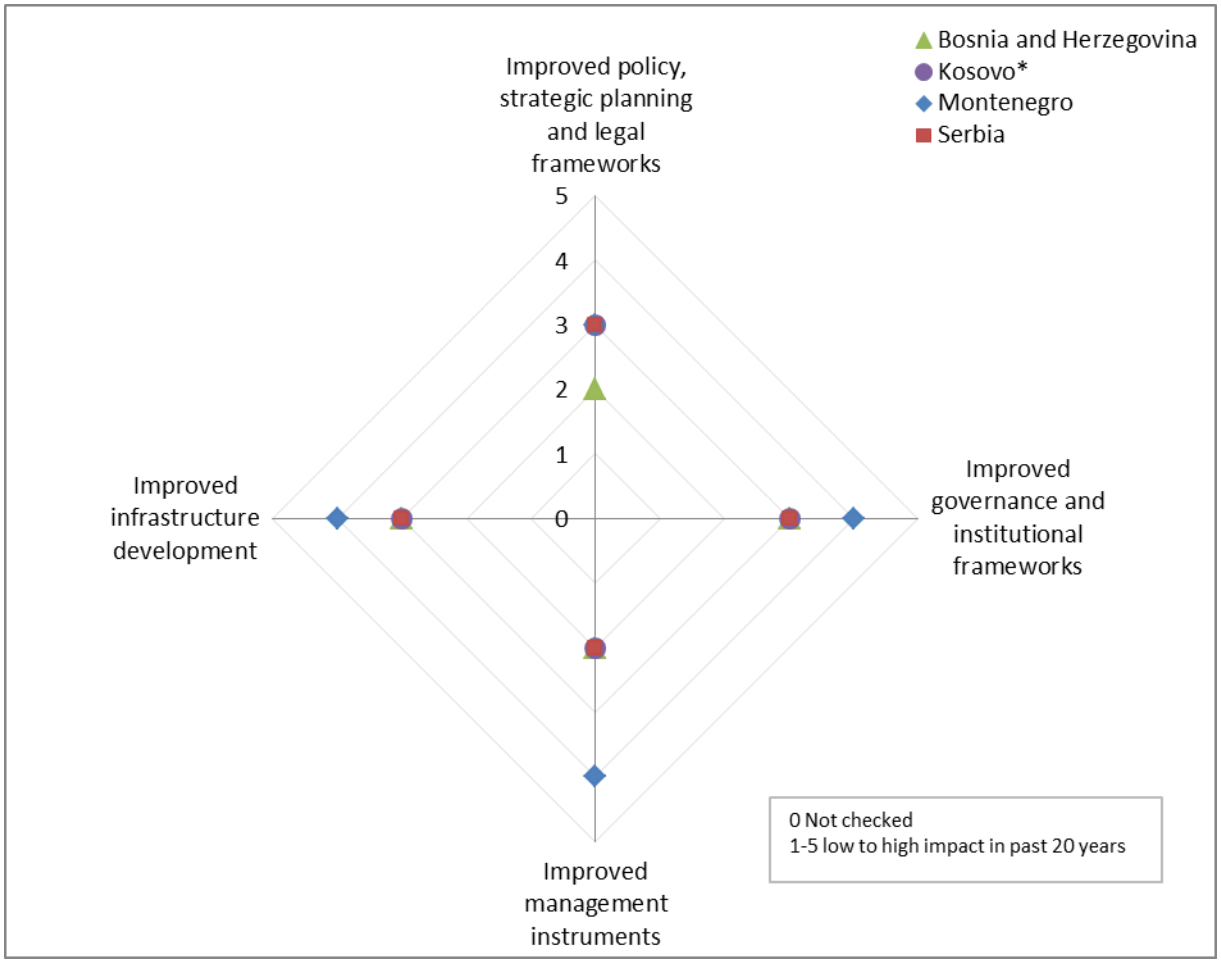

Figure 6: Sources of financing for the development of water resources (Question 6)

To which extent improved water resources management has impacted economic, social and environmental objectives in the past 20 years, is described in detail in the filled questionnaires of each country.

8 Priority challenges

Each WB country has indicated the current priority water resources challenge areas and how they have changed in the past 20 years. Water for domestic use has the highest priority in Bosnia and Herzegovina, while most of the other sectors have medium priority and the lowest priority is given to growing cities. Independent of the area all water sectors have medium to high priority in Montenegro. In Serbia and Kosovo* the highest priority has water for domestic use and for growing cities followed by water for agriculture.

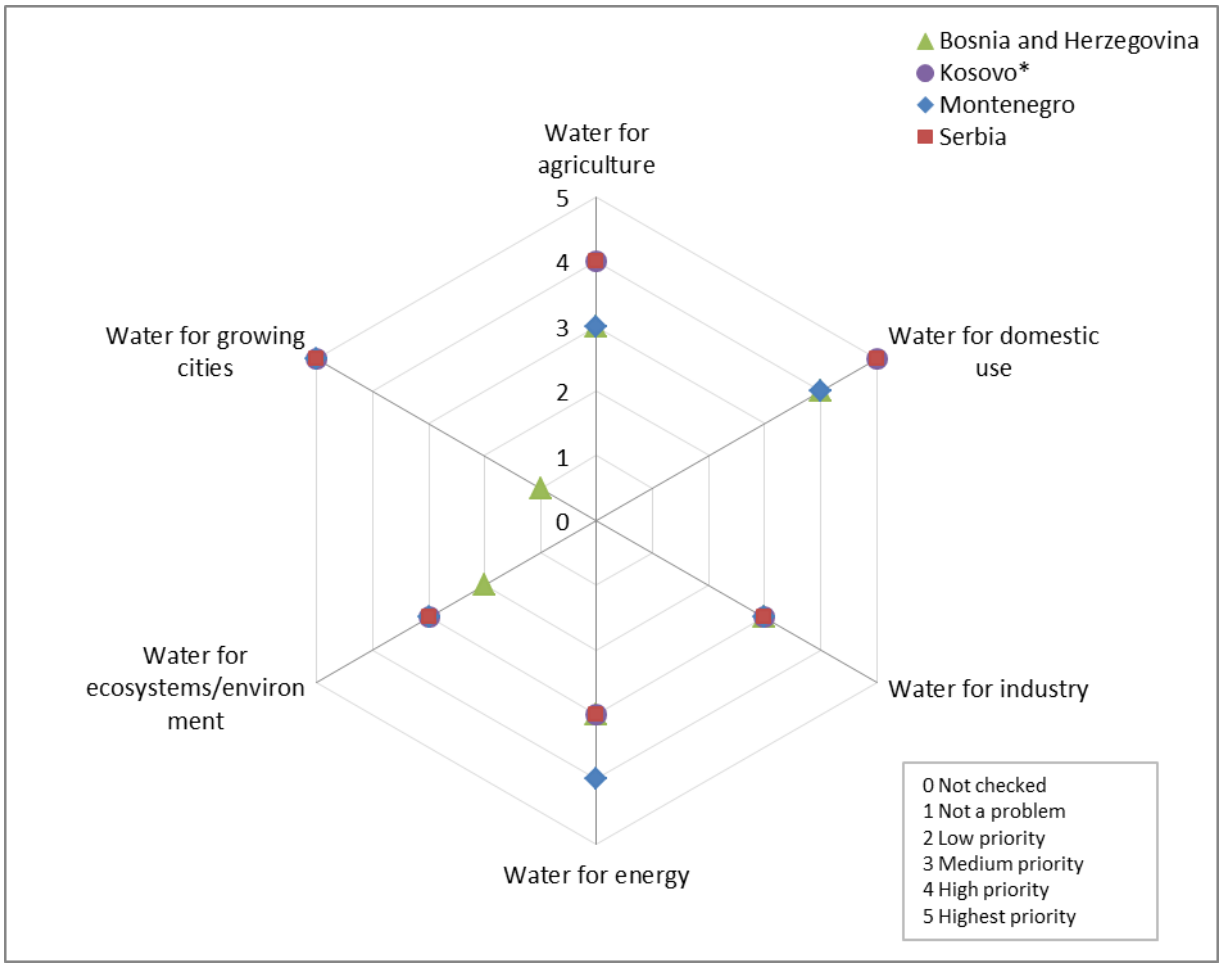

Figure 7: Priority water resources challenge areas – Current challenge level (Question 8A.I)

Figure 8 shows that in general the challenges in all water sectors slightly de- or increased. Exceptions are a significant increase of water for energy in Montenegro and a significant decrease of water for growing cities in Bosnia and Herzegovina.

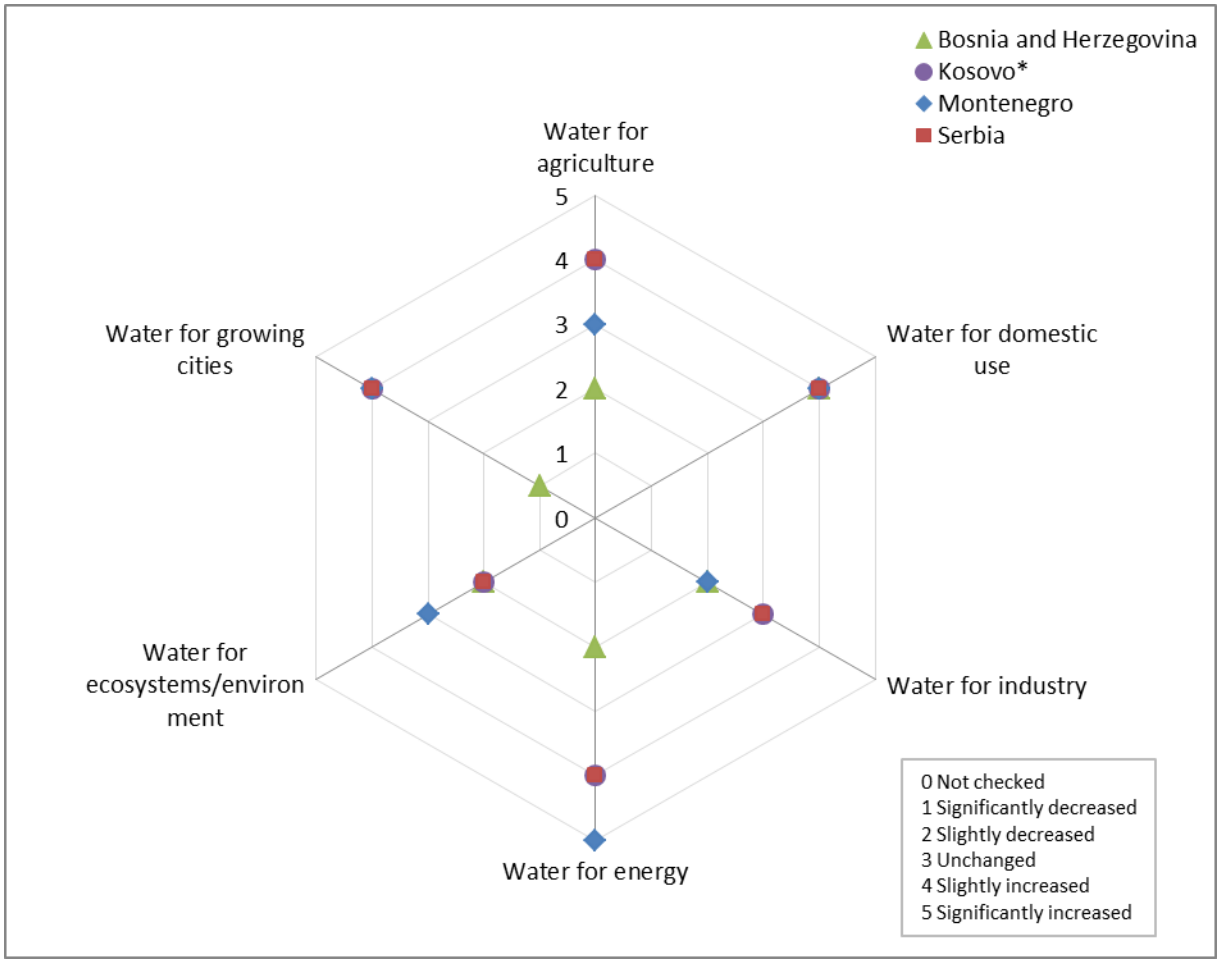

Figure 8: Priority water resources challenge areas – In the past 20 years, how has the challenge changed? (Question 8B.I)

Threats to the resources for the current situation and the changed challenges in the past 20 years are listed in detail in the filled questionnaires of each country.

Additionally each WB country has indicated current priority water management challenge areas and how have they changed in the last 20 years. Highest priority is dedicated to institutional capacity at sub-national level in Bosnia and Herzegovina. In Montenegro the institutional capacity at national level and the coordination between levels and types of management have the highest priority. In Serbia high priority is given to transboundary capacity at international level.

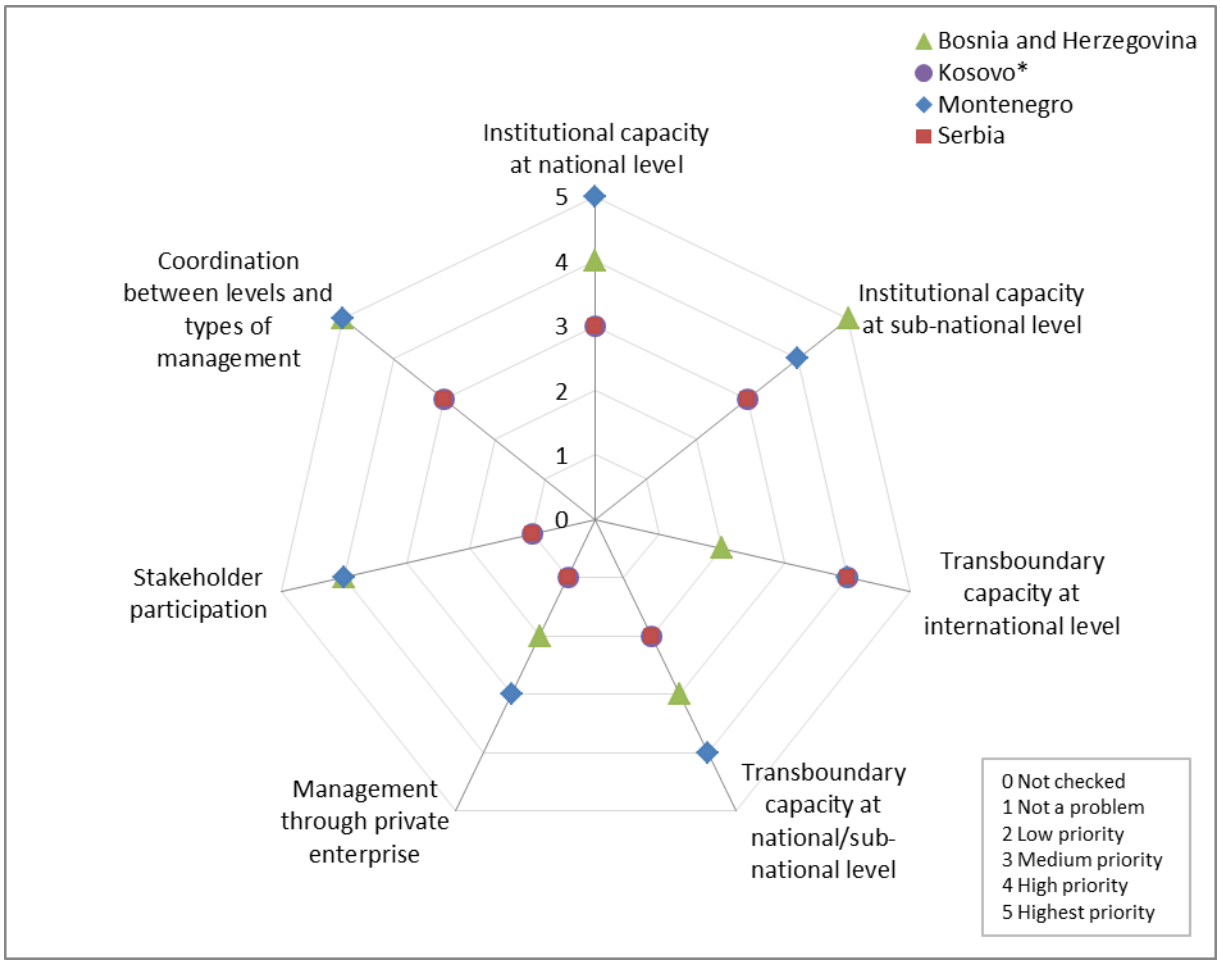

Figure 9: Priority water management challenge areas – Current challenge level (Question 8C.I)

Figure 10 shows that in general the challenges in all water management sectors slightly de- or increased. One exception is a significant decrease of institutional capacity at national level in Bosnia and Herzegovina.

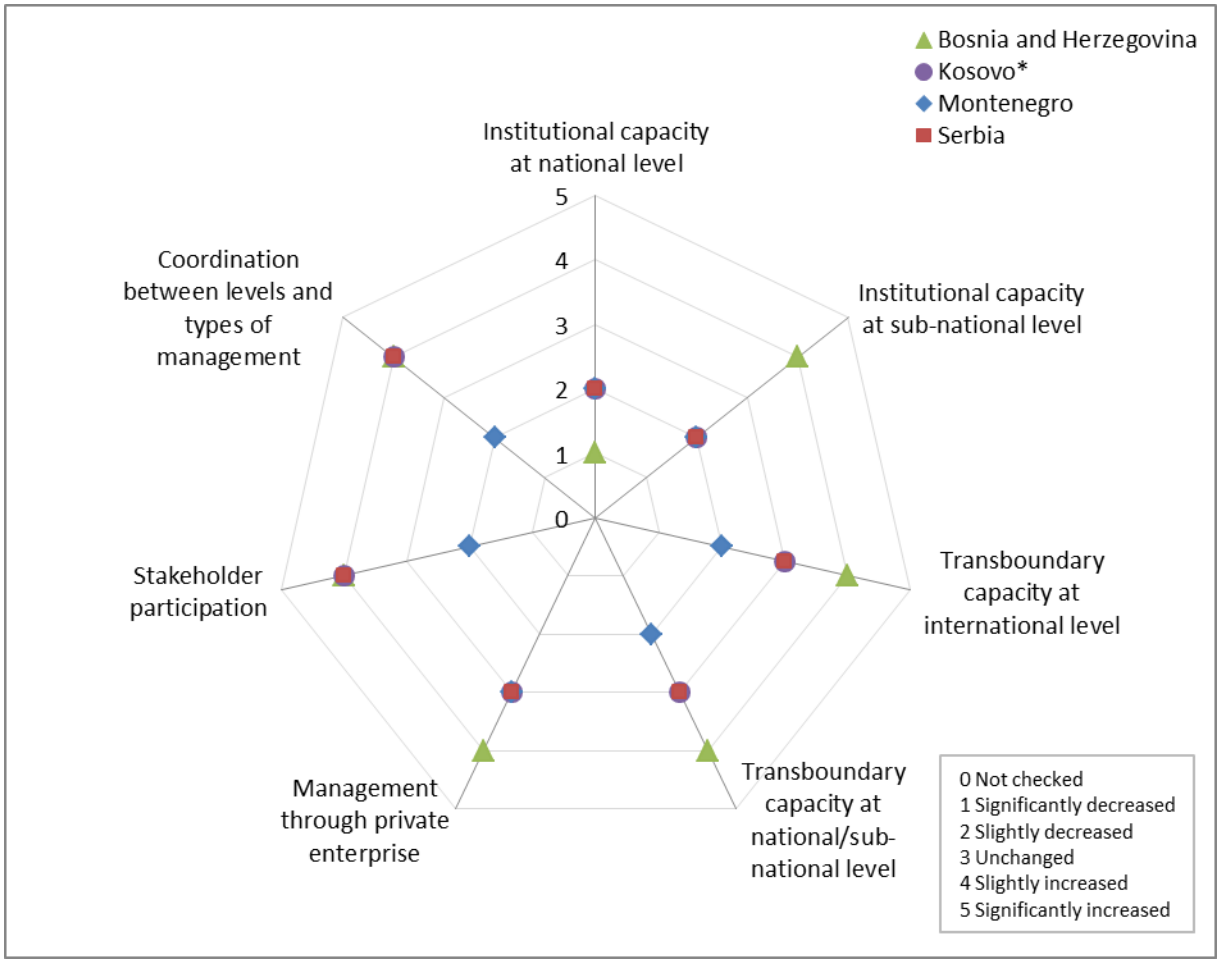

Figure 10: Priority water management challenge areas – In the past 20 years, how has the challenge changed? (Question 8D.I)

9 Issues in water resource management in WB

A summarized overview of issues related to water resource management is given in the following list. Due to the different situations in the WB nations, a wide range of different concerns has been identified. Further details are presented in the national reports on regional issues.

Bosnia and Herzegovina

- Increased pressure on limited water resources requires generally accepted "rules of conduct" related to the utilization of water resources.
- There is no state-level policy on water resources (including laws, strategies, etc.), because the entities/provinces (Federation of Bosnia and Herzegovina, Republic of Srpska) are responsible for this sector.
- Water sector is divided into administrative boundaries not at the country or river catchment basin level.
- International transboundary water management (e.g. Adriatic watershed) is an open issue.
- There is a health concern due to microbiological hazards on water resources. 21 percent of drinking water samples failed microbiological tests.
- Anthropogenic pressures on water resources are evident, due to a lack of sewerage and wastewater treatment plants, uncontrolled leachates from solid waste sites and wastewater from industrial facilities, livestock, poultry and fish farms.
- Water losses in water supply networks are large, because the networks are poorly maintained.
- Water protection is the weakest part of the water management system.
- According to EU Water Framework Directive more than half of the water bodies have a status lower than good, due to high organic concentration and high microbiological levels.
- The national basic revenues in the water sector do not cover the actual costs for all water services. Therefore, EU/international funds or increasing prices are necessary to provide "cost recovery" principles for water services.

Kosovo*

- Currently, only 81.2% of Kosovo`s* population is supplied with drinking water from functional water supply systems. While urban population has 100% coverage with public water supply systems, the percentage of rural population coverage is at 69.7%.

- Additionally, the existing infrastructure for water supply in Kosovo* is insufficient to meet the needs for drinking water, and water for household maintenance.

- The price of water is too low, so that the losses in the water supply network are high and the fee for water use is insufficient. A special problem is that there is no control over many rural water supply systems.

- Access to sewage system is also a problem, especially in rural areas. As much as 65% of the total population lives in settlements with a sewage system, whereas only 42% of the rural population has access to a sewage system.

- Generally, there is no wastewater treatment in Kosovo* (Only one is located in Kosovo*.). Wastewater is usually discharged directly into rivers and it is one of the main surface water pollutants.

- Huge industrial polluters (energy, cement, mining, etc.) as well as agriculture largely affect the quality of water.

- The irrigation systems in Kosovo* are facing the problem of aging infrastructure and declining revenues to maintain and repair irrigation structures. The other serious problem the irrigation companies are facing is the large number of small illegal irrigation systems.

- Groundwater is not adequately covered in water monitoring.

- It is evident the inappropriate use of water resources and uncontrolled exploitation of gravel from river beds.

- Flood Risk Management Planning in Kosovo* is a process that is at the very beginning. Properly defined plans for flood risk management do not exist, and it is necessary to develop and define measures for the reduction and mitigation of risk.

- Only ten hydrological stations of originally more than 30 stations remain functional.

- There is a lack of research institutions and consequently lack of scientific research in the field of water.

- Coordination and cooperation in the planning and implementation of programs is unsatisfactory. Decentralized management, which is applied in developed countries, is at the beginning in Kosovo*.

- Kosovo* still has not: a strategic plan for water, water management plan, river basin management plan and flood management plan.

- The overall water situation in Kosovo* in all its aspects and dimensions is unsatisfactory. This is because on one hand, the water resources in Kosovo* are relatively insufficient (1600 m3 per year / resident), and on the other hand there is the systematic degradation of waters due to the lack of an effective management system and lack of adequate water protection measures.

Montenegro

- Stronger involvement of the private sector in water resource management and development at national and basin level.
- Implementation of water resources management in the technical/higher education curriculum.
- Implementation of research programs in water resource management.
- Basin studies for long-term development and management of water resources and periodical assessment of water resources.
- Programs for efficient allocation of water resources among competing uses considering environmental impacts.
- Improvement of water use efficiency in all sectors including re-use or recycling of water and promotion of water efficiency.
- Cost recovery mechanisms (including charges for management)/progressive staff structures for all water uses.

Serbia

- Economic price for drinking water (drinking water supply, water discharge and treatment are included) as main method of financing of Local Public Water Utilities in the Republic of Serbia is very low (0.6 – 0.72 €/m^3), while the real economic price for drinking water should be 1.5 €/m^3 which would allow the water distribution system to function.
- Water losses in water supply networks are large, because the networks are poorly maintained. A special problem is that there is no control over many rural water supply systems.
- Water protection is the weakest part of the water management system.
- Flood protection is the main problem in the area of protection from water. Maintenance of the existing systems for flood protection is minimal, which causes the reduction of systems functionality.
- Coordination and cooperation in the planning and implementation of programs is unsatisfactory. Decentralized management, which is applied in developed countries, is at the beginning in Serbia.
- It is necessary to adopt the new, functional and sustainable concept of water management based on groundwater, and artificial reservoirs, if there is not enough groundwater quality or quantity.

10 References

UNEP 2012. The UN-Water Status Report on the Application of Integrated Approaches to Water Resources Management. ISBN: 978-92-807-3264-1.

Annexes

- Annex I – Bosnia and Herzegovina - Guideline for identification of WB regional issues related to WRM
- Annex II – Kosovo* - Guideline for identification of WB regional issues related to WRM
- Annex III – Montenegro - Guideline for identification of WB regional issues related to WRM
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ANNEX I –

BOSNIA AND HERZEGOVINA - GUIDELINE

FOR IDENTIFICATION

OF WB REGIONAL ISSUES

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v.03	10.03.2019	UNSA and UNMO filled document	UNSA, UNMO

Contents

1 Introduction

1.1 Geography of Bosnia and Herzegovina

Bosnia and Herzegovina is located in South-East Europe at the Western Balkans peninsula. The total area of the country is 51.209,2 km2, of which 51.197 km2 is land, and 12,2 km2 is the area of the sea. The total border of Bosnia and Herzegovina with the neighboring countries is 1.538 km, of which the land border is 774 km long, 751 km in the river and 13 km inland. Borders with Croatia in the north, northwest and south (total length of the border: 932 km), Serbia to the east (357 km) and Montenegro to the southeast (249 km) (Statistical yearbook, 2009). At the far south, Bosnia and Herzegovina have access to the Adriatic Sea, 20 km long (The World Factbook, 2006), located at te territory of the municipality Neum. The borders of Bosnia and Herzegovina are mostly natural and those are the rivers Drina, Sava and Una, and the mountains such as Dinara in the southwest of the country. According to the 2013 census, there are about 3.531.159 inhabitants in Bosnia and Herzegovina, and the average population density is 69/km2 (178.7 / sq mi).

Hydrographically, Bosnia and Herzegovina belongs to Black (75%) and Adriatic Sea (25%) basins.

Fig. 1 Topographic map of Bosnia and Herzegovina, (Hodžić i Abdurahmanović , 2017)

The relief of Bosnia and Herzegovina is very different, both in shape and age and way of origin. Most of the reliefs of the country consist of the mountains of different heights. The other part is flatland, and consists of parts of the Pannonian plain, large basins and river valleys, as well as the narrow belt of the Adriatic coast.

4/5 of the Bosnia and Hercegovina are mountains. Of the total land area, 5% are lowlands, 24% hills, 42% mountains and 29% karst . Almost 80% of territory of BiH spreads between 200 m and 1500 m above the sea level (see Fig. 1).

The climate of Bosnia and Herzegovina is determined by a complex of physical and geographical factors, of which the most significant are: latitude, relief, proximity to large ocean and marine areas and large land masses. The Climate in BiH varies from a temperate continental climate in northern Pannonia lowlands along Sava River and in the foothill zone, to an alpine climate in the mountain regions, and a Mediterranean climate in the coastal and lowland areas of the Herzegovina region in the south and southeast. The lowland area of northern BiH has a mean annual temperature of between 10°C and 12°C, while in areas above 500 masl the mean annual temperature is below 10°C. Mean annual air temperature in the coastal area varies between 12°C and 17°C. In the period 1981-2010, an increase in air temperature was recorded in the entire territory of BiH. The highest increase of approximately 1°C is recorded during summer and winter period. Annual precipitation amounts range from 800 mm in the north along the Sava River to 2000 mm in the central and southeastern mountainous regions of the country (period 1961-1990). Average annual precipitation in BiH is about 1,250 mm. However, it is not evenly distributed, either spatially or temporally (Second National Communication of BiH under UN Framework Convention on Climate Changes, UNDP, 2013).

1.2 Hydrographic characteristics of Bosnia and Herzegovina

Bosnia and Herzegovina has significant water resources that represent one of the base economic potential. Hydrographically, Bosnia and Herzegovina is belonging to Black and Adriatic Sea basins. (see Fig. 2).

According to the World Bank report [15], the relative annual availability of water resources per capita rank Bosnia and Herzegovina in the countries of "average water availability" between 5.000-10.000 m3/capita.

Average yearly precipitation in the territory of BH is 1.250 l/m2 which theoretically results with average yearly potential outflow of 2.030 m3/s. However, it is estimated that only 57% of total precipitation water (1.155 m3/s) really outflows from territory of BH (403 m3/s outflows towards the Adriatic Sea and 722 m3/s outflows towards the Sava river basin and to the Black Sea), (see Table 1).

Table 1 Water Balance of Bosnia and Herzegovina, (Okvirna vodoprivredna osnova Bosne i Hercegovine, 1994)

Area BiH (km^2)	Percipitation (mm)	Outlow (mm)	Outflow coefficient (%)	Evaporation (mm)	Volume of annual autflow m^3x10^9
51.129	1.250	750	60	500	38

Fig. 2 Major River Basins and the related sub-basins in BH, (Pregled stanja okoliša u BiH, II pregled, 2004)

Figure 2. shows the main water districtsand the associated river basins. The largest tributaries of the Sava River are Una (214 km), Vrbas (240 km), Bosna (271 km), and Drina (346 km). The largest river basin of the Adriatic Sea is the river Neretva (218 km).

To present a clear view of water resources of Bosnia and Herzegovina characteristic hydrological parameters for the main river basins are given in Table 2.

Table 2. Characteristic hydrological parameters for the main river basins of BH

Basin	Area of the basin (km^2)	Length of watercourses longer than 10 km	No. of inhabitants (1991)	Average flow (m^3/s)	Minimal flow $Q_{min.mont95\%}$ (m^3/s)
Immediate Sava river basin	5.506	1.693,2	635.353	63	1,5
Una in BH	9.130	1.480,7	620.373	240	41,9
Vrbas	6.386	1.096,3	514.038	132	26,3
Bosna	10.457	2.321,9	1.820.080	163	24,2
Drina in BH	7.240	1.355,6	422.422	124	24,1
Black Sea Basin	38.719	7.947.7	4.012.266	722	
Neretva and Trebišnjica	10.110	886.8	436.271	402	56,5
Cetina in BH	2.300	177	79.089	31	1,8

Adriatic Sea Basin	12.410	1.063,8	515.360	433	
Bosnia and Herzegovina	51.129	9.011,5	4.527.626	1.155	

The Una River is the right tributary of Sava river and it forms the border between Croatia and Bosnia and Herzegovina. The catchment area is 9.130 km2 and an average flow is 240 m3/s. Vrbas has a basin of 6.386 km2 and an average flow of 132 m3/s. Bosna river has a catchment area of 10.457 km2 and an average flow of 163 m3/s. The Drina River is the border between Bosnia and Herzegovina and Serbia and Montenegro. The Drina River basin in BH is 7.240 km2 and the average flow is 124 m3/s. The Neretva River basin is the most important cross-border basin in the catchment area of the Adriatic Sea. Of the total length of the Neretva River of 222 km, only about 25 km runs through Croatia.

Rivers in BH are characterized by high gradients and relatively high flow rate (22 l/s/ km2). All rivers flow through the mountainous areas in the upper stream, while in the downstream sections near the confluence, run through the plains and often flood the areas. It is very important to emphasis that a large part of the BH watercourse and river basins belongs to the category of international, whether they constitute the border of state or just cross the borders. As already mentioned, the Sava River throughout its length in BH is the northern border and the Una River is partly the western border to Croatia. The eastern border of BH towards Serbia is the Drina River. Interstate streams that cut borders are Lim and Jadar towards Serbia, Ćehotina towards Montenegro, and from the larger rivers towards Croatia are Neretva, Korana and Glina.

Last demographic census in BiH was conducted in 2013, when it was estimated that about 3.531.159 people lived Bosnia and Herzegovina. The number of inhabitants is about 1.000.000 lower than the pre-war one. However, more serious water balance analyzes have not been conducted after 1991. Assuming that, there were no significant changes in the water balance, for thr purpose of this report the data from that period are used. Therefore, to the 1991 census, around 4.012.266 inhabitants lived in the area of the Sava River Basin, and in the area of the Adriatic Sea Basin there were about 515.366 inhabitants.

Table 3 Specific discharges of average and minimum water flow in Bosnia and Herzegovina, (Strategija upravljanja vodama FBiH 2010-2022)

Basin	Area (km^2)	No. of inhabitants (1991.)	Average Discharge			Minimal Discharge		
			m^3/s	$l/s/km^2$	l/s/capita	m^3/s	$l/s/km^2$	l/s/capita
Black Sea	38.719	4. 012.266	722	18	0,18	118	3	0,03
Adriatic Sea	12.410	515.366	433	35	0,84	58	4,7	0,11
Bosnia and Herzegovina	51.129	4.527.626	1.155	23	0,25	176	3,5	0,04

Based on date given in the Table 3. it could be concluded that ¾ area of Bosnia and Hezegovina discharge towards Black Sea has two times less average discharge (18 l/s/km2) compared to ¼ of the country area that belongs to Adriatic Sea, where the average discharge is 35 l/s/km2. Also, around 88% of the population lives on the territory of the Black Sea Basin and the average discharge is about

0.18 l /s/capita, which is five times less than in the Adriatic Sea Basin, where the average discharge is about 0.84 l/s/capita.

From the previous tables, it's obvious that the Bosna River Basin, bearing in mind the number of inhabitants, has the poorest values of water resources, while Neretva and Trebišnjica River Basin has the highest values. Observing sub-basins or smaller units within the basins, the problem of areal inequality becomes even more pronounced.

Fig. 3 The average surface runoff in BiH (l/s/km2), according to the flows registered in the profiles of surface watercourses, (Treći nacionalni izvještaj BiH u skladu sa okvirnom konvencijom UN, 2016)

The highest values of the average surface runoff are in the Neretva and Trebišnjica River Basin, then in the Vrbas River Basin, the Una River Basin, the Drina River Basin, and the Bosna River Basin, Korana and Glina River Basins and finally in the catchments of the watercourses that flow into the Sava River (Ukrina, Tolisa and other watercourses the so-called "immediate" Sava River Basin). Basins with poor water resources (Bosna River basin, the immediate Sava River Basin, the upper Vrbas River Basin) have even poorer parts of the basin, such as the Spreča river basin, parts of the immediate Sava River Basin, the sub-basins of Bosna River Basin, especially its middle and lower flows, the Miljacka and Lašva, Vrbanja, etc. (Okvirna vodoprivredna osnova Bosne i Hercegovine, 1994)

Table 4 Characteristic flows along river basins, (Okvirna vodoprivredna osnova Bosne i Hercegovine, 1994)

Basin	Average flow Qav (m3/s)	Specific average flow		Minimal flow	
		Average flow per Area Qav/A (l/s /km2)	Average flow per capita Qav/capita (l/s/capita)	Average flow per Area Qav/A (l/s /km2)	Average flow per capita Qav/capita (l/s/capita)
Immediate Sava river basin	63	11,4	0,099	0,272	0,002
Una in BH	240	26,3	0,387	4,589	0,067
Vrbas	132	20,7	0,257	4,118	0,051
Bosna	163	15,6	0,089	2,314	0,013
Drina in BH	124	17,1	0,293	3,329	0,057
Neretva and Trebišnjica	402	39,7	0,921	5,588	0,129
Cetina in BH	31	13,5	0,392	0,782	0,023

2 Policy, Strategic Planning and Legal Framework

The legal framework for water management in BH.

Bosnia and Herzegovina is decentralized state with two entities (Federation of Bosnia and Herzegovina and Republic of Srpska) and Brcko District. FBiH consists of 10 cantons (each canton has its Government and Constitution). There are 16 administrative cities, 71 municipalities in FBiH and 57 municipalities in RS as the local administrative units. Brcko District is formed in 2000. as a separate administrative unit administratively under direct sovereignty of Bosnia and Herzegovina.

According to the Constitution of Bosnai and Herzegovina, and the FBiH, RS and Arbitration Decisions on the Brčko District, competencies in water management (development, water protection, water use, watercourse regulation and protection against harmful effects of water) are under the competence of entities (and cantons in the Federation of BiH) and the Brčko District, while BiH's foreign policy in the water sector is under the jurisdiction of BiH institutions. Such a constitutional solution must be treated in two ways. On the one hand, it gives a lot of rights, because responsibility in water management - as the most vital national resource - is entrusted to the entities, giving them the highest level of state-legal legitimacy and significance. On the other hand, it is also a significant obligation, because it implies great responsibility to ensure that in very complex management conditions, as the entity boundaries do not match hydrographic units, they find the best forms of management coordination, which will ensure optimum water management in conditions of very complex structure in the basins[1].

Also, it should be noted that water management solutions for the transboundary river basins (Sava, Drina, Una, Neretva) should be negotiated and harmonized with the neighboring countries and with the international obligations defined by relevant documents. BiH is a signatory of the Danube Convention and members of the ICPDR. Beside Danube Convention two very important treaties for BH transboundary river basins management are enforced: Framework Agreement on the Sava River Basin (FASRB) and Bilateral Agreement with Republic of Croatia (among the other issue concerning water management of Adriatic Sea river basins Neretva-Trebišnjica, Krka and Cetina) – signed 1996. Also, two Bilateral Agreements are in preparation: the Agreement with Republic of Serbia, with the aim to deal with Management of Drina River Basin (Sava's tributary) dominantly regarding flood protection and hydropower generation and the Agreement with Republic of Crna Gora.

2.1 Participation of BiH in the international institutions/organizations

Regarding the fact that all surface and groundwaters of BiH belong to the category of so-called transboundary waters, active participation of BiH in the international institutions/organizations related to water sector represents one of the most important activities of ministries responsible for water resources management in BiH. There is a large number of global (UN) and European commissions/institutions in which representatives of BiH are actively involved in resolving of certain problems related to water sector. Therefore, it can be stated that the representatives of BiH are currently the most engaged in the work of ICPDR and Sava Commission which are primarily focused on development of Danube, i.e. Sava river basin management plans.

[1] INDICATIVE STRATEGY PAPER FOR BOSNIA AND HERZEGOVINA(2014-2017) ADOPTED ON 15/12/2014

Having in mind that the neighbouring countries, Republic of Croatia and Republic of Serbia are also involved in the work of ICPDR and Sava Commission, and Montenegro is involved in work of Sava commission, it can be concluded that BiH is in this way indirectly resolving greater number of open issues related to water sector with neighbouring countries. Here we have to mention that in 2006 BiH has ratified a special "Contract between the Government of Republic Croatia and the Government of Bosnia and Herzegovina on regulation of water management relations ".

2.2 Bilateral agreements / arrangements

Agreement between the Council of Ministers of Bosnia and Herzegovina and the Government of the Republic of Croatia on joint financing of the maintenance of the regional drainage system Komarna-Neum-Mljetski kanal (signed on July 11, 2004)

Agreement between the Council of Ministers of Bosnia and Herzegovina and the Government of the Republic of Croatia on joint financing of the maintenance of the regional drainage system Komarna-Neum-Mljetski kanal (signed on July 11, 2004)

Agreement between the Council of Ministers of Bosnia and Herzegovina and the Government of the Republic of Croatia on the rights and obligations of using water from public water supply systems crossed by the state border (Decision on Ratification of the Contract, "Official Gazette of BiH", No. 10/15)

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International conventions ratified by BiH[2]. Some of them are:

- ✓ UN Millennium Declarations, New York, SAD, 2000;
- ✓ "Helsinki Convention" - UNECE convention on use and protection of transboundary watercourses and international lakes", Helsinki, Finland, 1992;
- ✓ "Barcelona Convention" – Convention on the protection of the Mediterranean Sea against pollution, Barcelona, Spain, 1976;
- ✓ "Danube Convention" – Convention on cooperation for protection and sustainable use of Danube river, Sofia, Bulgaria, 1994;
- ✓ "Agreement on the Sava river" – the Framework agreement on Sava river basin, Kranjska Gora, Slovenia, 2002;
- ✓ UNECE protocol on water and health, London, UK, 1999

[2] http://www.dei.gov.ba/dei/dokumenti/uskladjivanje/default.aspx?id=10919&langTag=en-US

- ✓ "Aarhus Conventions" – Convention on access to information, public participation in decision making and access to justice related to environmental matters, , Aarhus, Denmark, 1998;
- ✓ "Ramsar Conventions" – Convention on wetlands, Ramsar, Iran, 1971
- ✓ Convention on Cooperation on the Protection and Sustainable Use of the Danube River ("Official Gazette of BiH", No. 65/05) Framework Agreement on the Sava River Basin ("Official Gazette of B & H", No. 8/2003)
- ✓ UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992) ("Official Gazette of B & H", No. 8/09)

2 Enabling environment for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Main national instruments for water resources management							
a.	National water resources policy	X[3]					
b.	Sub-national/provincial/state water resources policy				X		
c.	National water laws	X[4]					
d.	Sub-national/provincial/state water law						X
e.	National integrated water resources management plan/s or equivalent strategic plan document/s	X					
f.	Separate national water efficiency plan/s	X					
g.	Water efficiency in integrated water resources management plan or equivalent	X					
II) Other national instruments that may incorporate water resources management							
a.	Integrated national policy/strategy/plan for land and water resources management	X					
b.	Poverty Reduction Strategy (PRS) with water resources management component	X					
c.	National Strategy for Sustainable Development		X				

[3] There is no water Management strategy for BH, because the entities are legaly responsible for water management

[4] Same as 1

d.	National Development Plan with water resources management component	X[5]					
e.	National Environmental Action Plan water resources management component		X				
f.	National climate change adaptation policy/strategy/plan with water resources management component					X[6]	
g.	National Agricultural Plan with water resources management component					X[7]	
h.	National energy policy/strategy/plan with water resources management component					X[8]	
i.	National desertification policy/strategy/plan with water resources management component			X[9]			
j.	National wetland policy/strategy/plan with water resources management component	X[10]					
k.	National biodiversity policy/strategy/plan with water resources management component					X[11]	
III) International agreements on water resources management to which your country is party							
a.	Regional/sub-regional water resources management agreements	X					
b.	Transboundary water resources management agreements for specific river basins						X[12]

2.3 Issues

Existing problems in the water sector of BiH are not unique. There are wide spread statements of numerous experts that increased pressures of some users on limited water resources might lead to greater number of international and national conflicts in the near future. Therefore, it should not be surprising that new initiatives are being started up all around the world in order to adequately (in integral way) consider the multidisciplinary character of water resources utilisation and to

[5] www.dep.gov.ba
Council of Europe - Action Plan for Bosnia and Herzegovina 2018-2021
[6] Climate Change Adaptation and Low Emission Development Strategy for BiH (2013)
[7] Strategic Plan for Rural Development of BiH (2018-2021)
[8] Framework Energy Strategy of Bosnia and Herzegovina until 2035, adopted on 29.08.2018.
[9] First national report on the implementation of the united nations convention to combat desertification/land degradation in Bosnia and Herzegovina (2007)
[10] The wetlands are considered under Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina (2015-2020)
[11] Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina (2015-2020)
[12] ICPDR – Danube RB and ISRBC – Sava RB

appropriately define generally accepted "rules of conduct" related to the utilization of water resources.

There is mainly no state-level law on water resources policy. Numerous recommendations were made to the country in the past two decades to adopt such a law. Since 2011 Bosnia and Herzegovina has made some efforts to transpose the EU environmental acquis into the national legislation; however, the country is still at an early stage in these efforts.
Bosnia and Herzegovina does not have a national sustainable development strategy or other comprehensive development strategy.

The draft development strategy and draft social inclusion strategy were prepared for the period 2008–2013 but were never adopted.

Also, there is no water Management strategy for BiH, because the entities are legaly responsible for water management.

COMPETENCE FOR WATER MANAGEMENT IN BH

- State level:
  - ✓ Ministry for Foreign Trade and Economic Relations,
- Entities level:
  - Federation of BiH
    - ✓ Ministry for Agriculture, Water Management and Forestry of Federation BH,
    - ✓ Sava River Watershed Agency Sarajevo,
    - ✓ Adriatic Sea Watershed Agency Mostar,
    - ✓ Cantonal ministries responsible for water management,
  - Republic of Srpska
    - ✓ Ministry for Agriculture, Water Management and Forestry of Republic Srpska
    - ✓ Water Agency for Sava River District Bijeljina
    - ✓ Water Agency for Trebišnjica River District Trebinje
  - Brčko District
    - ✓ Department for Agriculture, Forestry and water management
- Local level:
    - ✓ Municipalities (more than 140) responsible for water supply and sanitation services (through public companies)

Bosnia and Herzegovina does not have a national sustainable development strategy or other comprehensive development strategy. The draft development strategy and draft social inclusion strategy were prepared for the period 2008–2013 but were never adopted.

International transboundary water management is also a major theme in the Adriatic watershed, where Bosnia and Herzegovina is the upstream country vis-à-vis Croatia. The Neretva River has the most significant transboundary river basin in the Adriatic Sea watershed. The Neretva River flows from Republika Srpska down to the Federation of Bosnia and Herzegovina and towards Croatia, where the costal delta is listed under the Ramsar Convention.

2.4 References

Please provide a reference list including policies, strategies, plans, laws or agreements, which are implemented in your country.

I) Main national instruments for water resources management

The water regulations of the Federation of BiH are adopted both at the BiH Federation level and at the Cantonal level, in accordance with the so defined constitutional framework. The first Law on Waters of the Federation of BiH was adopted in 1998. The second Law on Water of the Federation of BiH34, superseding the 1998 Law on Water and the 2003 Law on Water Protection, was adopted in 2006. This Law stipulates adoption of a large number of by-laws35, which is in progress. In the Federation of Bosnia and Herzegovina, the 2006 Law on Water (OG FBiH, No. 70/06) is accompanied by extensive subsidiary legislation. Since 2011, progress has been made with advancing the legislation on water quality. The Rulebook on drinking water safety (OG FBiH, No. 40/10, 30/12) prescribes the requirements and standards for drinking water and measures for monitoring the health safety of drinking water. New subsidiary legislation has been adopted on wastewater discharges and sanitary protection zones. Amendments to the Law on Water are currently under preparation to better coordinate the procedures for issuance of environmental permits and water permits and to increase the transposition of the EU Water Framework Directive and the Floods Directive. It is also envisaged to amend the fines stipulated in the Law on Water – surprisingly, to decrease the fines by a factor of two to three. In Republika Srpska, the 2006 Law on Water (OG RS, No. 50/06, 92/09, 121/12) is supported by extensive subsidiary legislation. In 2012, through amendments to the Law on Water, the two water agencies were merged into a new centralized institution – the Public Enterprise "Vode Srpske". Brčko District still uses the old 1998 Law on Water of Republika Srpska although this law is no longer in use in Republika Srpska. A new law on water is being developed in Brčko District.

The trend of these changes in the existing system has been reflected in the development of legal and institutional framework for water management based on the principles and in accordance with the requirements set out in the policies and laws of the European Union. The underlying instrument serving as the general paradigm based on the national system is developing is the Water Framework Directive (WFD), along with dozens of other EU regulations that should be taken into consideration.

The Law stipulates the obligation to adopt Water Management Strategy (“Strategy”) defining, in the broadest sense, the water management policy of the Federation of BiH. The Strategy, upon the Government’s proposal, is to be adopted by the Parliament of the Federation of BiH for the period of 12 years. The Water Management Strategy makes an integral part of Environmental Protection Strategy. The first Sava River Basin Management Plans in Bosnia and Herzegovina for the period 2016–2021 were prepared in the framework of the EU project Capacity Building in the Water Sector in Bosnia and Herzegovina.

The Memorandum of Understanding between the Federation of Bosnia and Herzegovina and Republika Srpska regarding water issues was signed in 1998 by entity governments, recognizing the need for establishing the mechanism of inter-entity cooperation in the area of water and the need of informing the institutions of Bosnia and Herzegovina on the activities in the area of international cooperation in terms of trans-boundary watercourses.

In 2013, both entities adopted a Law on the Use of Renewable Energy Sources and Efficient Cogeneration (OG FBiH, No. 70/13; OG RS, No. 39/13, 108/13 and 79/15). Both entities promote electricity generated from renewable sources through feed-in tariffs or feed-in premiums.

II) Other national instruments that may incorporate water resources management

The Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina was adopted by the Council of Ministers of Bosnia and Herzegovina in 2013. The adaptation component of the Strategy is focused on seven priority sectors, with water management underpinning many of the activities.

Climate Change Adaptation and Low Emission Development Strategy for BiH (2013)

In FBiH Midterm agricultural sector development strategy in Federation of Bosnia and Herzegovina for the 2015-2020 period is in force, while Rural development program for Federation of Bosnia and Herzegovina for the 2018-2020 period is in the adoption process. Strategic plan for the development of agriculture and rural areas of Republic of Srpska, 2016-2020 was adopted in Republic of Srpska. Strategy for development of agriculture, food and rural development in BD BiH was developed for the 2008 – 2013 period, but was never adopted at the BD BiH Parliament. Development of a new Agriculture, food and rural development strategy is in progress.

Strategic Plan for Rural Development of BiH (2018-2021)

National Renewable Energy Action Plan of Bosnia and Herzegovina (NREAP BiH) – an obligation of BiH resulting from the international obligation assumed by BiH in 2006, when it enacted the Decision to Establish the Energy Community. In 2013, both entities adopted a Law on the Use of Renewable Energy Sources and Efficient Cogeneration (OG FBiH, No. 70/13; OG RS, No. 39/13, 108/13 and 79/15). Both entities promote electricity generated from renewable sources through feed-in tariffs or feed-in premiums.

Nature conservation in Bosnia and Herzegovina is regulated by the Law on Nature Protection and Law on Environmental Protection in both entities and Brčko District. In the Federation of Bosnia and Herzegovina, Biodiversity conservation and protected areas are being increasingly recognized as one of the top national priorities in the updated national environmental legislation and several recent national strategic documents, such as the 2012 State of the Environment Report, National Environmental Action Plan (NEAP), environmental protection strategies of the two entities and the NBSAP.

Strategy and action plan for protection of biological diversity in BiH (2015-2020) https://www.cbd.int/doc/world/ba/ba-nbsap-v2-en.pdf

Sava River Basin Management Plan Background paper No. 9 Integration of water protection in developments in the Sava River Basin (Floods, Navigation, Hydropower, Agriculture), International Sava River Basin Commission, March 2013
http://www.savacommission.org/dms/docs/dokumenti/srbmp_micro_web/backgroundpapers_approved

Bosnia and Herzegovina (2012). State of the Environment Report Bosnia and Herzegovina 2012. Available from:
http://ba.one.un.org/content/dam/unct/bih/PDFs/BiH_Izvjestaj_o_stanju_okolisa_En.pdf: Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina.

Federal Ministry of Agriculture, Water Management and Forestry (2015). Information on forest management in 2015 and plans for management in 2016 in FB&H. Available from:
http://fmpvs.gov.ba/V_3/informacije-o-gospodarenju-sumama?p=0

Federal Ministry of Environment and Tourism (2008). First National Report of BiH to the Convention on Biological Diversity – Land of Diversity. Sarajevo.

The Sava River Basin Analysis Report (SRBAR), ISRBC, 2009.

Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

Water Framework Directive & Hydropower, Key Conclusions of the Common Implementation Strategy Workshop, Berlin, 4-5 June 2007.
EU WFD CIS Policy Paper on WFD and Hydro-morphological pressures, 2006.

Note of the Water Directors on Hydropower Development and the WFD, May2010.

Action Plan of the EU Strategy for the Danube Region, December 2010

3 Governance and Institutional Frameworks

Please indicate the current status of governance and institutional frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

3 Governance systems for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Institutional frameworks							
a.	Mechanisms (e.g. commissions, councils) for river basin management					X	
b.	Mechanisms for management of groundwater		X				
c.	Mechanisms for management of lakes		X				
d.	Mechanisms for cross-sector management of water resources		X				
e.	Mechanisms for transboundary water resources management					X	
f.	Decentralized structures for water resources management (other than above)					X	
II) Stakeholder participation							
a.	Stakeholder have access to information on national water resources management and development						X
b.	Public awareness campaigns on water resources management and development						X
c.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the national level						X
d.	Involvement of the private sector in water resources management and development at the national level					X	
e.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the basin level					X	
f.	Involvement of the private sector in water			X			

	resources management and development at the basin level						
g.	Gender mainstreaming in water resources management and development						X
III) Capacity building							
a.	Assessment of capacity needs in water resources management at national level			X			
b.	Assessment of capacity needs in water resources management at sub-national level			X			
c.	Programs for capacity needs in water resources management institutions/organizations at national level			X			
d.	Programs for capacity development in water resources management institutions/organizations at sub-national level			X			
e.	Programs for in-service training of staff/professionals in water resources management				X		
f.	Water resources management in the technical/higher education curriculum				X		
g.	Research programs in water resources management		X				

3.1 Issues

Please indicate any issues related to the topic “governance and institutional frameworks” in your nation and focus on documents, which are “not yet started”, “under development” or “developed but implementation not yet started”.

Schematic overview of levels of governance in Bosnia and Herzegovina http://www.dei.gov.ba/dei/dokumenti/uskladjivanje/default.aspx?id=13859&langTag=en-US

The Ministry of Foreign Trade and Economic Relations of BiH is in charge of carrying out activities and tasks within the competence of BiH related to the definition of policy, basic principles, coordination of activities and harmonization of plans of entity bodies and institutions on an international level in the fields of environmental protection, development and use of natural resources, and tourism. These activities are carried out in the Sector for Water Resources, Tourism and Environmental Protection, which consists of three sections: Department for Water Resources, Department for Tourism and Department for Environmental Protection.

The **Water Resources Department**, in accordance with its competencies, and domestic and EU legislation in this area, contributes, through regional and international cooperation, as well as cooperation with entity competent institutions, to better management and use of water resources in BiH and wider. All key activities of the Water Resources Department of the MoFTER BiH regarding

coordination, from the aspect of international assistance and cooperation in the field of water resources, are carried out in consultation with the competent entity ministries.

Bosnia and Herzegovina is a country rich in water resources. According to the World Bank (WB) data, BiH is the country with the largest amount of drinking water in the region, the seventh in Europe, and by water resources, it is richer than many countries in the world. Taking into account that the key commitment of BiH is to integrate into the European Union, the reform and priorities in the water sector are focused on the application of European legislation, that is, harmonization of domestic legislation with the European one. Bosnia and Herzegovina, as a potential candidate for EU membership, has taken, in whole or in part, all the key objectives of EU legislation on water management and incorporated them into their legal and strategic documents. The main challenges of water management are related to the proper implementation and implementation of the objectives of the Water Framework Directive, the Drinking Water Directive, the Urban Wastewater Treatment Directive and other Directives that allow integrated water resources management.

Bosnia and Herzegovina is a signatory country to several conventions and protocols in this area: the Convention on the Protection and Sustainable Use of the Danube River, the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the Framework Agreement on the Sava River Basin, with a number of related protocols. The Ministry of Foreign Trade and Economic Relations of BiH, or the Water Resources Department, is actively involved in the implementation of the mentioned Agreement, through participation in working groups, meetings and other working bodies, and it carries out their implementation activities in BiH.

The Water Resources Department participates in the implementation of a number of projects in the country as well as at the regional level, which contribute to the sustainable management of water resources in accordance with the EU and domestic legislation, and the provisions of international agreements and conventions. Through the implementation of these activities, the Department actively cooperates with the EU Delegation to BiH, the World Bank, UN agencies and other international and financial organizations and institutions.

State level - Bosnia and Herzegovina

On the level of Bosnia and Herzegovina, key institutions which are participating in processes important for water resources management are:

- Parliamentary Assembly of Bosnia and Herzegovina is the highest legislative authority in BiH which, among the others, decides on ratification of documents important for water sector;

- Presidency of Bosnia and Herzegovina which is, among the others, responsible for conducting foreign policy of Bosnia and Herzegovina as well as representing BiH in international and European organisations and institutions;

- Council of Ministers of Bosnia and Herzegovina which is, among the others, competent to, through its three ministries (Ministry of Foreign Affairs, Ministry of Foreign Trade and Economic Relations and Ministry of Communications and Transport) and Directorate for European Integrations coordinate the activities which BiH has to realize based on the international agreements/contracts related to water sector;

- Ministry of Foreign Affairs which is, among the others, responsible for enforcing the designated policy of BiH and development of international relations in accordance with views and guidelines of the Presidency of BiH;

- Ministry of Foreign Trade and Economic Relations which is, among the others, responsible for conducting activities and tasks under the competence of BiH which are related to defining of policies and general principles, coordination of activities and harmonisation of plans made by entity authorities and institutions on international level in the fields of environment protection, development and protection of nature resources;

- Ministry of Communication and Transport which is, among the others, responsible for international and inter-entity transport and infrastructure with particular emphasis on preparation of international contracts, agreements and other acts which are regulating the navigation on the Sava river;

- Directorate for European Integrations which is responsible to coordinate the integration process of Bosnia and Herzegovina into the European Union.

- Agency for Food Security of Bosnia and Herzegovina which is, among the others, responsible to secure quality of water intended for human consumption.

3.1.1. Federation of Bosnia and Herzegovina

In the Article 21 of Water Law of FBiH, it is stated that the water resources management is under the competence of Bosnia and Herzegovina, Federation of BiH, cantons, cities and municipalities. On the level of FBiH, key institutions which are participating in processes important for water resources management are:

- Parliament of Federation of BiH which is among the others, responsible for enactment of the Law on Water and Water Management Strategy of FBiH;

- President of Federation of BiH who is, among the others, responsible for signing the decisions of Parliament of FBiH after the enactment of it, as well as for signing and ratification of international agreements;

- Government of Federation of BiH which is, among the others, responsible for conducting policies and enforcement of the Federal Government laws, proposing and giving recommendations in the field of legislation as well as for preparation of budget proposals to the Parliament of F BiH and adopting of river basin district management plans and directing it to the Council of Ministers for adoption at the the level of BiH;

- Ministry of Agriculture, Water Management and Forestry which is, among the others, responsible for administrative, professional and other activities specified by laws related to the responsibilities of Federation in the field of water management;

- Ministry of Tourism and Environment which is, among the others, responsible for administrative, professional and other tasks specified by laws related to the responsibilities of Federation in the field of protection, preservation and improvement of the environment;

- Ministry of Health which is, among the others, responsible for administrative, professional and other tasks specified by laws related to the responsibilities of Federation in the field of sanitary safety of water intended for human consumption;

- Administration for Inspection Issues – which is, among the others, responsible for executing inspection of water resources use;

- Agency for Watershed of Sava river and Agency for Watershed of Adriatic Sea which are, among the others, responsible for conduction of water management activities which are specified and placed under their competences by Law on Water of FBiH and regulations enacted based on that law, including the preparation of management plans and programs of measures for watersheds under their competences;

- Fund for Environmental Protection FBiH which is, among the others, competent for collection and distribution of financial resources for environment protection in the territory of Federation;

- Cantonal legislative and executive authorities which are, among the others, competent for water management activities prescribed by the Law on Water and cantonal regulations, providing of public water supply as well as wastewater collection and treatment in the area of cantons.

- City/Municipal legislative and executive authorities which are, among the others, competent water management activities prescribed by the law on Water and city/municipal regulations, providing public water supply as well as collection and treatment of wastewater in the area of cities/municipalities.

3.1.2. Republic of Srpska

In the Article 21 of Water Law of Republic of Srpska, it is stated that Republic of Srpska is responsible for water management in Republic of Srpska in the manner defined by that Law as well as to perform all obligations which Bosnia and Herzegovina has as international legal subject. On the level of Republic of Srpska, key institutions which are participating in processes important for water resources management are:

- National Assembly of Republic of Srpska which is, among the others, competent for enacting the Laws on waters, strategies for water management, spatial plan and the budget;

- President of Republic of Srpska who is, among the others, competent for declaration of Laws and other general acts enacted by the National Assembly;

- Government of Republic of Srpska which is, among the others, competent for conducting policies and enforcement of the laws, proposing and giving recommendations in the field of legislation, proposing the strategy for water management as well as for adopting of river basin district management plans;

- Ministry of Agriculture, Forestry and Water Management which is, among the others, competent for administrative, professional and other tasks specified by laws related to the competences of Republic of Srpska in the field of water management;

- Ministry of Spatial Planning, Civil Engineering and Ecology of RS which is, among the others, competent for administrative, professional and other tasks specified by laws related to the competences of Republic of Srpska in the field of protection, preservation and improvement of the environment;

- Ministry of Health and Social Protection which is, among the others, competent for administrative, professional and other tasks specified by laws related to the competences of Republic of Srpska in the field of sanitary safety of water intended for human consumption;

- Republic Administration for Inspection Issues – which is, among the others, competent for executing of inspection of water resources use;

- Agency for Sava river basin district and Agency for Trebisnjica river basin district which are, among the others, responsible for conduction of water management activities which are specified and placed under their competences by the Law on Water of RS and regulations enacted based on that law;

- Fund for Environment Protection of Republic of Srpska which is, among the others, competent for collection and distribution of financial resources for environment protection in the territory of Republic of Srpska;

- City/Municipal legislative authorities which are, among the others, competent for providing public water supply as well as collection and treatment of wastewater in the area of cities/municipalities.

3.2 References

Please provide a reference list dealing with the topic of "governance and institutional frameworks" in your country.

See 3.1.

4 Management Instruments

Please indicate the current status of management instruments for the development, management and use of water resources in your country, by checking one of the six columns for each line.

4 Management instruments for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Water resources development							
a.	Basin studies for long-term development and management of water resources			X			
b.	Periodical assessment of water resources			X			
c.	Regulatory norms and guidelines for sustainable development of water resources		X				
d.	Programs to value water-related or dependent ecosystem services	X					
II) Water resources management programs							
a.	Groundwater management program		X				
b.	Surface management program				X		
c.	Linked ground and surface water management program				X		
d.	Programs for efficient allocation of water resources among competing uses	X					
e.	Land/natural resources management programs that include water resources management components	X					
f.	Programs for allocating water resources that include environmental considerations	X					
g.	Demand management measures to improve water use efficiency in all sectors	X					
h.	Program for re-use or recycling of water	X					
i.	Programs to evaluate environmental impacts of water projects	X					
j.	Programs to address water-related disasters (e.g. floods and droughts)		X				
k.	Programs to address climate change			X			

	adaptation through water resources management						
l.	Cooperative programs managing transboundary water resources					X	
m	Programs to reverse environmental/ecosystem degradation	X					
III) Monitoring and information management							
a.	Government responsibility for hydro-meteorological monitoring adequately addressed in national legislation						
b.	Monitoring of surface water quantity					X	
c.	Monitoring of ground water quantity				X		
d.	Monitoring of water quality					X	
e.	Monitoring of aquatic ecosystems				X		
f.	Monitoring of water use				X		
g.	Monitoring of water use efficiency	X					
h.	Water resources information system					X	
i.	Forecasting and early warning systems				X		
IV) Knowledge Sharing							
a.	Programs for information exchange and knowledge sharing of good practices	X					
b.	Programs for providing advisory (extension) services on water management issues to end users	X					
c.	Programs for transferring improved and cost effective water saving technologies	X					
d.	Mechanisms for exchanging information between countries		X				
V) Financing of water resources management							
a.	Cost recovery mechanisms/progressive staff structures for all water uses	X					
b.	Subsidies for promoting water efficiency	X					
c.	Charges for water resources management (e.g. pollution charges)	X					

4.1 Issues

Please indicate any issues related to the current status of "management instruments" in your nation and focus on topics, which are "not yet started", "under development" or "developed but implementation not yet started".

Water Quality. Water resources in Bosnia and Herzegovina are sufficient to fulfil drinking water demands, but microbiological hazards are a health concern. Chlorination is the standard disinfection method in Bosnia and Herzegovina. However, 21 per cent of drinking water samples failed microbiological tests.
Most anthropogenic pressures on water are caused by urban zones without sewerage and wastewater treatment plants (WWTPs) or uncontrolled leachates from solid waste sites without proper treatment. It is evident that groundwater vulnerability is boosted by the prevalence of Bosnia and Herzegovina's karst geology.
The main environmental pressures on surface waters derive from urban and rural agglomerations, industrial facilities, livestock and poultry farms and fish farms. Diffuse sources of pollution in Bosnia and Herzegovina result from uncontrolled animal manure, the leaching of silage and solid waste dumping sites, and fertilizer surplus.

Currently, surface water quantity monitoring is performed at 134 hydrological stations in Bosnia and Herzegovina, most of which (around 90 per cent) are automatic. Furthermore, the Sava River Watershed Agency has an online water monitoring service with forecasting and early warning, based on online data acquisition and numerical simulation.
Information on ecological quality based on monitoring and risk assessment procedures following the EU Water Framework Directive (WFD) shows that good water status was not achieved in large parts of Bosnia and Herzegovina; indeed, more than half of these water bodies present a status lower than good. The main problems are organic matter concentration and microbiological levels due to untreated municipal loads. Nutrients are also a problem.

Water resources monitoring is under the competence of three river basin authorities: the Sava River Watershed Agency and Adriatic Sea Watershed Agency of the Federation of Bosnia and Herzegovina and "Vode Srpske" in Republika Srpska. These water agencies exchange data with the Hydrometeorology Institute of the Federation of Bosnia and Herzegovina and Hydrometeorology Service of Republika Srpska.

4.2 References

Water Management Strategy of the Federation of Bosnia and Herzegovina 2010-2022
https://fmpvs.gov.ba/strategija-voda/

Water Management Strategy of the Republic of Srpska 2010-2022, http://www.voders.org/wp-content/uploads/2017/12/Стратегија-интегралног-управљања-водама-2015-2024.pdf

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5 Infrastructure Development and Financing

Please indicate the current status of investment plans and mobilized financing for infrastructure for the development, management and use of water resources in your country, by checking one of the six columns for each line.

5 Infrastructure development for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Investment plans and programs							
a.	Water resources included in national infrastructure investment plans		X				
b.	Irrigation		X				
c.	Energy/hydropower			X			
d.	Groundwater (e.g. boreholes, pumps and treatment)			X			
e.	Flood management			X			
f.	Water supply (domestic and industrial)			X			
g.	Wastewater treatment			X			
h.	Desalination of seawater	X					
i.	Rainwater harvesting	X					
j.	Natural systems (e.g. wetlands, floodplains and catchment restoration)	X					
II) Mobilizing financing for water resources infrastructure							
a.	Financing for water resources included in national investment plans		X				
b.	Financing for irrigation		X				
c.	Financing for energy/hydropower	X					
d.	Financing for groundwater (e.g. boreholes, pumps and treatment)	X					
e.	Financing for flood management		X				
f.	Financing for water supply (domestic and industrial)		X				
g.	Financing for wastewater treatment		X				
h.	Financing for desalination of seawater	X					

i.	Financing for rainwater harvesting	X					
j.	Financing for natural systems (e.g. wetlands, floodplains and catchment restoration)	X					

5.1 Issues

Please indicate any issues related to the current status of investment plans and mobilized financing for infrastructure in your nation and focus on topics, which are “not yet started”, “under development” or “developed but implementation not yet started”.

5.2 References

Please provide a reference list dealing with current investment plans in your country.

6 Sources of Financing for the Development of Water Resources

Please indicate sources of financing as well as financing trends over the last 20 years for the development of water resources in your country, by checking one or more appropriate columns for each line.

6 Sources of financing for the development of water resources		Data not available or not recorded	Not funding allocations made	Declining trend over last 20 years	Increasing trend over last 20 years	Highly variable and no clear trends
a.	Government budget allocation (as % of GDP) for water resources development	X				
b.	Grants and loans from aid agencies for water resources development					X
c.	Investments from International Financing Institutions (e.g. World Bank) for water resources development					X
d.	Investments from private sources (e.g. banks and private operators, non-profit) for water resources development	X				
e.	Revenues (e.g. from water use charges/tariffs) used for water resources development				X	
f.	Payments for ecosystem services and related benefit/cost transfer schemes	X				

6.1 Issues

Please indicate any issues related to sources of financing for the development of water resources.

Financing of the water sector of BiH

Financing of the water sector in BiH is defined by entity Laws on Waters. In accordance with these laws, basic revenues in the water sector are provided from the following sources:

FBiH	RS
• General water fees; • Special water fees; • Budgets of FBiH, cantons, cities and municipalities; • Credits/Loans; • Funds provided by special law; • Donations and other funds in accordance with applicable laws.	• Special water fees; • Revenues generated by lease of public property; • Revenues from general part of budget of Republic of Srpska; • Donations and other funds in accordance with applicable laws.

General water fees are applied only in FBiH in the amount of 0.5% of netto salary of every employee.

Special water fees are applied in both entities on the basis of:

- Water abstraction (for public water supply, for bottling of (non)mineral waters, for irrigation, for fish-farming, for industrial processes (including thermal power plants as well as for other purposes);
- Water protection (fees from owners of transport vehicles which are using oil or oil products, fees for discharging of wastewater on the basis of PE, fees for fish-farming, fees for using fertilizers and chemicals for plant protection);
- Extraction of materials (mostly sand and gravel) from watercourses;

In both entities also exists legal basis for realization of special fee based on protection from water (fees from owners of agricultural, forest or construction land as well as fees from owners of housing, business and other buildings which are protected by structures for protection from water) but currently it is not enforced.

Amount of fees is determined by entity Governments whereby the total collected funds are distributed among competent institutions according to the legally designated percentages presented in following table:

FBiH	Collected funds are distributed on the following basis: • 40% competent water agency; • 45% competent cantons; • 15% Fund for Environment Protection FBiH.
RS	Special water fees are distributed on the following basis: • 70% to budget of RS for special water purposes; • 30% to local administration units for special water purposes;
RS	Water fees paid by owners of transport vehicles which are using oil and oil products, fees for discharging on the basis of PE and fees paid by fish farmers are

distributed on the following basis:

- 55% to budget of RS for special water purposes;
- 30% to local administration units for special water purposes;
- 15% Fund for Environmental Protection RS.

Potential sources of financing

In order to provide implementation of EU Directives in BiH, it is planned to ensure necessary financial resources from three key sources:

- EU funds and international donations;
- Local sources of financing;
- Credits/Loans provided by foreign banks and international financial institutions (IFI).

Regarding local assets it was planned that it will be provided through:

- through water fees;
- through special (dedicated/earmarked) fees realized based on other laws (e.g. "Law on Environment Protection ")
- through revenues of WS companies realized by increased prices of services;
- from specially dedicated funds of entity, cantonal and municipal budgets;
- from the assets of public loans;
- based on special (dedicated) taxes;
- based on "Law on Concessions";

By analyses are not included possibilities to provide assets based on the participation of private sector since current regional trends have confirmed that in neighbouring countries the privatization will not have "more significant role" in water sector during next few years. Of course, if this trend changes, it will have to be adequately valorised.

Based on official data in FBiH, based on the existing water fees is collected annually about 38.5 million KM. Currently, 18 million KM is collected based on existing water fees in RS while about 50.000 KM is collected in District Brčko. Based on these data it can be concluded that by 2035 based on existing water fees in BiH really can be collected about 1.4 billion KM. Therefore, competent institutions will have to provide additional 8.6 billion KM from other funding sources.

In all analyses of ways to provide missing funds, it is identified that BiH can achieve fulfilment of its obligations on the basis of EU water sector legislation only by intense use of EU (accession) funds.

It is clear that all costs for construction and costs for maintenance of infrastructural system in water sector will not be covered by the resources from EU funds and loans from International Financial Institutions. Currently, average price in BiH for water supply, wastewater collection and is 1.0 KM/m3. Based on statistical data in 2007, when average income per household was 525.00 KM, it is estimated that average household in BiH is spending about 4.00 KM/month or 0.8 % of its average income on subjected water services. In EU countries, these costs are 4-5% of total income of average household. Therefore, it is imposed as unavoidable to increase prices for subjected services for 2-3 times in order to provide application of “cost recovery” principle for water services. Here presented values have proximate character and correct values will be estimated within feasibility study for each agglomeration separately. However, it is necessary to emphasize that significant increase of tariffs for

these services is key change which has to be introduced as soon as possible and especially in situations when competent authorities require from Water and Sanitation companies to be carriers of loan commitments.

6.2 References

Please provide a reference list dealing with current sources of financing in your country.

1. Council of Ministers of BiH and Directorate for economic planning, 2010. Strategy for Development of Bosnia and Herzegovina – Proposal
2. Law on Waters FBiH, 2006.
3. Law on Waters RS, 2006.
4. EU Water Policy: http://ec.europa.eu/environment/water/index_en.htm
5. Ministry of agriculture, water management and forestry FBiH, 2010. Strategy for water management in Federation of BiH 2010 – 2022 – Proposal.
6. Ministry of agriculture, forestry and water management RS and Republic directorate for waters, 2006. Framework plan for development of water management in Republic of Srpska
7. Ministry of agriculture, forestry and water management RS, 2007. Action Plan for realisation of framework plan for development of water management of Republic of Srpska – Planning period 2007 – 2016.
8. Public Water Management Company "Vodoprivreda Bosne i Hercegovine" and Institute for Water Management Sarajevo, 1994. Framework background for Water Management in Bosnia and Herzegovina.
9. Ministry of Tourism and Environment FBiH, 2008. Strategy for protection of environment in Federation of BiH 2008-2018.

7 Outcomes and Impacts

Please indicate to what extent improved water resources management has impacted economic, social, environmental and overall national objectives in the past 20 years in your country, by checking the appropriate columns for each line.

7 Improved Water Resources Management		Economic* development objectives impact in past 20 years	Social** development objectives impact in past 20 years	Environmental*** objectives impact in past 20 years	Overall national development impact in past 20 years
		1-5 low to high	1-5 low to high	1-5 low to high	1-5 low to high
a.	Improved policy, strategic planning and legal frameworks	2	2	3	2
b.	Improved governance and institutional frameworks	2	2	3	3
c.	Improved management instruments	2	2	2	2
d.	Improved infrastructure development	2	3	3	3

*Economic development objectives relating to economic growth, wealth, management of monetary assets, and economic sector development.

**Social development objectives relating to human development, gender considerations, such as poverty alleviation, health, education, and job creation.

***Environmental objectives relating to the conservation and sustainable use of natural resources, such as water, pollution control, nature, agricultural land, forest, and fisheries.

7.1 Key outcomes and impacts from water resources management measures

I) List the outcomes and key results achieved as a result of implementing integrated approaches to the development, management and use of water resources.

Existing problems in the water sector of BiH are not unique.

II) Briefly list the constraints or obstacles that your country has experienced in implementing integrated approaches to water resources management.

Coordination and cooperation in the planning and implementation of program is unsatisfactory.

Water sector is divided into administrative boundaries not at the country or river catchment basin level.

Alls parts of BH has its own water legislation

- water losses in water supply networks are large, because the networks are poorly maintained,

- water protection is the weakest part of the water management systems,

7.2 References

Strategija integralnog upravljanja vodama REpublike Srpske 2015–2024, (2014), Vlada RS, Banja Luka, BiH

Strategija upravljanja vodama FBiH 2010-2022. (2011) Zavod za vodoprivredu d.d. Sarajevo i Zavod za vodoprivredu d.d. Mostar

8 Priority challenges

What are the priority water resources challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8A Priority water resources challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Water uses						
a.	Water for agriculture			x		
b.	Water for domestic use				x	
c.	Water for industry			x		
d.	Water for energy			x		
e.	Water for ecosystems/environment		x			
f.	Water for growing cities	x				
II) Threats to the resource						
a.	Floods					x
b.	Droughts			x		
c.	Water scarcity (surface water)			x		
d.	Water scarcity (groundwater)				X	
e.	Water quality (surface water)				x	
f.	Water quality (groundwater)			x		

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Water uses						
a.	Water for agriculture		x			
b.	Water for domestic use				x	
c.	Water for industry		x			
d.	Water for energy		x			
e.	Water for ecosystems/environment		x			
f.	Water for growing cities	x				
II) Threats to the resource						
a.	Floods					x
b.	Droughts			x		
c.	Water scarcity (surface water)					
d.	Water scarcity (groundwater)					
e.	Water quality (surface water)					
f.	Water quality (groundwater)					

What are the priority water management challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8C Priority water management challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Levels of management						
a.	Institutional capacity at national level				X	
b.	Institutional capacity at sub-national level					X
c.	Transboundary capacity at international level		X			
d.	Transboundary capacity at			X		

	national/sub-national level					
e.	Management through private enterprise		X			
f.	Stakeholder participation				X	
g.	Coordination between levels and types of management					X
II) Management between sectors						
a.	Coordination between sectors at national level			X		
b.	Coordination between sectors at sub-national level					X
III) Other governance issues						
a.	Legislation					X
b.	Infrastructure development					X
c.	Financing of water resources management					X
d.	Financing of infrastructure					X
IV) Managing resource information						
a.	Monitoring the resource				X	
b.	Knowledge sharing			X		
V) Specific types of management						
a.	Disaster management				X	
b.	Climate change adaption management				X	
c.	Water use efficiency management				X	

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Level of management						
a.	Institutional capacity at national level	X				

b.	Institutional capacity at sub-national level				X	
c.	Transboundary capacity at international level				X	
d.	Transboundary capacity at national/sub-national level				X	
e.	Management through private enterprise				X	
f.	Stakeholder participation				X	
g.	Coordination between levels and types of management				X	
II) Management between sectors						
a.	Coordination between sectors at national level		X			
b.	Coordination between sectors at sub-national level		X			
III) Other governance issues						
a.	Legislation				X	
b.	Infrastructure development				X	
c.	Financing of water resources management				X	
d.	Financing of infrastructure		X			
IV) Managing resource information						
a.	Monitoring the resource				x	
b.	Knowledge sharing					
V) Specific types of management						
a.	Disaster management			x		
b.	Climate change adaption management				x	
c.	Water use efficiency management			x		

8.1 Issues

Please indicate any issues related to priority challenges in the field of water resource management.

WATER USE: Approximately 82 per cent of the water abstraction in Bosnia and Herzegovina is for domestic use, 16 per cent is for industry and the remainder for agriculture and other applications. These figures are not the traditional pattern in EU countries and reveal the underdevelopment of industry and irrigated agriculture in Bosnia and Herzegovina.
The accomplishment of the two strategic objectives in this area: (i) Increase in coverage and improvement of public water supply systems, and (ii) Ensuring conditions for sustainable use of water in the areas whose development depends on market interest.

Independent from potential future changes in water sector, it has to be emphasized that here planned goals and general measures can be implemented also within the existing administrative-institutional setup if following activities are realised within short period of time:

- more precisely defined and provided more efficient coordination role of MOFTER, as well as obligations of other competent authorities in order to fulfil international obligations of BiH related to water sector;

- provide additional employment of expert personnel in institutions competent for water resources management so that the number of employees in water sector compared to total population in percentage is approximated to the situation in less-developed EU countries;

- that the number of employed in WS companies is harmonised step-by-step with European standards on number of employees in similar companies. In the same time, it is necessary to elaborate in detail and implement the measures of social policy for all released employees;

- provide that all ministries competent for water management have the key role in forming minimal tariffs for public water supply, collecting and treatment of wastewater, all that with a goal to fulfil the obligations based on complementary EU Directives which BiH has to implement in the process of accession to EU

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ANNEX II –
KOSOVO* - GUIDELINE FOR IDENTIFICATION OF WB REGIONAL ISSUES RELATED TO WRM

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Contents

1 Introduction

1.1 Geography of Kosovo*

Kosovo and Metohija is autonomous provinces of Serbia under the interim UN administration in accordance with the United Nations Security Council Resolution 1244/99, in further as Kosovo*. Kosovo* is located in South-East Europe and is characterized by its central position in the Balkan Peninsula. It is surrounded by: Albania (length of the border - 112 km), Macedonia (161 km), Serbia (352 km) and Montenegro (77 km). It is located in the northern geographic hemisphere with width ranging from 41° 50' 58'' to 43° 15' 42'', and eastern geographic height ranging from 20° 01’ 02'' to 21° 48’ 02’’.

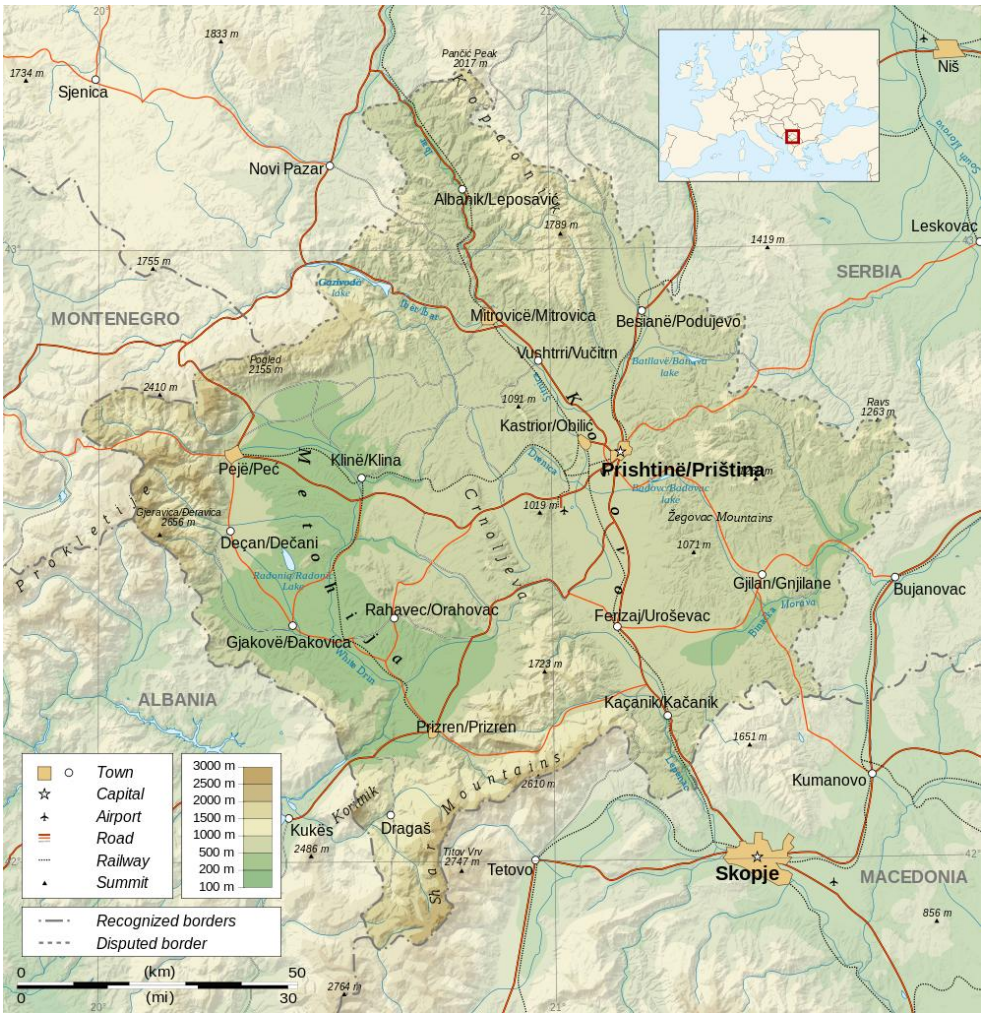

Figure 1. – Physical map of Kosovo* [https://en.wikipedia.org/wiki/File:Kosovo_map-en1.svg]

Kosovo* has a surface of 10,907 km², and has a population of 1.74 million inhabitants (according to population census data conducted in April 2011, Kosovo* has in total 1,739,825 residents,

excluding municipalities: Leposavić, Zubin Potok, Zvečan and Mitrovica North), and represents a territory that is densely populated (160 inhabitants per km²).

Kosovo* is surrounded by high mountains, with some mountain peaks exceeding 2,000 m above sea level (highest peak - Đeravica 2,656m), which have different geological compositions, and has two great plains in the middle, Metohija and Kosovo.

The mountains do not isolate Kosovo* from other areas because rivers have cut very deep river beds on four sides, overcoming these natural barriers, and making a bridge out of Kosovo* in the depths of the Balkan Peninsula and seas around it. Kosovo* is the hydrographic key, with water flowing from it towards the Adriatic, the Black Sea and Aegean Sea.

Kosovo*, with its geographic elements is an individualized and specific area. Important roads linking Central Europe with the coast along the Mediterranean go through its territory. As such, it has an important strategic position in this part of Europe.

Kosovo's* good geographic position is further enhanced by variety of natural elements: geological composition, landscape, climate, hydrography, vegetation, types of land, as well as underground resources that provide a good basis for economic development. With elements of its natural landscape, it displays its own unique identity. Nearly all categories of landscape, in different varieties and climatic differences, are developed within this limited territorial unit. Changes within the natural elements have been manifested in types of land and natural vegetation, making it a unique area and landscape. Kosovo* is noted for many natural resources that have made it renowned, not only within the Balkan Peninsula, but farther also.

Agriculture is the main economic activity, with great agrarian density, insufficient mechanisms and an inappropriate structure for cultivating different products, etc.

Agricultural land makes up 53 % of the territory and forests make up 39.1 % of the territory, whereby approximately half (52.3 %) of the land is arable, while one third (31 %) are pastures (UNDP). Industry is in transition. Such economic traits have resulted with the domination of rural population over the urban one.

The territory of Kosovo* is placed between the lowest points above sea level at 265 m – in Vrbnica, where the Beli Drim river runs and the highest point above sea level 2,656 m – the Đeravica mountain peak, among the Prokletije (Damned Mountains).

The landscape in Kosovo* is characterized with: high mountains (Prokletije, Šar planina, Kopaonik and Central Mountains) and low plains (Metohija Plain and Kosovo Polje Plain) with several river valleys. The whole surface of Kosovo* divided based on its correlation with the sea level is depicted as follows: more than 17% of the surface is located at e height lower than 500 m above sea level. The greatest portion of the territory (63.4%) of Kosovo* is located at e height ranging from 500 to 1,000 m above sea level, while only 17% of the territory is located at a height ranging from 1,000 to 2,000 m above sea level. The highest areas within Kosovo* are located at a height of over 2,000 m above sea level and comprise about 2.3% of the total surface and include the highest peak – Đeravica peak, located at an altitude of 2,656 m above sea level.

Kosovo* is located in middle latitude belt of northern geographical and medium characterized by continental climate. Amplitude -20C º in winter to +38 º C in summer and annual average rainfall of 700 mm.

1.2 Water resources in Kosovo*

Water resources in Kosovo* can be divided into surface, underground and thermal water. Surface water resources are significant on the territory of Kosovo* (Figure 2). All rivers in Kosovo* can be divided into drainage basins of three seas: Black Sea (the largest area – 5500 km^2) or 51% of the Kosovo* territory, Adriatic Sea (4.500 km^2) or 43%, and Aegean Sea (900 km^2) or just 6%.

On the mountain of Crnoljevo there is a hydrographic knot where there is a diversion between the basins of the Black, the Adriatic and the Aegean seas.

From the highest point of Crnoljevo (Drmanska glava 1367 m) the Topluga river goes west in to the Beli Drim and onwards to the Adriatic Sea. To the north, Crnoljeva river descends, which through Sitnica and Ibar goes to the Black Sea. To the south flows Nerodimka, tributary to Lepenac, which through Vardar sends water to the Aegean Sea.

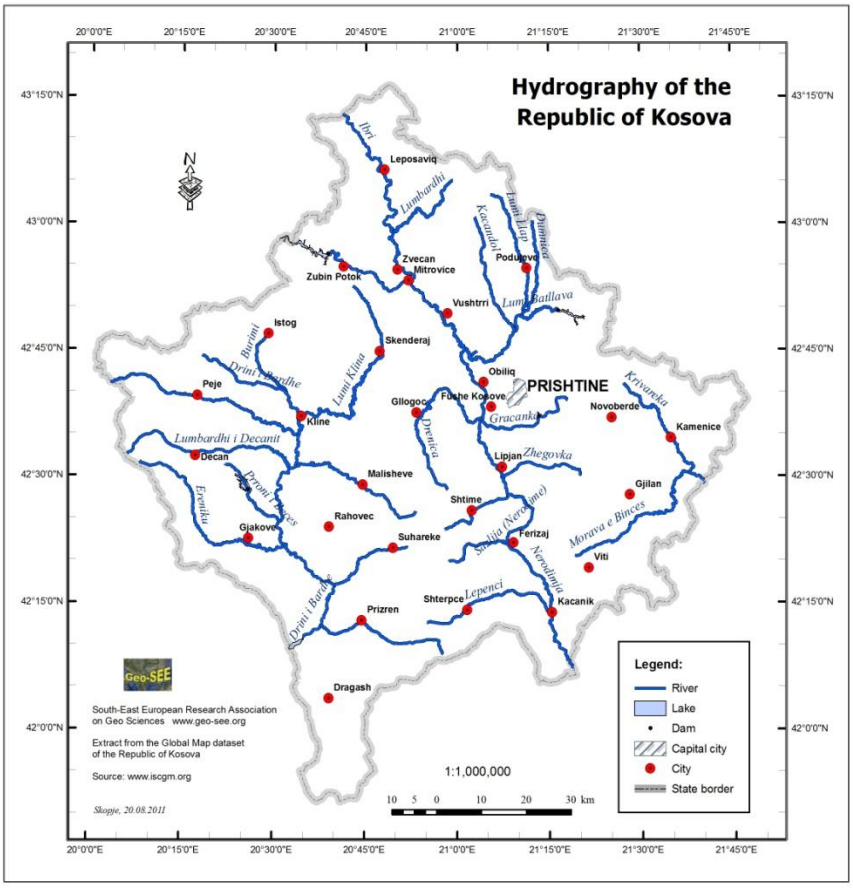

Figure 2. – Hydrographic map of Kosovo*
[http://geo-see.org/?p=1]

Natural lakes in this region exist in the form of karst lakes that were created by karst erosion. The most famous is Lake Sava on Prokletije. There are 12 Glacial Lakes on mount Šar, and the most famous are: Šutmansko (2070m n. V.), Golemo (2400m n. V.) And Livadičko. In the vicinity of Ljuboten there is the Livadačko Lake. It is located at an altitude of 2173 m, and although it does not have a large surface (about 21000 m²), it is the deepest glacial lake in Kosovo*.

The largest artificial lakes are located on the periphery of the Kosovo Basin, and are made primarily for irrigation. The lake of Batlava, is located on the river Lab. It is used for the water supply of Kosovska Mitrovica and Priština, as well as hydroelectric power station. Lake Gazivode, formed by the damming of the Ibar river in the upper stream, is 24 km long, and the height of the dam is 107 m. The dam is built of natural materials, and as such is one of the largest in Europe. The main purpose of Gazivode Lake is irrigation of the Kosovo* lowland, supply of drinking water to the Kosovska Mitrovica district, but also has a small hydroelectric power plant located in Zubin Potok. In addition to these two there are also Gračanica Lake and Opoljsko Lake.

In Kosovo*, mineral and thermal mineral waters are present, such as: mineral water in Klokot, on Ilidža in Miliševo, on Velekinci, on Miraš, Banjska and some other sources. Currently, their capacities are very small.

• In Klokot near Gnjilane there are spa, as well as several thermomineral springs, which are considered very medicinal.

• Ilidža near the city of Peć is located at an altitude of 499 m. The water contains sulfur, with a temperature of about 56 ° C and contains alkaline-earth gases. It is known for the treatment of rheumatism and skin diseases. The most visited is from May to October.

1.2.1 Water resources in Kosovo* – current situation

Water resource management and preserving water resources are of vital importance for every society because of its invaluable importance for the survival of all living beings but also as an important factor for sustainable socio - economic development. So far, Kosovo* does not meet the necessary requirements when it comes to unlimited water supply, collection and treatment of waste water, irrigation, flood and erosion management, and river and groundwater pollution contribute to increasing environmental degradation and degradation of the quality of life of citizens.

Water resources of Kosovo* include surface water and groundwater, and sources of water. Drinking water is mainly provided by the surface water (Figure 3.). Regarding the rivers, the hydrography of water flows of Kosovo* is split into five river basins: Beli Drim (Adriatic Sea basin), Ibar (Black Sea basin), Lepenac (Aegean Sea), Binačka Morava (Black Sea basin), Plava River (Adriatic Sea). There are a small number of natural lakes, and six artificial accumulation sites meet the water demand, not only for drinking, but for industrial and agricultural needs as well. As for the amount of water accumulated, the largest lake is the Gazivode Lake, formed by the damming of the Ibar River in the municipality of Zubin Potok, with the volume of 390 million m^3 of water. The Gazivode Dam is one of the largest dams in Europe with a length of 460 m and a height of 107 m. Water from this lake is conducted through canals to Priština, where it is used for water supply, as well as cooling of turbines of thermal power station in Obilić. Beside Gazivode Lake, the main artificial accumulations in Kosovo* are Batllava Lake, Badovac Lake, Livoč Lake, Radonić Lake, Prelepnica Lake. The quality monitoring system of surface water exists, but it is necessary to modernize it.

The main reserves of groundwater are limited and located in the western part of Kosovo*, where reserves of surface water are also greater compared to the eastern and southeastern parts. According to the recommendations of the European Commission in Kosovo* Progress Report for 2016, work needs to begin on identifying groundwater resources and establishing the groundwater monitoring system. Therefore, in order to ensure progress in the supply of high quality water for all citizens in Kosovo*, more efforts are necessary.

The main hydrological problem in Kosovo* is inadequate and unequal distribution of water resources. Equal and unlimited water supply in urban and rural areas in Kosovo* remains to be a problem for which the authorities have not found solution. Currently, 81.2% of Kosovo`s* population is supplied with drinking water from functional water supply systems. While urban population has 100% coverage with public water supply systems, the percentage of rural population coverage is at 69.7%14. In the rural areas population has no access to the public water supply system or they have non-operational public water supply systems. In addition, access to sewage system is also a problem, especially in rural areas. As much as 65% of the total population lives in settlements with a sewage system, whereas only 42% of the rural population has access to a sewage system.

The central public company "Ibar - Lepenac" operates in Kosovo*, with the infrastructure in seven municipalities: Zubin Potok, Mitrovica, Vučitrn, Obilić, Priština, Kosovo Polje and Glogovac. This multifunctional enterprise supplies water to several regional water supply systems in Kosovo*, supplies water for irrigation of agricultural land and industrial systems (Trepča, Kosovo B, A and Kosovo Feronikl), and produces electricity. During the period 2002-2006, seven regional companies were established for water supply and sewage system, and two regional irrigation companies:

1. Regional Water Company "Priština", Priština
2. Regional Water Company "Hidroregjioni Jugor" Prizren
3. Regional Water Company "Hidrodrini", Peć
4. Regional Water Company "Mitrovica", Kosovska Mitrovica
5. Regional Water Company "Radonić", Đakovica
6. Regional Water Company "Hidromorava", Gnjilane
7. Regional Water Company "Bifurkacioni", Urosševac

Water treatment plant in Orlovici, Priština was established in March, 2017, as a part of Regional Water Company Priština. This factory will supply Priština municipality with water, but also six municipalities connected with this regional water supply. Funds for this project come from IPA fund in the amount of EUR 5 million, the municipality of Pristina – EUR 5 million, Government of Kosovo* – EUR 5 million, and a loan from the German Development Bank in the amount of EUR 20 million.

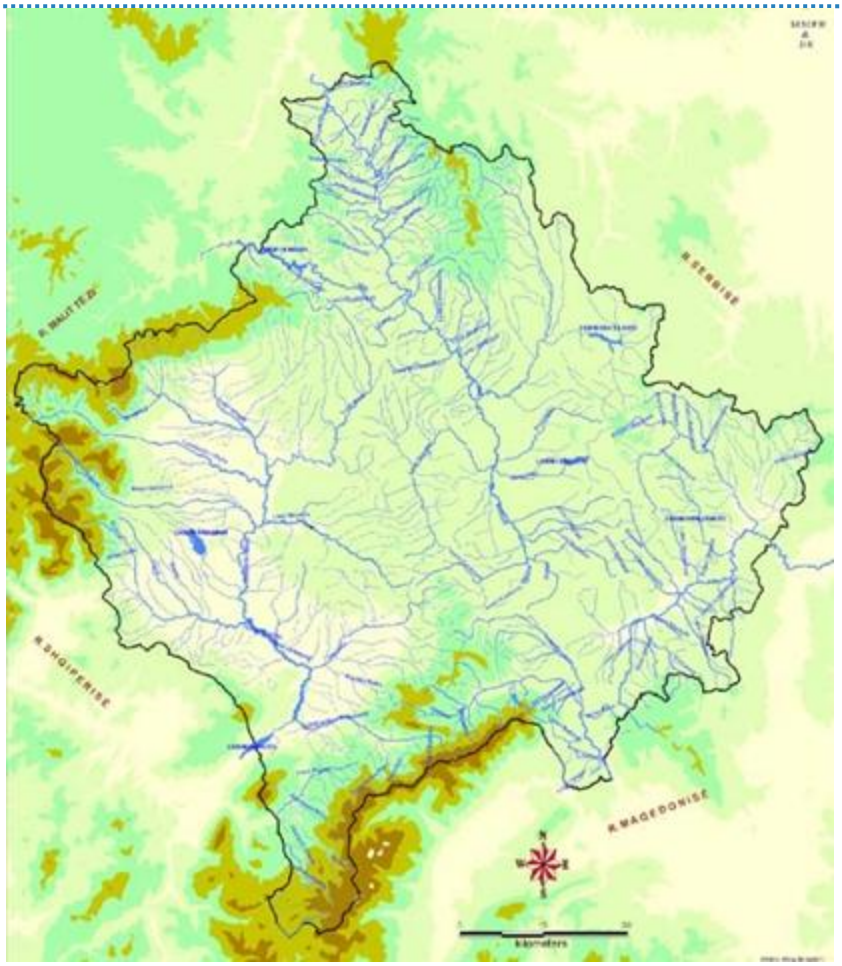

Figure 3. – Surface water bodies in Kosovo* (https://www.ammk-rks.net/repository/docs/raporti_ujerave_2010-angl.pdf)

Besides regional water supply companies, there are two regional companies for irrigation:

1. Regional Irrigation Company Beli Drim
2. Regional Irrigation Company Radonjić-Metohija

The irrigation systems in Kosovo* are facing the problem of aging infrastructure and declining revenues to maintain and repair irrigation structures. The overall revenues collected from irrigation business can neither cover the operational and maintenance costs nor the capital investment costs. The other serious problem the irrigation companies are facing is the large number of small illegal irrigation systems. These systems have been built upon the initiative of an individual or a group of local farmers.

Public company "Vodovod Ibar" in Mitrovica North is responsible for water supply in the municipalities of Mitrovica North and Zvečan. These two municipalities are supplied with water by the Regional Water Company "Mitrovica" through water factory which is located in Šipolje (Municipality of South Mitrovica). Municipalities Zubin Potok and Leposavić have their own water supply systems; Public Utility Company "Ibar" in Zubin Potok and Public Utility Company "24 Novembar" Leposavić. Water treatment plant was set up in Leposavić, with the help of donors, but it does not work.

In order to solve the problem of water supply, municipalities Zubin Potok, Zvečan and North Mitrovica raised a loan for the construction of the regional water supply system which would supply these municipalities with drinking water from the Gazivode Lake. Overall value of the project is over EUR 10 million. Within the framework of the project, regional water supply company was established, which will manage this system in the future.

The existing infrastructure for water supply in Kosovo* is insufficient to meet the needs for drinking water, and water for household maintenance. Furthermore, the state of the infrastructure is bad and affects the efficiency of water supply. Water pipes are obsolete, leading to water leakage and hence to lower efficiency and a higher risk of contamination. Some of the pipes are replaced, as a result of donor investments.

Generally, there is no wastewater treatment in Kosovo*. Wastewater is usually discharged directly into rivers and it is one of the main surface water pollutants. The only wastewater treatment plant is located in Srbica and it is not functional due to technical and financial problems. Wastewater treatment plant does not exist in North Kosovo, so sewage flows directly into the Ibar River. As a result of the feasibility studies for wastewater it is estimated that the total cost for the construction of facilities for the entire Kosovo* will be EUR 517 million. Public service coverage of wastewater collection provided by regional water companies in 2013 was 60%, which marked an increase of 4% compared to 2012.

Flood Risk Management Planning in Kosovo* is a process that is at the very beginning. Properly defined plans for flood risk management do not exist, and it is necessary to develop and define measures for the reduction and mitigation of risk. Preliminary assessments for flood risk are not conducted, although a few small projects are implemented. For some individual river basins there are flood risk management planning but there is no unique methodology that could be applied to all river basins.

Important investments have been made in the water sector by the Government of Kosovo* and foreign donors. Investment by the Government of Kosovo* focused on regulation of rivers and improvement of water infrastructure especially for water and wastewater services. Donor investments also focused mainly on improving water sector services and feasibility studies for water treatment infrastructure. The main foreign donors in the water sector in Kosovo* include Swiss Cooperation Office, European Union, GIZ, KfW Development Bank, JICA, DANIDA, IOM, USAID, the Government of Luxembourg and others. Based on available data, total investments in the water sector since 1999 amount to EUR 255.77 million, out of which EUR 189.9 million were donations. According to European Union standards, it is estimated that it will take at least EUR 60 million per year in the next ten years for Kosovo* approximation to these standards.

Population growth, urbanization, demands of industry and agriculture, climate change may increase the demand for water. But the impact on biological, chemical and physical characteristics of the water, which reduce its quality, must not be neglected. Water quality plays a central role in human life and the entire ecosystem. Drinking water should not contain biological, chemical and physical contaminants. Regional Environmental Center (REC) in cooperation with MESP prepared the Water Polluters Cadastre in Kosovo*, where in total 368 water polluters were registered. Out of this number, 266 are collective polluters, whereas 102 are individual polluters.

In the region of the watercourse of the Bardhe River, 154 polluters were identified, 99 are collective polluters and 56 are individual polluters. In the regions of Ibar River, Lepenac and Binačka Morava watercourses, 100 polluters were identified, 75 were collective polluters and 25 individual polluters. The watercourse of Binačka Morava and Lepenac has 24 polluters.

The main industrial polluters are Kosovo Energy Corporation (KEK), Feronikl (production of nickel alloys and iron), cement factory Sharrcem, as well as the Trepča and Kišnica mining complex. Trepča was once the backbone of the economy in Kosovo*, but today it is one of the biggest environmental challenges. In the full operational capacity, Trepča's discharge of polluters in the water was estimated at 150 tons/year lead, 300-900 tons/year zinc, 900 tons/ year fluoride, etc. Even though most of Trepča's mining and metallurgical plants are out of operation, acids, dust particles, unsecured operation and poorly maintained and unstable tailing ponds represent a daily danger to those living nearby.

In addition to industry, agriculture is a significant user of water resources but also one of the biggest polluters. Agricultural activities largely affect the quality of water, especially through the effects of agrochemicals (pesticides, fertilizers, etc.) which dissolves in rivers and groundwater. Agricultural producers use agrochemicals inadequately and with no control, which contributes to a more serious contamination of water resources.

The longest and most polluted river in Kosovo* is the Sitnica, a 90 km long river that flows into the Ibar River. In the area around the river Sitnica agriculture is the most common activity. The average quantity of used organic fertilizers is much lower than the rate of use in many EU member states, which is in line with the fact that agricultural development is still on the low level in Kosovo*. Intensification of agricultural production must be accompanied with agricultural-environmental and efficiency measures to minimize pollution risk and to maximize added value.

Kosovo* has a relatively short history of surface water monitoring, although the first water level measurements in some rivers of Kosovo* date back to 1923. Regular and systematic measurements with an increasing number of hydrological stations, covering the entire territory of Kosovo*, began after the Second World War. Initially water level readings were conducted manually from stage boards, later main river proles were equipped with self-recording limnigraphs. This way with occasional interruptions water level recordings were carried out until the last war. At the end of the last century only ten stations remained functional of originally more than 30 stations.

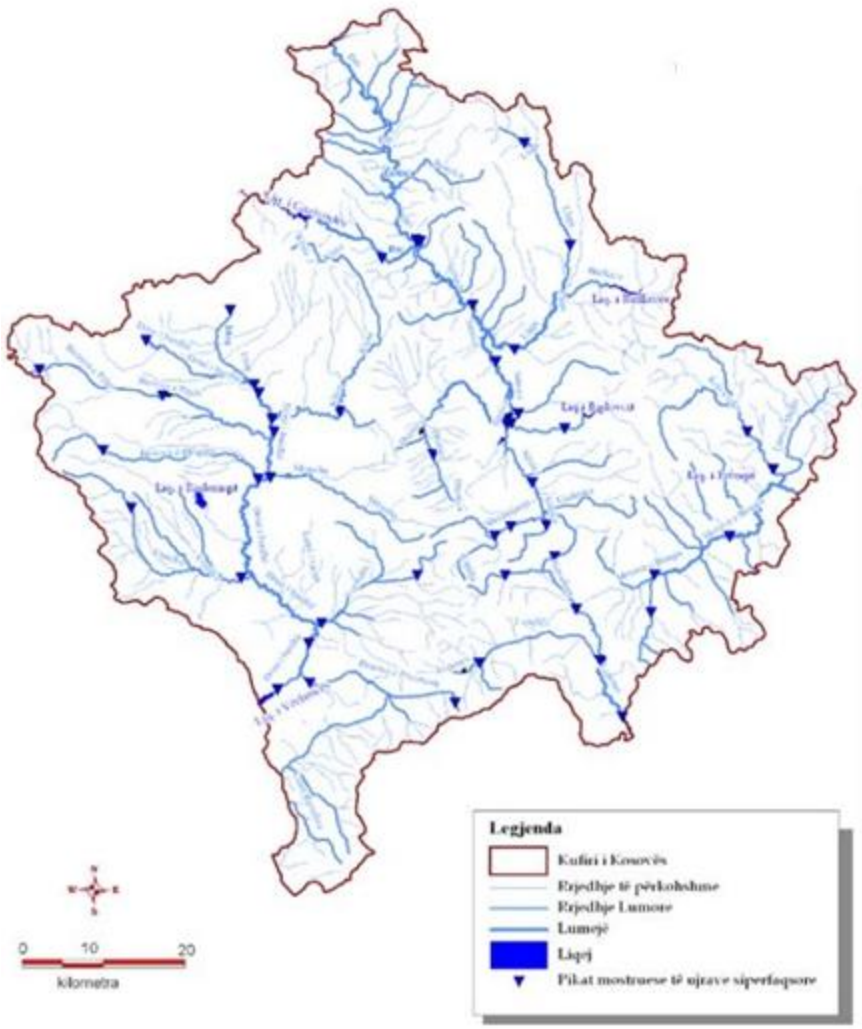

Figure 4. – Network of surface water monitoring stations in Kosovo * (https://www.ammk-rks.net/repository/docs/raporti_ujerave_2010-angl.pdf)

After the war, the build-up of the hydrometric monitoring network started with 22 stations, which were equipped with automatic pressure sensors for water level recording. Figure 4 shows the network of surface water monitoring stations on the territory of Kosovo *. Even today the expansion of the hydrometric monitoring network continues. The aim is to improve the spatial coverage of gauging stations of major rivers in Kosovo*. In early 2014 only eight hydrometric stations of this network were still fully functioning (see table 5.1). Up to the end of 2015 the existing hydrometric network was expanded up to 27 stations as depicted on map 5.1. Seven of these stations allow for a real-time data access via GPRS from a central server. Two of these stations as well as the soft- and hardware of the server platform were donated by German GIZ (Gesellschaft fÜr Internationale Zusammenarbeit GmbH) in the context of the "Climate change adaptation in the Western Balkans" project.

1.2.2 Legislation in the field of water resources in Kosovo*

These are the following water legislation on the territory of Kosovo*:

Law Nr. 2004/24 on Kosovo* water

- The purpose of this law is:

• To ensure sustainable development and utilization of water resources, which are necessary for public health, environmental protection and socio-economic development of Kosovo*;

• To establish procedures and guiding principles for optimal allocation of water resources, based on the use and purpose;

• Ensure protection of water resources from pollution, misuse and overuse

• To establish the institutional framework for water resource management.

Law no. 02 / l-79 on hydro-meteorological tasks. It is another important law in the water sector, aimed to regulate meteorological works and the manner of their accomplishment.

Law no. 02/L-78 on public Health. This law stipulates, inter alia, institutions responsible for implementation of health policies, defines the duties of the National Institute of Public Health of Kosovo*, and among other establishes the responsibilities for drinking water quality monitoring.

Law Nr. 03/L-086 on providers of waste, water, and sewage services-is an important law by which the WWRO is established, and established the legal framework for economic regulation of public companies which provide water and sewerage services;

Law Nr. 02/L-9 on Irrigation of Agricultural Land. This Law regulates the organization and management of irrigation and drainage of agricultural land in Kosovo*; it defines the powers and responsibilities of the entities for irrigation and drainage. It defines also the establishment and registration of: irrigation companies, associations that use the water for irrigation, federations and their organization, irrigation, water fees, associations' business and other issues related to irrigation and drainage.

Law on Water no. 04/L-147 is the most important legal act regulating the use of water resources for public health, environmental protection and socio-economic development in Kosovo*. The main objectives defined in Article 1 of this Law are protection of water resources from pollution, overuse and misuse, establishment of procedures and guiding principles for the optimal distribution of water resources and determination of the institutional structures for managing the water resources.

There are some other important laws such as:

Law no. 05/L-042 on Regulation of Water Services

Law no. 04/L-232 on Kosovo* Geological Service

Law no. 05/L-081 on Energy

Law no. 04/L-016 on Energy Efficiency, etc.

Laws in the field of environmental protection and agriculture are closely related to water sector, and there are some significant laws:

Law no. 03/L-025 Law on Environmental Protection

Law no. 03/L-233 on Nature Protection

2 Policy, Strategic Planning and Legal Framework

Please indicate the current status of key policy making, strategic planning and legal frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

2 Enabling environment for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Main national instruments for water resources management							
a.	National water resources policy						√
b.	Sub-national/provincial/state water resources policy					√	
c.	National water laws						√
d.	Sub-national/provincial/state water law	√					
e.	National integrated water resources management plan/s or equivalent strategic plan document/s						√
f.	Separate national water efficiency plan/s	√					
g.	Water efficiency in integrated water resources management plan or equivalent	√					
II) Other national instruments that may incorporate water resources management							
a.	Integrated national policy/strategy/plan for land and water resources management				√		
b.	Poverty Reduction Strategy (PRS) with water resources management component					√	
c.	National Strategy for Sustainable Development						√
d.	National Development Plan with water resources management component	√					
e.	National Environmental Action Plan water resources management component					√	
f.	National climate change adaptation policy/strategy/plan with water resources management component		√				
g.	National Agricultural Plan with water resources management component						√
h.	National energy policy/strategy/plan with water resources management component			√			
i.	National desertification policy/strategy/plan			√			

	with water resources management component						
j.	National wetland policy/strategy/plan with water resources management component				√		
k.	National biodiversity policy/strategy/plan with water resources management component	√					
III) International agreements on water resources management to which your country is party							
a.	Regional/sub-regional water resources management agreements						√
b.	Transboundary water resources management agreements for specific river basins						√

2.1 Issues

In the framework of the obligations arising from the Water law and Public Health Law, the administrative instructions are issued that regulate the following issues:

• Water permits

• Structure of water charges

• Water infrastructure

• Testing and implementation of minimum standards for drinking water quality monitoring

• Sanitary inspectors

• Criteria for establishment of water protected areas for drinking water sources

• Allowed limit values for effluent parameters which can be discharged into the water body or public sewage network

Administrative instruction under the drafting procedure are:

• Measures and actions for protection from erosion

• Use and maintenance of dams

• Water information system

• Content of the strategic plan for water resources management.

• Water protocol

2.2 References

Kosovo* Environment Strategy, MESP 2003 7

The Law No 2004/24 on Kosovo* waters

Government Water Policy Paper, Inter-Ministerial Water Council

Law on Regulation of Water Services no. 05 / L-042, available at http://bit.ly/2rc0HLi.

Law no. 02 / L-78 on Public Health, available at http://bit.ly/2qBLErN.

Law no. 04/L-232 on Kosovo* Geological Service, available at http://bit.ly/2rFbgYM.

Law no. 02 / L-79 on Hydro-Meteorological Activities, available at http://bit.ly/2qGXtfj.

Law no. 05 / L-081 on Energy, available at http://bit.ly/2qBGkVp.

Law no. 03 / L-025 on Environmental Protection, available at http://bit.ly/2k0hcnt.

Law no. 03 / L-233 on Nature Protection, available at http://bit.ly/2rFsNjK.

Law no. 02 / L-9 on the Irrigation of Agricultural Lands, available at http://bit.ly/2snL9Cg.

3 Governance and Institutional Frameworks

Please indicate the current status of governance and institutional frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

3 Governance systems for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Institutional frameworks							
a.	Mechanisms (e.g. commissions, councils) for river basin management						√
b.	Mechanisms for management of groundwater	√					
c.	Mechanisms for management of lakes				√		
d.	Mechanisms for cross-sector management of water resources	√					
e.	Mechanisms for transboundary water resources management						√
f.	Decentralized structures for water resources management (other than above)				√		
II) Stakeholder participation							
a.	Stakeholder have access to information on national water resources management and development			√			
b.	Public awareness campaigns on water resources management and development				√		
c.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the national level				√		
d.	Involvement of the private sector in water resources management and development at the national level	√					
e.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the basin level				√		
f.	Involvement of the private sector in water resources management and development at the basin level	√					
g.	Gender mainstreaming in water resources						√

	management and development						
III) Capacity building							
a.	Assessment of capacity needs in water resources management at national level				√		
b.	Assessment of capacity needs in water resources management at sub-national level			√			
c.	Programs for capacity needs in water resources management institutions/organizations at national level	√					
d.	Programs for capacity development in water resources management institutions/organizations at sub-national level	√					
e.	Programs for in-service training of staff/professionals in water resources management	√					
f.	Water resources management in the technical/higher education curriculum	√					
g.	Research programs in water resources management				√		

3.1 Issues

"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 key considerations for governance of the sector (and more generally) include:

- Effective – the tasks of "competent authorities" are undertaken in an effective manner so as to give effect to the provisions of sector policy and in particular sector legislation
- Efficient – the tasks are undertaken in an efficient manner such that the burden on both the competent authorities and those subject to governance procedures is minimised; in effect this requires a coordinated, professional and streamlined approach
- Proportionate – the level of resource devoted to specific aspects of governance (permitting, monitoring, enforcing, reporting …) is proportionate to the importance of the aspect in financial and economic terms
- Equitable – the system of governance is operated without prejudice
- Transparent – in accordance with the provisions of the Constitution (e.g. Article 41 of the Constitution: Right of Access to Public Documents), the Arhus Convention and other legal instruments (the Water Law, e.g. Article 3 on Access to Information) the governance process is transparent and open to public scrutiny through the provision of access to information and where relevant public participation in the decision-making processes

Of relevance in this regard are the provisions of the EU "Better Regulation" initiative.

According to the Law on Waters (no. 2004/24), the Ministry of Environment and Spatial Planning through the Water Department responsible for:

- Determination and implementation of policies for water development in Kosovo*
- Achievement of the objectives of the program approved by the Government
- Management of water resources
- Development of water strategic plan and other plans for water management
- Performing of related administrative and professional tasks
- Other organizational and development tasks pursuant to the provisions of the water law

3.2 References

Kosovo* Water Strategy 2017 - 2036

Article 41 of the Constitution: Right of Access to Public Documents

The Water Law, e.g. Article 3 on Access to Information

The Law No 2004/24 on Kosovo* waters

Water framework directive (2000/60/EC)

Extension and sustainable provision of drinking water supply services in Rural Areas in Kosovo* - Government of Kosovo* and Swiss Cooperation Office in Kosovo*

Kosovo* Environmental Action Plan 2006-2010

http://ec.europa.eu/governance/better_regulation/index_en.htm

4 Management Instruments

Please indicate the current status of management instruments for the development, management and use of water resources in your country, by checking one of the six columns for each line.

4 Management instruments for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Water resources development							
a.	Basin studies for long-term development and management of water resources						√
b.	Periodical assessment of water resources						√
c.	Regulatory norms and guidelines for sustainable development of water resources					√	
d.	Programs to value water-related or dependent ecosystem services				√		
II) Water resources management programs							
a.	Groundwater management program				√		
b.	Surface management program					√	
c.	Linked ground and surface water management program	√					
d.	Programs for efficient allocation of water resources among competing uses	√					
e.	Land/natural resources management programs that include water resources management components	√					
f.	Programs for allocating water resources that include environmental considerations	√					
g.	Demand management measures to improve water use efficiency in all sectors	√					
h.	Program for re-use or recycling of water	√					
i.	Programs to evaluate environmental impacts of water projects					√	
j.	Programs to address water-related disasters (e.g. floods and droughts)			√			
k.	Programs to address climate change adaptation through water resources management			√			
l.	Cooperative programs managing transboundary						√

	water resources						
m	Programs to reverse environmental/ecosystem degradation						√
III) Monitoring and information management							
a.	Government responsibility for hydro-meteorological monitoring adequately addressed in national legislation						√
b.	Monitoring of surface water quantity						√
c.	Monitoring of ground water quantity						√
d.	Monitoring of water quality						√
e.	Monitoring of aquatic ecosystems	√					
f.	Monitoring of water use	√					
g.	Monitoring of water use efficiency	√					
h.	Water resources information system					√	
i.	Forecasting and early warning systems					√	
IV) Knowledge Sharing							
a.	Programs for information exchange and knowledge sharing of good practices	√					
b.	Programs for providing advisory (extension) services on water management issues to end users	√					
c.	Programs for transferring improved and cost effective water saving technologies	√					
d.	Mechanisms for exchanging information between countries	√					
V) Financing of water resources management							
a.	Cost recovery mechanisms/progressive staff structures for all water uses	√					
b.	Subsidies for promoting water efficiency	√					
c.	Charges for water resources management (e.g. pollution charges)						√

4.1 Issues

The Water Council of Kosovo*, is an independent body, established by the Kosovo* Water Law. The Council is an advisory body, which reviews systematic issues of Water Management, harmonizes needs and diverse interests and proposes measures for the development, use and protection of resources and water system in Kosovo*. The Council also has the duty to:

- Reviews and give opinions in regard to legislative proposals on Water Management

• Initiates up-to-date approaches for medium and long-term solutions, and global determinations in the field of water system development, ensure water balances, water management, financing, organization of water systems and public resource development policy

• Reviews other issues of interest for the general and conceptual development of Water Management and the development of water systems of interest to Kosovo *. In regard to issues that it reviews, the Council gives opinions, conclusions and proposals for issuing legal provisions and undertaken measures.

The Kosovo* Environmental Protection Agency is a central institution for the state of environment monitoring. Duties and responsibilities of this institution in the water sector are:

• Collects and processes data for surface and ground waters of Kosovo *; storage, exchange and publication of these data

• The surface and ground water quality monitoring based up on schedule and methodology for operation with network of monitoring stations

• Urban, agriculture and industrial waste water discharges monitoring

• Prepares and compiles reports on the state of the waters; takes part in the review of various cases of EIA in the field of water (water and environmental permits, etc..)

• Forecasting and warning of potential or spontaneous risk for the loss of surface and ground waters in terms of quality and quantity

• Coordinates preparation of programs for municipal governance of water resources as according to their competencies.

The National Committee for Climate Change has the responsibility to follow up the implementation and enforcement of strategic documents and of the action plan for climate change in full compliance with the requirements of UNFCCC and Kyoto Protocol. Main functions of the National Committee for Climate Change are following:

- Coordinates all activities deriving from the UNFCCC and Kyoto Protocol
- Assures that the project having impact on the climate change are implemented in according to the national legislation and international agreements
- Drafts required documents for participation and for membership to the international conventions, protocols and membership related to the climate change
- Establishes and prepares the National Communication for the secretariat of the UNFCCC after ratification of Kyoto Protocol.

4.2 References

Kosovo* Water Strategy 2017 - 2036

The Law No 2004/24 on Kosovo*waters

Environmental protection and economic development in Kosovo*.pdf

Action Plan for Kosovo* Climate Change Startegy.pdf

Law Nr. 02 / l-79 on hydro-meteorological works

Kosovo* Environment Strategy, MESP 2003

5 Infrastructure Development and Financing

Please indicate the current status of investment plans and mobilized financing for infrastructure for the development, management and use of water resources in your country, by checking one of the six columns for each line.

5 Infrastructure development for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Investment plans and programs							
a.	Water resources included in national infrastructure investment plans					√	
b.	Irrigation					√	
c.	Energy/hydropower						√
d.	Groundwater (e.g. boreholes, pumps and treatment)	√					
e.	Flood management						√
f.	Water supply (domestic and industrial)						√
g.	Wastewater treatment					√	
h.	Desalination of seawater	√					
i.	Rainwater harvesting	√					
j.	Natural systems (e.g. wetlands, floodplains and catchment restoration)			√			
II) Mobilizing financing for water resources infrastructure							
a.	Financing for water resources included in national investment plans						√
b.	Financing for irrigation						√
c.	Financing for energy/hydropower						√
d.	Financing for groundwater (e.g. boreholes, pumps and treatment)	√					
e.	Financing for flood management						√
f.	Financing for water supply (domestic and industrial)						√
g.	Financing for wastewater treatment					√	
h.	Financing for desalination of seawater	√					
i.	Financing for rainwater harvesting	√					

j.	Financing for natural systems (e.g. wetlands, floodplains and catchment restoration)		√				

5.1 Issues

Water infrastructure includes facilities and equipment to regulate water, such as protection of embankments from large amounts of water, reservoirs, basin protection and water monitoring; facilities and equipment for water resources use, such as pumping stations, dams, supply canals and discharges including specified equipment and installations dedicated for protection from water damaging effects. Water Infrastructure, apart from facilities and equipment, should also include channels as result of canal dislocation or adjustment of natural flows, or the accumulations created by suspension of water flows if dedicated for public services. The classification of water infrastructure by the destination is determined by the administrative instruction for the content of water infrastructure.

Despite the completed legal framework in the field of water sector and despite some investments made in constructing water infrastructure, there are no detailed data on the number of Hydrotechnic and other accompanying facilities.

5.2 References

Kosovo* Environmental Action Plan 2006-2010, MESP / REC

Administrative Instruction for the content of water infrastructure

Kosovo* Water Strategy 2017 - 2036

The Law No 2004/24 on Kosovo* waters

6 Sources of Financing for the Development of Water Resources

Please indicate sources of financing as well as financing trends over the last 20 years for the development of water resources in your country, by checking one or more appropriate columns for each line.

6 Sources of financing for the development of water resources		Data not available or not recorded	Not funding allocations made	Declining trend over last 20 years	Increasing trend over last 20 years	Highly variable and no clear trends
a.	Government budget allocation (as % of GDP) for water resources development				√	
b.	Grants and loans from aid agencies for water resources development					√
c.	Investments from International Financing Institutions (e.g. World Bank) for water resources development					√
d.	Investments from private sources (e.g. banks and private operators, non-profit) for water resources development	√				
e.	Revenues (e.g. from water use charges/tariffs) used for water resources development					√
f.	Payments for ecosystem services and related benefit/cost transfer schemes	√				

6.1 Issues

The water sector in Kosovo* belongs to the sectors where a considerable number of projects and capital investment are oriented in. According to existing data, the largest investments by foreign donors have been made in the rehabilitation and construction of water supply systems and sewerage networks.

Important investments have been made in the water sector by the Government of Kosovo* and foreign donors. Investment by the Government of Kosovo* focused on regulation of rivers and improvement of water infrastructure especially for water and wastewater services. Donor investments also focused mainly on improving water sector services and feasibility studies for water treatment infrastructure. The main foreign donors in the water sector in Kosovo* include Swiss Cooperation Office, European Union, GIZ, KfW Development Bank, JICA, DANIDA, IOM, USAID, the Government of Luxembourg and others.

Based on available data, total investments in the water sector since 1999 amount to EUR 255.77 million, out of which EUR 189.9 million were donations. According to European Union standards, it is

estimated that it will take at least EUR 60 million per year in the next ten years for Kosovo* approximation to these standards.

6.2 References

Strategija za vode Kosova*, available at http://bit.ly/2rbZrbf, p. 104.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 90.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 88.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 96.

Severno Kosovo* u 2020 – Buduće istorije u nastajanju, p. 58

Kosovo* Water Strategy 2017 - 2036

The Law No 2004/24 on Kosovo* waters

7 Outcomes and Impacts

Please indicate to what extent improved water resources management has impacted economic, social, environmental and overall national objectives in the past 20 years in your country, by checking the appropriate columns for each line.

7 Improved Water Resources Management		Economic* development objectives impact in past 20 years	Social** development objectives impact in past 20 years	Environmental*** objectives impact in past 20 years	Overall national development impact in past 20 years
		1-5 low to high	1-5 low to high	1-5 low to high	1-5 low to high
a.	Improved policy, strategic planning and legal frameworks	2	2	4	3
b.	Improved governance and institutional frameworks	2	3	3	3
c.	Improved management instruments	1	2	3	2
d.	Improved infrastructure development	3	2	3	3

*Economic development objectives relating to economic growth, wealth, management of monetary assets, and economic sector development.

**Social development objectives relating to human development, gender considerations, such as poverty alleviation, health, education, and job creation.

***Environmental objectives relating to the conservation and sustainable use of natural resources, such as water, pollution control, nature, agricultural land, forest, and fisheries.

7.1 Key outcomes and impacts from water resources management measures

I) List the outcomes and key results achieved as a result of implementing integrated approaches to the development, management and use of water resources.

The Integrated water management system has enabled the implementation of the concept for adaptive management that over time should become the sustainable management system for water resources in Kosovo*. Kosovo* legislation for water resources is significantly harmonized with European legislation, related with water resources. According to Strategy of Water Management (Kosovo* Water Strategy 2017 - 2036), water sector in Kosovo* by adopting systemic solutions, acquires the necessary professional (expert) potential with significant domestic and international references. Improved water resources management shows that the percentage of population connected to public water supply systems has a growing trend (at this moment approximately 70 % of Kosovo* population is connected on the water supply systems).

II) Briefly list the constraints or obstacles that your country has experienced in implementing integrated approaches to water resources management.

Insufficient investment in water sector in last 20 years caused a number constraints:

- water losses in water supply networks are large, because the networks are poorly maintained,

- water protection is the weakest part of the water management systems, i.e. the application of legislation in the treatment of wastewater (especially in industrial wastewaters),

- flood protection is the main problem in the area of protection from water. Maintenance of the existing systems for flood protection is minimal, which causes the reduction of systems functionality.

- irrigation systems cover the small parts of arable land and

- drainage systems have poor and unintentional maintenance, which causes the reduction of system efficiency.

Coordination and cooperation in the planning and implementation of program is unsatisfactory. Decentralized management, which is applied in developed countries, is at the beginning in Kosovo*.

There is not enough a full defined projects for whose implementation international funds could be sought.

Groundwater are not adequately covered in water monitoring.

7.2 References

Strategija za vode Kosova*, available at http://bit.ly/2rbZrbf, p. 104.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 90.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 88.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 96.

Severno Kosovo* u 2020 – Buduće istorije u nastajanju, p. 58

Kosovo* Water Strategy 2017 - 2036

The Law No 2004/24 on Kosovo* waters

8 Priority challenges

What are the priority water resources challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8A Priority water resources challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Water uses						
a.	Water for agriculture				√	
b.	Water for domestic use					√
c.	Water for industry			√		
d.	Water for energy			√		
e.	Water for ecosystems/environment			√		
f.	Water for growing cities					√
II) Threats to the resource						
a.	Floods			√		
b.	Droughts			√		
c.	Water scarcity (surface water)			√		
d.	Water scarcity (groundwater)				√	
e.	Water quality (surface water)			√		
f.	Water quality (groundwater)				√	

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Water uses						
a.	Water for agriculture				√	
b.	Water for domestic use				√	
c.	Water for industry			√		
d.	Water for energy				√	
e.	Water for ecosystems/environment		√			
f.	Water for growing cities				√	
II) Threats to the resource						
a.	Floods			√		
b.	Droughts		√			
c.	Water scarcity (surface water)				√	
d.	Water scarcity (groundwater)				√	
e.	Water quality (surface water)		√			
f.	Water quality (groundwater)			√		

What are the priority water management challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8C Priority water management challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Levels of management						
a.	Institutional capacity at national level			√		
b.	Institutional capacity at sub-national level			√		
c.	Transboundary capacity at international level				√	
d.	Transboundary capacity at national/sub-national level		√			

e.	Management through private enterprise	√				
f.	Stakeholder participation	√				
g.	Coordination between levels and types of management			√		
II) Management between sectors						
a.	Coordination between sectors at national level				√	
b.	Coordination between sectors at sub-national level			√		
III) Other governance issues						
a.	Legislation				√	
b.	Infrastructure development					√
c.	Financing of water resources management				√	
d.	Financing of infrastructure				√	
IV) Managing resource information						
a.	Monitoring the resource				√	
b.	Knowledge sharing			√		
V) Specific types of management						
a.	Disaster management				√	
b.	Climate change adaption management				√	
c.	Water use efficiency management				√	

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Level of management						
a.	Institutional capacity at national level		√			
b.	Institutional capacity at sub-national level		√			
c.	Transboundary capacity at international level			√		
d.	Transboundary capacity at national/sub-national level			√		

e.	Management through private enterprise			√		
f.	Stakeholder participation				√	
g.	Coordination between levels and types of management				√	
II) Management between sectors						
a.	Coordination between sectors at national level				√	
b.	Coordination between sectors at sub-national level				√	
III) Other governance issues						
a.	Legislation				√	
b.	Infrastructure development				√	
c.	Financing of water resources management				√	
d.	Financing of infrastructure			√		
IV) Managing resource information						
a.	Monitoring the resource			√		
b.	Knowledge sharing				√	
V) Specific types of management						
a.	Disaster management				√	
b.	Climate change adaption management				√	
c.	Water use efficiency management				√	

8.1 Issues

The most important task of the Kosovo* water management is to provide a water supply to the population. Current situation of water sector in Kosovo* is that price of water is low, that the losses in the water supply network are high and fee for water use is insufficient. A special problem is that there is no control over many rural water supply systems.

The overall water situation in Kosovo* in all its aspects and dimensions is unsatisfactory. This is because in one hand, the water resources in Kosovo* are relatively insufficient (1600 m3 per year / resident), and in the other hand we have the systematic degradation of waters due to the lack of an effective management system and lack of adequate water protection measures.

Based on data presented in this report, it may be concluded that:

• Kosovo* still has not: a strategic plan for water, water management plan, river basin management plan and flood management plan.

• Database for water is still incomplete and it is an obstacle to adequate planning in the water sector

• It is evident the inappropriate use of water resources and uncontrolled exploitation of gravel from river beds

• There is a lack of investment for construction of sewerage systems and waste water treatment plants

• There is a lack of research institutions and consequently lack of scientific researches in the field of water

• Insufficient cooperation between the responsible institutions in the water sector

• Insufficient cooperation between government institutions, non-governmental organizations and public

• There is no integrated system for surface and ground water monitoring

The situation with drinking water supply is not satisfactory as a result of the following factors:

• Low quality maintenance of water infrastructure

• Amortization of water supply and sanitation networks

• Lack of a plan to protect water resources

• Lack of long-term plans to supply drinking water

• Concentration of population in urban areas due to uncontrolled migration

• The powers of regional water companies and local governments not clearly defined

• Illegal connections in water supply and sewerage systems

• Serious damage to the distribution network and maintenance problems

• Low levels of payment for water supply services.

8.2 References

Strategija za vode Kosova*, available at http://bit.ly/2rbZrbf, p. 104.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 90.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 88.

Report on State on Water Kosovo* 2015, Ministry of Environment and Spatial Planning, available at http://bit.ly/2snDB2e, p. 96.

Severno Kosovo* u 2020 – Buduće istorije u nastajanju, p. 58

Kosovo* Water Strategy 2017 - 2036

The Law No 2004/24 on Kosovo* waters

Extension and sustainable provision of drinking water supply services in Rural Areas in Kosovo* - Government of Kosovo* and Swiss Cooperation Office in Kosovo*

Kosovo* Environmental Action Plan 2006-2010

http://ec.europa.eu/governance/better_regulation/index_en.htm

9 References

1. Water supply issues in Kosovo*, OSCE, 2008

2. Some facts about the environment, SOK, 2007

3. Geothermal energy in Kosovo* and the prospects of its development, Avdi Konjuhi et al, Science Conference: Sustainable technical-technological development and environment, SHTM, Pristina 2002

4. Kosovo* in figures, SOK, 2008

5. Hydro-geological structure of Kosovo* Vilimirović J, 1967

6. Kosovo* Environmental Action Plan 2006-2010, MESP / REC, 2006

7. Report from the research on consumer attitudes about public services for water and waste-WWRO Kosovo*, 2008

8. State of Environment Report 2006/2007; KEPA - 2008

9. Progress monitoring report, REC, 2008.

10. Pre-feasibility study report to identify water resources for hydropower plants in Kosovo* MEM & AAEESD, 2006

11. The annual report of performance of public companies of water and waste in Kosovo* in 2007, WWRO, 2008

12. The annual report of performance of public companies for water and waste in Kosovo* in 2008, WWRO, 2009

13. Kosovo* Environment Strategy, MESP 2003

14. Study on wastewaters treatment strategy; Kemwater services OY, 2004

15. Law Nr. 2004/24 on Kosovo* waters

16. Law Nr. 02 / l-79 on hydro-meteorological works

17. Law Nr. 02/L-78 on public health

18. Law Nr. 02/L-9 on irrigation of agricultural lands

19. Extension and sustainable provision of drinking water supply services in Rural Areas in Kosovo* - Government of Kosovo* and Swiss Cooperation Office in Kosovo*

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22. Marjan Mitić; Optimalno korišćenje i održivo upravljanje vodnim resursima severnog dela Kosova i Metohije; doktorska disertacija; 2016god.

23. Environmental protection and economic development in Kosovo* - Marija Milenković, Jovana Jakovljević, Vesela Vlašković, Dragiša Mijačić (2017)

24. Kosovo* Water Strategy 2017 - 2036

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ANNEX III –
MONTENEGRO - GUIDELINE FOR IDENTIFICATION OF WB REGIONAL ISSUES RELATED TO WRM

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Contents

1 Introduction

Montenegro has sufficient water resources, but they are unevenly distributed across the country. Ninety-five percent of Montenegrin watercourses are formed within the country. This minimizes cross-border impacts on Montenegrin waters, but also engenders responsibility for the quality and distribution of water, which then flows into neighboring countries. Rainfall in Montenegro is characterized by high variability in both time and space. The country has good quality groundwater and surface water, but these resources are unevenly distributed throughout the country. Karst areas in the central and western parts are arid, whereas the northern mountainous area is richer in raw water. About half the country belongs to the Danube catchment and the other half to the Adriatic catchment. Flood water potentially threatens 24,500 hectares of farmland and urban areas. Central and northern parts of the country were hit by large floods in 1963, 1979, 1999, 2000 and 2010/11, causing power outages, landslides, and damage to water and wastewater infrastructure, resulting in serious drinking water shortages . Concerning long-term climate variations, the yield of water sources will be reduced, and some springs will dry up or experience intermittent flow. As a result, accumulations used for industrial and commercial purposes will decrease, as will hydropower generation, resulting in an increase in electricity imports. The southern parts of the country are likely to be most vulnerable to climate change.

The Law on Water (OG 27/07, 32/11, 55/16, 84/18) prescribes the main goals for sustainable water protection and management, as well as the terms and conditions for implementation of water management activities. The Law declares as main principles of water management the prevention of deterioration of aquatic ecosystems; ensuring the good status of waters; progressive reduction of pollution of groundwater; sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced and equitable water use; public participation in decision-making related to waters; and mitigation of the effects of floods and droughts. Among other issues, the Law on Water points to an integrated management based on river basin approach and regulates ownership on water, water management planning, water regulation and use, water infrastructure, water monitoring, protection against floods and erosion. However, implementation is still in progress despite the step forward given by the Law. A draft law on amendments to the Law on Water is now under discussion.

The Law on Hydrometeorological Affairs (OG 26/10, 40/11, 30/12) provides the framework for the activities of the HSS, including its water-related activities. The Law on Hydrographic Activity (OG 26/10, 40/11, 30/12) regulates activities aimed at ensuring safety of navigation at sea and on inlanwaters, and provision of information and data for the management of marine resources and environmental protection. The Rulebook on the content of a unique database of weather, climate and water (OG 2/14) was adopted in early 2014, providing detailed requirements regarding the composition of such a database as well as verification and accessibility of its data.

The Law on Coastal Zone (OG 14/92, 59/92, 27/94, 51/08, 21/09, 73/10, 40/11) refers to management, use and protection of coastal areas. A new law on coastal zone that is in the Parliament procedure of adoption, proposes the establishment of a coastal zone management agency with wide jurisdiction for the protection and management of the Montenegrin coastal zone.

The financing of water resources in Montenegro is carried out in accordance with the 2008 Law on Water Management Financing (OG 65/08) which regulates, among other matters, various water fees.

The EU Water Framework Directive 2000/60/EC has been the main driver for the evolution of the legal framework in Montenegro regarding water resources management and water services, providing the foundations for the Law on Water and associated draft amendments.

Categories of surface water and groundwater are defined by the Regulation on the classification and categorization of surface and groundwater (OG 2/07). Work is ongoing on quality objectives for surface waters and groundwater. The country did not designate sensitive areas in relation to urban wastewater treatment; neither did it designate the vulnerable zones for nitrate pollution from agricultural sources. The 2007 Law on Water and the above-mentioned Regulation transposed several parts of the EU Bathing Water Directive 2007/6/EC.

The 2001 Water Master Plan for the period 2001– 2011 expired but is still applied. According to the Law on Water, the Government should develop and adopt a water master plan for the whole country and water management plans for each river basin district, or for parts of a river basin district, by 2016. Subsequently, the Government has to adopt a programme of measures for each river basin district. However, in the process of negotiations with EU it was agreed to prolong deadline for this activity and insure financial resources through IPA 2014-2020 programme.

The Ministry of Agriculture and Rural Development is the main body responsible for development of water policy. It has a functional unit named the Water Administration that is responsible for implementation of water legislation, including management of water infrastructure, protection from the harmful effects of water, protection of water from pollution, establishment and maintenance of a water information system, delimitation of water resources and water permitting (both water use and effluent discharge).

The Ministry of Sustainable Development and Tourism is responsible for environmental policy, and encompasses the Directorate of Waste Management and Communal Development that is responsible for proposing, tracking and directing policies in the area of communal services, implementation of strategies, plans and programmes related to urban water supply and wastewater treatment, and monitoring the implementation of the adopted long-term development plans and action plans.

The Public Health Institute under the Ministry of Health is responsible for the quality control of drinking water in terms of human health and safety, including the quality of surface water and bathing waters. The Ministry of Economy is responsible for water tariffs and participates in the procedures for concession of some water rights.

The Ministry of Transport and Maritime Affairs performs administrative tasks related to maritime traffic and safety, for instance the protection of merchant ships and ports, the prevention of and emergency in the event of sea pollution, and the control of dangerous goods transportation in maritime and inland navigation. The Ministry of the Interior is responsible for risk management and emergency situations response, including in the event of floods.

At the local level, water services are provided by public companies founded by the municipalities. As a rule, water supply and wastewater management services are performed by companies specialized only in this type of activity, in the majority of municipalities. The exception is seen mostly in small municipalities, where mixed utility companies are also in operation. An interesting example is the “Regionalni Vodovod Crnogorsko Primorje”, a stateowned enterprise established for the purpose of providing bulk water to the local water companies serving the coastal municipalities in

Montenegro. The private companies that work in cooperation with public entities also play a role in the water and sanitation domain in Montenegro, namely in wastewater treatment management in the coastal zone.

Montenegro acceded to the Convention on the Law of the Non-Navigational Uses of International Watercourses in 2013 and to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) in 2014. The country is not a party to the Protocol on Water and Health. Montenegro is a party to the Barcelona Convention on the Protection of the Mediterranean Sea against Pollution.

2 Policy, Strategic Planning and Legal Framework

Please indicate the current status of key policy making, strategic planning and legal frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

2 Enabling environment for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Main national instruments for water resources management							
a.	National water resources policy				x		
b.	Sub-national/provincial/state water resources policy			x			
c.	National water laws				x		
d.	Sub-national/provincial/state water law			x			
e.	National integrated water resources management plan/s or equivalent strategic plan document/s				x		
f.	Separate national water efficiency plan/s				x		
g.	Water efficiency in integrated water resources management plan or equivalent				x		
II) Other national instruments that may incorporate water resources management							
a.	Integrated national policy/strategy/plan for land and water resources management				x		
b.	Poverty Reduction Strategy (PRS) with water resources management component				x		
c.	National Strategy for Sustainable Development					x	
d.	National Development Plan with water resources management component				x		
e.	National Environmental Action Plan water resources management component				x		
f.	National climate change adaptation policy/strategy/plan with water resources management component					x	
g.	National Agricultural Plan with water resources management component			x			
h.	National energy policy/strategy/plan with water resources management component				x		
i.	National desertification policy/strategy/plan						

	with water resources management component						
j.	National wetland policy/strategy/plan with water resources management component						
k.	National biodiversity policy/strategy/plan with water resources management component						
III) International agreements on water resources management to which your country is party							
a.	Regional/sub-regional water resources management agreements			x			
b.	Transboundary water resources management agreements for specific river basins				x		

2.1 Issues

Sub-national/provincial/state water resources policy
National water laws
Sub-national/provincial/state water law
National Agricultural Plan with water resources
Regional/sub-regional water resources management agreements

2.2 References

1. Law on Water ("OG of the RoM"27/07 and "OG of MNE" 48/15 i 84/18),
2. Law on Water Management Financing ("OG of MNE" 65/08 and 40/11)
3. Law on Urban Wastewater Management ("OG of MNE" 02/17)
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5. Law on Environment (Official Gazette of Montenegro 40/10

3 Governance and Institutional Frameworks

Please indicate the current status of governance and institutional frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

3 Governance systems for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Institutional frameworks							
a.	Mechanisms (e.g. commissions, councils) for river basin management				x		
b.	Mechanisms for management of groundwater				x		
c.	Mechanisms for management of lakes				x		
d.	Mechanisms for cross-sector management of water resources			x			
e.	Mechanisms for transboundary water resources management			x			
f.	Decentralized structures for water resources management (other than above)			x			
II) Stakeholder participation							
a.	Stakeholder have access to information on national water resources management and development			x			
b.	Public awareness campaigns on water resources management and development			x			
c.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the national level			x			
d.	Involvement of the private sector in water resources management and development at the national level		x				
e.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the basin level			x			
f.	Involvement of the private sector in water resources management and development at the basin level		x				
g.	Gender mainstreaming in water resources			x			

	management and development						
III) Capacity building							
a.	Assessment of capacity needs in water resources management at national level			x			
b.	Assessment of capacity needs in water resources management at sub-national level			x			
c.	Programs for capacity needs in water resources management institutions/organizations at national level			x			
d.	Programs for capacity development in water resources management institutions/organizations at sub-national level			x			
e.	Programs for in-service training of staff/professionals in water resources management			x			
f.	Water resources management in the technical/higher education curriculum		x				
g.	Research programs in water resources management		x				

3.1 Issues

Involvement of the private sector in water resources management and development at the national level

Involvement of the private sector in water resources management and development at the basin level.

Water resources management in the technical/higher education curriculum

Research programs in water resources management

3.2 References

1. Water Management Strategy (2017)
2. Law on Water ("OG of the RoM"27/07 and "OG of MNE" 48/15 i 84/18),
3. Law on Water Management Financing ("OG of MNE" 65/08 and 40/11)
4. Law on Urban Wastewater Management ("OG of MNE" 02/17)
5. Law on Financing of Water Management (Official Gazette of Montenegro, 65/08)
6. Law on Environment (Official Gazette of Montenegro 40/10
7. Strategic Master Plan for Sewerage and Waste Water in the Central and Northern Region of Montenegro and Waste Management Master Plan for Coastal Region and the Old Royal Capital Cetinje (2005.).

4 Management Instruments

Please indicate the current status of management instruments for the development, management and use of water resources in your country, by checking one of the six columns for each line.

4 Management instruments for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Water resources development							
a.	Basin studies for long-term development and management of water resources		X				
b.	Periodical assessment of water resources		X				
c.	Regulatory norms and guidelines for sustainable development of water resources			X			
d.	Programs to value water-related or dependent ecosystem services			X			
II) Water resources management programs							
a.	Groundwater management program			X			
b.	Surface management program			X			
c.	Linked ground and surface water management program			X			
d.	Programs for efficient allocation of water resources among competing uses		X				
e.	Land/natural resources management programs that include water resources management components		X				
f.	Programs for allocating water resources that include environmental considerations		X				
g.	Demand management measures to improve water use efficiency in all sectors		X				
h.	Program for re-use or recycling of water		X				
i.	Programs to evaluate environmental impacts of water projects			X			
j.	Programs to address water-related disasters (e.g. floods and droughts)			X			
k.	Programs to address climate change adaptation through water resources management			X			
l.	Cooperative programs managing transboundary			X			

	water resources						
m	Programs to reverse environmental/ecosystem degradation			X			
III) Monitoring and information management							
a.	Government responsibility for hydro-meteorological monitoring adequately addressed in national legislation			X			
b.	Monitoring of surface water quantity				X		
c.	Monitoring of ground water quantity				X		
d.	Monitoring of water quality				X		
e.	Monitoring of aquatic ecosystems				X		
f.	Monitoring of water use				X		
g.	Monitoring of water use efficiency				X		
h.	Water resources information system				X		
i.	Forecasting and early warning systems				X		
IV) Knowledge Sharing							
a.	Programs for information exchange and knowledge sharing of good practices			X			
b.	Programs for providing advisory (extension) services on water management issues to end users			X			
c.	Programs for transferring improved and cost effective water saving technologies			X			
d.	Mechanisms for exchanging information between countries			X			
V) Financing of water resources management							
a.	Cost recovery mechanisms/progressive staff structures for all water uses		X				
b.	Subsidies for promoting water efficiency		X				
c.	Charges for water resources management (e.g. pollution charges)		X				

4.1 Issues

Basin studies for long-term development and management of water resources
Periodical assessment of water resources
Programs for efficient allocation of water resources among competing uses
Land/natural resources management programs that include water resources management components
Programs for allocating water resources that include environmental considerations

Demand management measures to improve water use efficiency in all sectors
Program for re-use or recycling of water
Cost recovery mechanisms/progressive staff structures for all water uses
Subsidies for promoting water efficiency
Charges for water resources management (e.g. pollution charges)

4.2 References

Regulation on the classification and categorization of surface and groundwater "Off. Gazette of Montenegro", No. 2/07

Regulation on the method of categorization and categories of water facilities and their management and maintenance "Off. Gazette of Montenegro", No. 15/08

Regulation on the content and management of water information system "Off. Gazette of Montenegro", No. 33/08

Regulation on the content and method of preparation of water management plan for water area of the river basin or for its related section "Off. Gazette of Montenegro", No. 39/09

Regulation on the method for determining the boundaries of water lands "Off. Gazette of Montenegro", No. 25/12

Rulebook on the content of the request and documentation for the issuance of water acts, methods and requirements for mandatory announcement in the procedure of determining water conditions and the content of water acts "Off. Gazette of Montenegro", 7/08

Rulebook on quality and sanitary-technical conditions for wastewater discharge into the recipient and public sewage system, the method and procedure of testing the quality of wastewater, the minimum number of tests and the content of the report on the determined waste water quality "Off. Gazette of Montenegro", No. 45/08, 9/10, 26/12, 52/12 i 59/13

Rulebook on the form, detailed content and method for keeping water books "Off. Gazette of Montenegro", No. 81/08

Rulebook on the detailed content and management of water register "Off. Gazette of Montenegro", No.81/08

Rulebook on the determination and maintenance of zones and areas of sanitary source protection and restrictions in these zones "Off. Gazette of Montenegro", No. 66/09

Rulebook on the manner and conditions for measuring the quantity of wastewater discharged into the receiver "Off. Gazette of Montenegro", No. 24/10

Rulebook on the method and procedure for measuring the amount of water at the water intake "Off. Gazette of Montenegro", No. 24/10

Rulebook on the composition and content of water infrastructure "Off. Gazette of Montenegro", No.. 11/11

Rulebook on detailed conditions to be met by a company for the exploitation of river sediments "Off. Gazette of Montenegro", No. 51/12

Rulebook on detailed conditions to be met by legal entities performing water quality testing "Off. Gazette of Montenegro", No.. 66/12

Rulebook on the detailed content of preliminary flood risk assessment and the plan of flood risk management "Off. Gazette of Montenegro", No. 69/15

Rulebook on the methodology for declaring erosive areas "Off. Gazette of Montenegro", No. 72/15

Rulebook on the method for determining the environmentally acceptable flow of surface waters "Off. Gazette of Montenegro", No.. 2/16

Decision on determination of the waters of importance for Montenegro "Off. Gazette of Montenegro", No. 9/08, 28/09 i 31/09 i 31/15

Decision on determination of the sources intended for regional and public water supply and determination of their boundaries “Off. Gazette of Montenegro”, No. 36/08

LAW ON FINANCING OF THE WATER MANAGEMENT “Off. Gazette of Montenegro”, No. 65/08, 74/10 and No. 40/11

Decision on the amount and method of calculation of water charges and criteria and the method for determining the level of water pollution “Off. Gazette of Montenegro”, No. 29/09

5 Infrastructure Development and Financing

Please indicate the current status of investment plans and mobilized financing for infrastructure for the development, management and use of water resources in your country, by checking one of the six columns for each line.

5 Infrastructure development for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Investment plans and programs							
a.	Water resources included in national infrastructure investment plans		X				
b.	Irrigation		X				
c.	Energy/hydropower			x			
d.	Groundwater (e.g. boreholes, pumps and treatment)			X			
e.	Flood management			X			
f.	Water supply (domestic and industrial)		X				
g.	Wastewater treatment		X				
h.	Desalination of seawater	X					
i.	Rainwater harvesting		X				
j.	Natural systems (e.g. wetlands, floodplains and catchment restoration)		X				
II) Mobilizing financing for water resources infrastructure							
a.	Financing for water resources included in national investment plans			X			
b.	Financing for irrigation			X			
c.	Financing for energy/hydropower						
d.	Financing for groundwater (e.g. boreholes, pumps and treatment)			X			
e.	Financing for flood management			X			
f.	Financing for water supply (domestic and industrial)			X			
g.	Financing for wastewater treatment			X			
h.	Financing for desalination of seawater	X					
i.	Financing for rainwater harvesting			X			

j.	Financing for natural systems (e.g. wetlands, floodplains and catchment restoration)						

5.1 Issues

Water resources included in national infrastructure investment plans
Irrigation
Water supply (domestic and industrial)
Wastewater treatment
Rainwater harvesting
Natural systems (e.g. wetlands, floodplains and catchment restoration).

5.2 References

Water Management Strategy (2017)

LAW ON FINANCING OF THE WATER MANAGEMENT, "Off. Gazette of Montenegro", No. 65/08, 74/10 and No. 40/11

Decision on the amount and method of calculation of water charges and criteria and the method for determining the level of water pollution ,"Off. Gazette of Montenegro", No. 29/09 .

6 Sources of Financing for the Development of Water Resources

Please indicate sources of financing as well as financing trends over the last 20 years for the development of water resources in your country, by checking one or more appropriate columns for each line.

6 Sources of financing for the development of water resources		Data not available or not recorded	Not funding allocations made	Declining trend over last 20 years	Increasing trend over last 20 years	Highly variable and no clear trends
a.	Government budget allocation (as % of GDP) for water resources development				X	
b.	Grants and loans from aid agencies for water resources development				X	
c.	Investments from International Financing Institutions (e.g. World Bank) for water resources development				X	
d.	Investments from private sources (e.g. banks and private operators, non-profit) for water resources development				X	
e.	Revenues (e.g. from water use charges/tariffs) used for water resources development				X	
f.	Payments for ecosystem services and related benefit/cost transfer schemes				X	

6.1 Issues

No issues related to sources of financing for the development of water resources.

6.2 References

LAW ON FINANCING OF THE WATER MANAGEMENT, “Off. Gazette of Montenegro”, No. 65/08, 74/10 and No. 40/11

Decision on the amount and method of calculation of water charges and criteria and the method for determining the level of water pollution “Off. Gazette of Montenegro”, No. 29/09..

7 Outcomes and Impacts

Please indicate to what extent improved water resources management has impacted economic, social, environmental and overall national objectives in the past 20 years in your country, by checking the appropriate columns for each line.

7 Improved Water Resources Management		Economic* development objectives impact in past 20 years	Social** development objectives impact in past 20 years	Environmental*** objectives impact in past 20 years	Overall national development impact in past 20 years
		1-5 low to high	1-5 low to high	1-5 low to high	1-5 low to high
a.	Improved policy, strategic planning and legal frameworks	3	3	3	3
b.	Improved governance and institutional frameworks	4	4	4	4
c.	Improved management instruments	4	4	4	4
d.	Improved infrastructure development	4	4	4	4

*Economic development objectives relating to economic growth, wealth, management of monetary assets, and economic sector development.

**Social development objectives relating to human development, gender considerations, such as poverty alleviation, health, education, and job creation.

***Environmental objectives relating to the conservation and sustainable use of natural resources, such as water, pollution control, nature, agricultural land, forest, and fisheries.

7.1 Key outcomes and impacts from water resources management measures

I) List the outcomes and key results achieved as a result of implementing integrated approaches to the development, management and use of water resources

1. Established optimal conditions for water management within the River Basin Districts (RBD) in Montenegro (Adriatic Sea & Black Sea)
2. Definition and delineation of water bodies
3. Characterisation of river basins
4. Reference conditions
5. Monitoring systems
6. Definition of impacts and pressures
7. Production of RBMPs.
8. Definition of programmes of measures

II) Briefly list the constraints or obstacles that your country has experienced in implementing integrated approaches to water resources management.

1. Unclear or overlapping responsibilities that result in reduced interagency cooperation from conflicting interests or policies
2. A shortage of funding, budget limitations
3. A shortage of human capacity for planning or implementation, especially at subnational levels, which affects the status of water management structures, and impedes their ability to plan, assess and monitor activities

7.2 References

National Development Directions 2013-2016;
Accession Programme of Montenegro (2014-2018);
The Pre-accession Economic Programme (PEP) 2012-2015;
The Regional Development Strategy of Montenegro (2014-2020);.
National Strategy on Sustainable Development 2007-2012;
Water Management Plan

8 Priority challenges

What are the priority water resources challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8A Priority water resources challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Water uses						
a.	Water for agriculture			X		
b.	Water for domestic use				X	
c.	Water for industry			X		
d.	Water for energy				X	
e.	Water for ecosystems/environment			X		
f.	Water for growing cities					X
II) Threats to the resource						
a.	Floods				X	
b.	Droughts				X	
c.	Water scarcity (surface water)			X		
d.	Water scarcity (groundwater)					X
e.	Water quality (surface water)					X
f.	Water quality (groundwater)					X

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Water uses						
a.	Water for agriculture			X		
b.	Water for domestic use				X	
c.	Water for industry		X			
d.	Water for energy					X
e.	Water for ecosystems/environment			X		
f.	Water for growing cities				X	

II) Threats to the resource						
a.	Floods				X	
b.	Droughts				X	
c.	Water scarcity (surface water)			X		
d.	Water scarcity (groundwater)				X	
e.	Water quality (surface water)					X
f.	Water quality (groundwater)					X

What are the priority water management challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8C Priority water management challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Levels of management						
a.	Institutional capacity at national level					X
b.	Institutional capacity at sub-national level				X	
c.	Transboundary capacity at international level				X	
d.	Transboundary capacity at national/sub-national level				X	
e.	Management through private enterprise			X		
f.	Stakeholder participation				X	
g.	Coordination between levels and types of management					X
II) Management between sectors						
a.	Coordination between sectors at national level					X
b.	Coordination between sectors at sub-national level					X
III) Other governance issues						
a.	Legislation					X
b.	Infrastructure development					X

c.	Financing of water resources management				X	
d.	Financing of infrastructure					X
IV) Managing resource information						
a.	Monitoring the resource					X
b.	Knowledge sharing				X	
V) Specific types of management						
a.	Disaster management			X		
b.	Climate change adaption management			X		
c.	Water use efficiency management				X	

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Level of management						
a.	Institutional capacity at national level		X			
b.	Institutional capacity at sub-national level		X			
c.	Transboundary capacity at international level		X			
d.	Transboundary capacity at national/sub-national level		X			
e.	Management through private enterprise			X		
f.	Stakeholder participation		X			
g.	Coordination between levels and types of management		X			
II) Management between sectors						
a.	Coordination between sectors at national level		X			
b.	Coordination between sectors at sub-national level		X			
III) Other governance issues						
a.	Legislation		X			
b.	Infrastructure development		X			

c.	Financing of water resources management		X			
d.	Financing of infrastructure		X			
IV) Managing resource information						
a.	Monitoring the resource		X			
b.	Knowledge sharing		X			
V) Specific types of management						
a.	Disaster management					
b.	Climate change adaption management					
c.	Water use efficiency management		X			

8.1 Issues

Stakeholder participation
Coordination between levels and types of management
Coordination between sectors at national level
Coordination between sectors at sub-national level
Management through private enterprise

8.2 References

1. Water Management Strategy (2017)
2. Law on Water ("OG of the RoM"27/07 and "OG of MNE" 48/15 i 84/18),
3. Law on Water Management Financing ("OG of MNE" 65/08 and 40/11)
4. Law on Urban Wastewater Management ("OG of MNE" 02/17)
5. Law on Financing of Water Management (Official Gazette of Montenegro, 65/08)
6. Law on Environment (Official Gazette of Montenegro 40/10
7. Strategic Master Plan for Sewerage and Waste Water in the Central and Northern Region of Montenegro and Waste Management Master Plan for Coastal Region and the Old Royal Capital Cetinje (2005.)

9 References

UNEP 2012. The UN-Water Status Report on the Application of Integrated Approaches to Water Resources Management. ISBN: 978-92-807-3264-1.

Water Management Strategy (2017)

Law on Water ("OG of the RoM"27/07 and "OG of MNE" 48/15 i 84/18),

Law on Water Management Financing ("OG of MNE" 65/08 and 40/11)

Law on Urban Wastewater Management ("OG of MNE" 02/17)

Law on Financing of Water Management (Official Gazette of Montenegro, 65/08)

Law on Environment (Official Gazette of Montenegro 40/10

Strategic Master Plan for Sewerage and Waste Water in the Central and Northern Region of Montenegro and Waste Management Master Plan for Coastal Region and the Old Royal Capital Cetinje (2005.)

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ANNEX IV –
SERBIA - GUIDELINE FOR IDENTIFICATION OF WB REGIONAL ISSUES RELATED TO WRM

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University of Nis

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Contents

1 Introduction

1.1 Geography of Serbia

Territory of Serbia is located in the southern part of the Pannonian Plain and in the central part of Balkan Peninsula, Figure 1. Serbia covers a total area of 88.361 km^2. Serbia has two autonomous provinces Vojvodina (located in the northern part of the country) and Kosovo and Metohija (located in the southern part of the country). There are five statistical regions in Serbia: Vojvodina, Belgrade, Sumadija and Western Serbia, Southern and Eastern Serbia and Kosovo and Metohija.

Figure 1. – Physical map of Serbia [http://www.serbiamap.net/maps.html]

The topography of Serbia is diverse. Plain is in the northern part of the country and other parts of Serbia consist chiefly from hills, low, medium-high and high mountains interspersed with numerous rivers and creeks. Mountains cover the largest parts of the country and there are four mountain systems: Dinaric, Carpathian, Balkan and Rhodope Mountain systems. The most significant mountains in Serbia are: Kopaonik, Stara Planina, Golija, Tara and Zlatibor.

The climate in Serbia is moderately continental with a gradual change between the seasons. The majority of Serbia has a temperate climate zone, while the southwest regions of the country border the subtropical and continental climate zones. The mean annual air temperature is between 10.9°C and 3°C, which depends on altitude. The coldest month is January and the warmest is July. The autumn is the warmer than spring. Similar to the air temperature, the annual precipitation depends on altitude, with values between 540 mm and 1500 mm. The average annual precipitation is 896 mm. The continental precipitation patterns are in the majority of the country. February and October are the least rainy months, and June is the rainiest month. Even 12% to 13% of the annual precipitation falls during the June. Solar radiation, annual sums, are in the interval 1500-2200 hours annually. Air circulation is mostly influenced by orographic lift. Winds from northwest and west prevail in warmer part of the year.

Serbia has rich ecosystem and species diversity. There are 39 % of European vascular flora, 51 % of European fish fauna, 40 % of European reptile and amphibian fauna, 74 % of European bird fauna and 67 % European mammal fauna in Serbia. Serbia is middle-forested country, 29.1 % of total territory is covered by forest. Oak, beech, pines and firs are the most common trees. Protected areas covers 6.4 % of Serbian territory. Protected areas in Serbia include: 5 national parks (Djerdap, Tara, Kopaonik, Fruška gora, Šar Planina), 15 nature parks, 15 landscapes of outstanding features, 61 nature reserves and 281 natural monuments.

1.2 Water resources in Serbia

Water resources in Serbia can be divided into surface, underground and thermal water. Surface water resources are significant on the territory of Serbia, Figure 2. Large international rivers and other transboundary rivers are92 % of all surface waters (Water Management Strategy in Republic of Serbia until 2034, 2017). All rivers in Serbia can be divided into drainage basins of three seas: Black Sea (the largest area – 81.261 km^2), Adriatic Sea (4.500 km^2) and Aegean Sea (2.650 km^2). The major rivers in Serbia are: the Danube, the Sava, the Great Morava, the Tisa and the Drina. Natural lakes are small in Serbia, they are mostly located on the territory of autonomous province Vojvodina. Serbia has a lot of artificial lakes, some of greatest are: Djerdap, Perucac and Vlasina. Artificial lakes are mostly built for production of electricity (as product of hydroelectric dams).

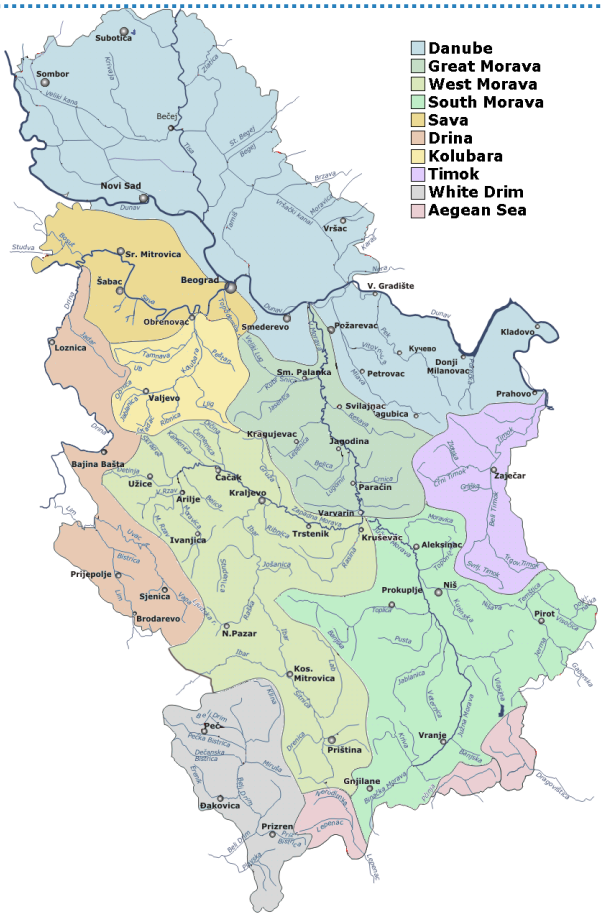

Figure 2. – Hydrographic map of Serbia
[Adopoted from Republic Hydrometeorological Service of Sebia]

Serbia has a numerous underground natural and mineral water sources. Those springs have a high quality of water and they are used for water supply. There is huge thermal water potential, but this potential is partially utilized.

1.2.1 Water resources in Serbia – current situation

According to the Regulations on the determination of water bodies of surface and groundwater (Ordinance on the determination of water bodies of surface and groundwater, 2010), Republic of Serbia has 498 surface water bodies, from which 99 % are watercourses and 1 % are lakes. All water bodies are grouped into three categories: 1) river, 2) artificial surface water body and 3) heavily modified surface water body, figure 3. Water resources in Serbia have unequal spatial and temporal distribution. Only 8 % of all available surface waters originates within the Serbia, so the domestic water resources are insufficient in Serbia. Transit waters are 92 % of surface waters in Serbia (Water Management Strategy in Republic of Serbia until 2034, 2017), with main rivers such as: Danube, Sava, Tisa and Drina. Current situation with natural lakes in Serbia, shows water degradation as well as living communities in them (Denic et al., 2015). The main reasons for this situation are lack of adequate management, various agricultural activities and drainage of waste water directly into lake without any previous treatment. Situation with artificial lakes is same as with natural lakes, i.e. water in lakes is treated as a raw material, and not as an environment. All these caused degradation and inadequate exploitation of some artificial lakes (Bovan, Celije, Gruza, Medjuvrsje) (Lausevic, 1995). Half of total groundwater resources are in alluvial sand-gravel sediments. Groundwater in large river valleys is in

the form of the shallowest phreatic aquifer. In the northern Serbia important groundwater resources are in neogene sediments. The best quality of groundwater is from karst springs but they are poorly presented in Serbia (Milanovic Pesic et al., 2017).

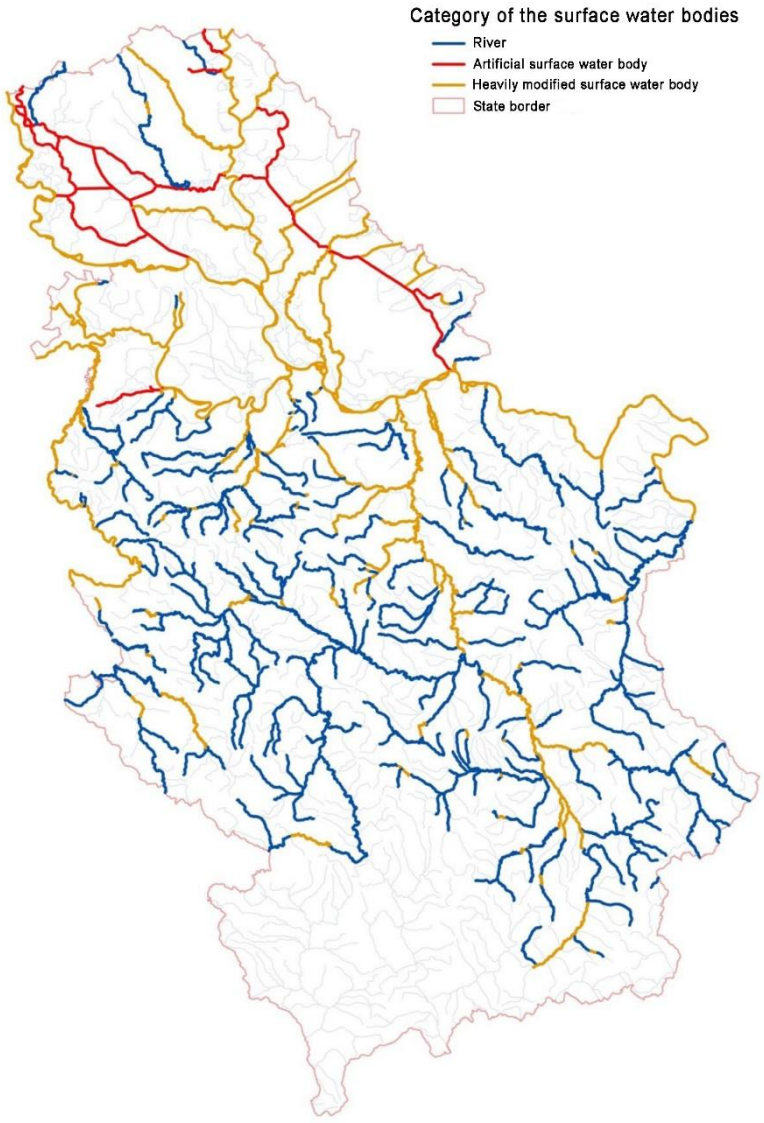

Figure 3. – Surface water bodies in Serbia (Denic et al., 2015)

Monitoring of surface waters in Serbia is being carried out since 2012, and it is harmonized with Water Framework Directive (Denic et al., 2015). As a result of harmonization, three types of monitoring has been implemented (WFD, 2000): 1) surveillance, 2) operational and 3) investigative monitoring. Figure 4 shows the network of surface water monitoring stations on the territory of Serbia. According to Denic et al. (2015), results of river monitoring shows that worst water body status had been found in the Danube (water bodies had completely unsatisfied status), the Sava (3 % of water bodies had satisfied status) and the Morava (2 % of water bodies had satisfied status) river catchment area.

Figure 4. – Network of surface water monitoring stations in Serbia (Denic et al., 2015)

According to Denic et al. (2015), chemical status of surface waters in 2014 shows, that 59 % of surface waters has good status and 41 % has poor status. The main causes for this status were high level of dissolved nickel, dissolved lead, fluoranthene and endosulfan. Quality of drinking water in Serbia is generally unsatisfactory. Water resources with high quality are distributed around the borders of the Serbia. Quality of groundwater is especially bad in Vojvodina.

Territory of Serbia, according to the United Nations (Managing Water under Uncertainty and Risk, 2012), is classified as little or no water scarcity territory. The main water lack is in the densely populated lowlands. Surface waters share in water supply is 31 %, while 69 % of water supply covers the groundwater. In Autonomous Province of Vojvodina 100 % of drinking water originate from groundwater sources (Water Management Strategy in Republic of Serbia until 2034, 2017).

Groundwater represent slowly renewable resource and nowadays it is under pollution risk. According to (Spatial plan for the Republic of Serbia 2010-2014-2020, 2010), Serbia has total

groundwater capabilities range from $678x10^6$ m^3 to $750x10^6$ m^3 per year, where groundwater is mostly used for population water supply, for industry and for irrigation. The hydrogeological analysis shows that Serbia is using around 30 % of total renewable groundwater, approximately 67 m^3/s (Milanovic Pesic et al., 2017). From total groundwater potential 70 % are alluvial aquifers (more than 50 % in Central Sebia, 37 % AP Vojvodina), while Karst aquifers represent 16 % of total groundwater potential (all originate from Central Serbia) (Water Management Strategy in Republic of Serbia until 2034, 2017).

According to (Water Management Strategy in Republic of Serbia until 2034, 2017), 81 % of inhabitants connected to the public water supply (mostly in Belgrade and Vojvodina with more than 90 %). The average amount of distributed water for households was $658x10^6$ m^3 per year, during the period 2010-2015, where groundwater took amount of $459x10^6$ m^3 per year (Milanovic Pesic et al., 2017). The main problems for water quality impairment (in supply systems) are: inadequate technological and economic development and underdeveloped awareness on water protection. The main problem in Central Serbia is bacteriologically contaminated water (more than 40 %), while in Vojvodina the main problems are turbidity, presence of iron, nitrates and arsenic (Sector Review Paper on the Water Supply and Waste Water Sector, 2006). What is more, water accumulations are exposed to erosion, to sediments accumulation and to eutrophication.

Wastewater is one of the main polluters of water in Serbia. In Serbia the sewage network covers about 55% of the population, while settlements larger than 2000 inhabitants are covered with approximately 72% of the sewage connection (Water Management Strategy in Republic of Serbia until 2034, 2017). Serbia has 44 treatment plants for wastewater, but only 6 operate efficiently and they can treat about 8 % of total wastewater (Water Sector in Serbia, 2017). Problems with treatment plants are lack of financial resources and poor maintenance. Serbia should build 320 wastewater treatment plants, in order to align with EU standards. Industrial waters are especially dangerous, because 50 % of industrial facilitates do not treat wastewater, and over the past few years the volume of wastewater from industry has risen substantially (especially in mining industry).

The water management in Serbia is based on its natural characteristics, on the present status of water resources, on the need to meet the water demand, to protect water resources and to ensure protection against the adverse effects of water. The main strategic goal is to achieve integrated water management in Serbia (Water Management Strategy in Republic of Serbia until 2034, 2017). Water management in Serbia is under the jurisdiction of the national government. Major administrative units related to water management are: Ministry of Environmental Protection, National Water Directorate and government-held water management companies (Srbijavode, Vode Vojvodine and Beogradvode).

1.2.2 Legislation in the field of water resources in Serbia

There are the following water legislation on the territory of Republic of Serbia:

- Water Law (Water Law, 2016)

- Water Regime Law (Water Regime Law, 2005)

- Environmental Protection Law (Environmental Protection Law, 2009)

- Decree on the Establishment of the General Plan for the Protection of the Flood for the Period from 2012 to 2018 (Decree on the Establishment of the General Plan for the Protection of the Flood for the Period from 2012 to 2018, 2012)

- Decree on the Water Fees Amount (Decree on the Water Fees Amount, 2018)

- Decree on the Establishment the Master Plan for the Development of Water Resources in the Republic of Serbia (Decree on the Establishment the Master Plan for the Development of Water Resources in the Republic of Serbia, 2002)

- Decree on Limit Values of Pollutant Emissions in Water and Deadlines for their Achievement (Decree on Limit Values of Pollutant Emissions in Water and Deadlines for their Achievement, 2016)

- Decree on Limit Values of Pollutants in Surface and Groundwaters and Sediments and Deadlines for their Achievement (Decree on Limit Values of Pollutants in Surface and Groundwaters and Sediments and Deadlines for their Achievement, 2012)

- Decree on Limit Values of Priority and Priority Hazardous Substances that Pollute Surface Waters and Deadlines for their Achievement (Decree on Limit Values of Priority and Priority Hazardous Substances that Pollute Surface Waters and Deadlines for their Achievement, 2011)

- Order on the Establishment of the Operational Plan for Flood Protection for 2018 (Order on the Establishment of the Operational Plan for Flood Protection for 2018, 2018)

- Ordinance on Determination Irrigation Areas and their Boundaries (Ordinance on Determination Irrigation Areas and their Boundaries, 2011)

- Ordinance on Determination of Water Units and their Boundaries (Ordinance on Determination of Water Units and their Boundaries, 2018)

- Ordinance on the Content and Manner of Managing the Water Information System, the Methodology, Structure, Categories and Levels of Data Collection, as well as the Content of the Information Notified to the Public (Ordinance on the Content and Manner of Managing the Water Information System, the Methodology, Structure, Categories and Levels of Data Collection, as well as the Content of the Information Notified to the Public, 2011)

- Ordinance on the Determination of Water Bodies of Surface and Groundwater (Ordinance on the determination of water bodies of surface and groundwater, 2010)

- Ordinance on Parameters of Ecological and Chemical Status of Surface Waters and Parameters of Chemical and Quantitative Status of Groundwater (Ordinance on Parameters of Ecological and Chemical Status of Surface Waters and Parameters of Chemical and Quantitative Status of Groundwater, 2011)

- Ordinance on the Manner of Determining and Maintaining Sanitary Protection Zones of Water Supply Springs (Ordinance on the Manner of Determining and Maintaining Sanitary Protection Zones of Water Supply Springs, 2008)

- Ordinance on the Manner and Conditions for Measuring the Quantity and Testing the Quality of Wastewater and the Content of the Report on the Performed Measurements (Ordinance on the

Manner and Conditions for Measuring the Quantity and Testing the Quality of Wastewater and the Content of the Report on the Performed Measurements, 2016)

- Ordinance on the Hygienic Correctness of Drinking Water (Ordinance on the Hygienic Correctness of Drinking Water, 1999)

- Ordinance on the Classification and Categorization of Groundwater Reserves and Keeping Records of them (Ordinance on the Classification and Categorization of Groundwater Reserves and Keeping Records of them, 1979)

- Ordinance on the Classification of Cross-Border and Coastal Water Bodies (Ordinance on the Classification of Cross-Border and Coastal Water Bodies, 1978)

- Decision on Determination the Boundaries of Water Areas (Decision on Determination the Boundaries of Water Areas, 2017)

2 Policy, Strategic Planning and Legal Framework

Please indicate the current status of key policy making, strategic planning and legal frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

2 Enabling environment for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Main national instruments for water resources management							
a.	National water resources policy						√
b.	Sub-national/provincial/state water resources policy					√	
c.	National water laws						√
d.	Sub-national/provincial/state water law	√					
e.	National integrated water resources management plan/s or equivalent strategic plan document/s						√
f.	Separate national water efficiency plan/s	√					
g.	Water efficiency in integrated water resources management plan or equivalent	√					
II) Other national instruments that may incorporate water resources management							
a.	Integrated national policy/strategy/plan for land and water resources management				√		
b.	Poverty Reduction Strategy (PRS) with water resources management component					√	
c.	National Strategy for Sustainable Development						√
d.	National Development Plan with water resources management component	√					
e.	National Environmental Action Plan water resources management component					√	
f.	National climate change adaptation policy/strategy/plan with water resources management component		√				
g.	National Agricultural Plan with water resources management component						√
h.	National energy policy/strategy/plan with water resources management component			√			
i.	National desertification policy/strategy/plan			√			

	with water resources management component						
j.	National wetland policy/strategy/plan with water resources management component				√		
k.	National biodiversity policy/strategy/plan with water resources management component	√					
III) International agreements on water resources management to which your country is party							
a.	Regional/sub-regional water resources management agreements						√
b.	Transboundary water resources management agreements for specific river basins						√

2.1 Issues

Serbia has draft of national adaptation plan for the changed climatic conditions, which covers topic "National climate change adaptation policy/strategy/plan with water resources management component" (The First National Adaptation Plan for the Changed Climatic Conditions for the Republic of Serbia, 2015). The main aim of this plan is adaptation to integral water resources management, on the territory of Serbia. All measures for risk reduction are grouped into three strategic areas: water use, protection from water and water quality. As medium-term measure, Plan proposes an increase in efficiency of water supply systems, i.e.: reduction of water losses to an optimal level, economic price for drinking water and optimization of water treatment plants.

Strategy of energy development of the Republic of Serbia, defines the strategic development of energy, which is based on balance between energy production from available sources, energy consumption and more efficient "clean" energy production from renewable sources (Strategy of Energy Development of the Republic of Serbia until 2025 with Projections Until 2030, 2015). The most important priorities in Strategy are:

- ensuring energy security by reducing dependence from abroad and

- establishment of sustainable energy, using the measures for energy efficiency and energy renewable sources and using the environmental protection standards.

The energy resources and potentials of Serbia consist of fossil, conventional and non-conventional fuels and renewable energy sources. Hydro-energy potentials in Serbia are on the second place of renewable energy (first is energy from biomass). Approximately 70 % of hydro-potential is on rivers: Danube, Drina, Morava, Lim and Ibar. Serbia has 16 hydropower plants which give 10.5 TWh per year. It is estimated that technically potential of hydro-energy in Serbia is around 19.5 TWh per year.

According to National Action Plan for Drought Mitigation and Land Degradation (National Action Plan for the Mitigation Drought Effects and Land Degradation – draft 2015), 86.4 % of territory of Serbia was affected by land degradation. Causes which lead to the land desertification are: excessive and inefficient use of natural resources and their use in a way that gives permanent negative impact on the environment. The most influential factor for land desertification in Serbia is the state of soil

moisture. Surface waters have impact on this factor, i.e. large spatial river heterogeneity and fact that significantly large amount of water comes from neighboring territories.

2.1.1 References

The First National Adaptation Plan for the Changed Climatic Conditions for the Republic of Serbia 2015. Ministry of Agriculture and Environmental Protection, Belgrade, Serbia.

Strategy of Energy Development of the Republic of Serbia until 2025 with Projections until 2030 2015. Official Gazette of the RS, issue 101/15.

National Action Plan for the Mitigation Drought Effects and Land Degradation – draft 2015. Ministry of Agriculture and Environmental Protection, Belgrade, Serbia.

2.2 References

Strategy of Water Management on the Territory of the Republic of Serbia until 2034 2017. Official Gazette of the RS, issue 3/17.

Strategy of Water Supply and Water Protection in AP Vojvodina 2009. Department for Chemistry, Faculty of Sciences, University of Novi Sad, Novi Sad, Serbia.

Water Law 2016. Official Gazette of the RS, issue 30/10, 93/12 and 101/16.

Strategy for Reduction Poverty in Serbia 2003. Government of Republic of Serbia, Belgrade, Serbia.

National Sustainable Development Strategy 2008. Official Gazette of the RS, issue 57/08.

Law on Integrated Prevention and Control of Environmental Pollution 2015. Official Gazette of the RS, issue 135/04 and 25/15.

National Program of Environmental Protection 2010. Government of Republic of Serbia, Belgrade, Serbia.

National Program for Agriculture for the Period 2018-2020 2017. Official Gazette of the RS, issue 120/17.

Convention on Cooperation for the Protection and Sustainable use of the Danube River 1994. Official Gazette of the SMN – international agreements, issue 4/03.

Law on the Ratification of the Agreement between the Government of the Republic of Serbia and the Government of Hungary on the Navigation of the River Tisa 2017. Official Gazette of the RS – international agreements, issue 2/17.

Framework Agreement on the Sava River Basin 2002. UN United Nations.

The Law on Ratification of the Framework Agreement on the Sava River Basin, the Protocol on the Navigation Regime to the Framework Agreement on the Sava River Basin and the Agreement on the

Amendments to the Framework Agreement on the Sava River Basin and the Protocol on Navigation Sails to the Framework Agreement on the Sava River Basin 2004. Official Gazette of the SMN – international agreements, issue 12/04.

3 Governance and Institutional Frameworks

Please indicate the current status of governance and institutional frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

3 Governance systems for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Institutional frameworks							
a.	Mechanisms (e.g. commissions, councils) for river basin management						√
b.	Mechanisms for management of groundwater	√					
c.	Mechanisms for management of lakes				√		
d.	Mechanisms for cross-sector management of water resources	√					
e.	Mechanisms for transboundary water resources management						√
f.	Decentralized structures for water resources management (other than above)				√		
II) Stakeholder participation							
a.	Stakeholder have access to information on national water resources management and development			√			
b.	Public awareness campaigns on water resources management and development				√		
c.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the national level				√		
d.	Involvement of the private sector in water resources management and development at the national level	√					
e.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the basin level				√		
f.	Involvement of the private sector in water resources management and development at the basin level	√					
g.	Gender mainstreaming in water resources						√

	management and development						
III) Capacity building							
a.	Assessment of capacity needs in water resources management at national level				√		
b.	Assessment of capacity needs in water resources management at sub-national level			√			
c.	Programs for capacity needs in water resources management institutions/organizations at national level	√					
d.	Programs for capacity development in water resources management institutions/organizations at sub-national level	√					
e.	Programs for in-service training of staff/professionals in water resources management	√					
f.	Water resources management in the technical/higher education curriculum	√					
g.	Research programs in water resources management				√		

3.1 Issues

Serbia has the draft version of Law on Associations of Water Users where is one of the important principle integrated water management (Law on Associations of Water Users in Agriculture – draft, 2013). According to draft version of Law, the goals of the association are: enabling, realizing and improving the individual, as well as common interest of association members in irrigation of agricultural land, in order to increase the efficiency and profitability of agricultural production. The Law enable the establishment of a user's association of water users/stakeholders, but the members can be persons only if they are owners or users of agricultural land.

According to AP Vojvodina Strategy for Water Resources (Strategy of Water Supply and Water Protection in AP Vojvodina, 2009), capacities in water resources management at sub-national level exist in quantitative terms. For more advanced management of water resources Strategy proposes additional professional training of staff. One of the basic disadvantages is the lack of an integrated approach in research and innovation. Also, there is the lack detailed testing on the pilot device. Testing on the pilot device enables optimization of the solution and provides opportunities for further improvement and development. What is more, there are new technologies (advanced) in the world that can be applied to us.

3.1.1 References

Law on Associations of Water Users in Agriculture – draft 2013. Ministry of Agriculture, Forestry and Water Management, Belgrade, Serbia.

Strategy of Water Supply and Water Protection in AP Vojvodina 2009. Department for Chemistry, Faculty of Sciences, University of Novi Sad, Novi Sad, Serbia.

3.2 References

Convention on Cooperation for the Protection and Sustainable use of the Danube River 1994. Official Gazette of the SMN – international agreements, issue 4/03.

Framework Agreement on the Sava River Basin – Sava commission 2002. UN United Nations.

Plan for Improving the Ecological Status of the Palic Lake and Its Surroundings 2014. Official Gazette of the City of Subotica, issue 24/14.

Strategy of Water Management in the Territory of the Republic of Serbia - Analysis and Research 2015. Jaroslav Cerni Institute for the Development of Water Resources, Belgrade, Serbia.

Law on Free Access to Information from Public Meaning 2010. Official Gazette of the RS, issue 120/04, 54/07, 104/09 and 36/10.

Water Law 2016. Official Gazette of the RS, issue 30/10, 93/12 and 101/16.

Law of the Gender Mainstreaming 2009. Official Gazette of the RS, issue 104/09.

Strategy of Water Management on the Territory of the Republic of Serbia until 2034 2017. Official Gazette of the RS, issue 3/17.

Kolakovic, S. 2011. Development of Decision Support System for the Needs of Integrated Water Resources Management in the Basin, Ministry of Education, Science and Technological Development, Belgrade Serbia.

4 Management Instruments

Please indicate the current status of management instruments for the development, management and use of water resources in your country, by checking one of the six columns for each line.

4 Management instruments for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Water resources development							
a.	Basin studies for long-term development and management of water resources						√
b.	Periodical assessment of water resources						√
c.	Regulatory norms and guidelines for sustainable development of water resources					√	
d.	Programs to value water-related or dependent ecosystem services				√		
II) Water resources management programs							
a.	Groundwater management program				√		
b.	Surface management program					√	
c.	Linked ground and surface water management program	√					
d.	Programs for efficient allocation of water resources among competing uses	√					
e.	Land/natural resources management programs that include water resources management components	√					
f.	Programs for allocating water resources that include environmental considerations	√					
g.	Demand management measures to improve water use efficiency in all sectors	√					
h.	Program for re-use or recycling of water	√					
i.	Programs to evaluate environmental impacts of water projects					√	
j.	Programs to address water-related disasters (e.g. floods and droughts)			√			
k.	Programs to address climate change adaptation through water resources management			√			
l.	Cooperative programs managing transboundary						√

	water resources						
m	Programs to reverse environmental/ecosystem degradation						√
III) Monitoring and information management							
a.	Government responsibility for hydro-meteorological monitoring adequately addressed in national legislation						√
b.	Monitoring of surface water quantity						√
c.	Monitoring of ground water quantity						√
d.	Monitoring of water quality						√
e.	Monitoring of aquatic ecosystems	√					
f.	Monitoring of water use	√					
g.	Monitoring of water use efficiency	√					
h.	Water resources information system					√	
i.	Forecasting and early warning systems					√	
IV) Knowledge Sharing							
a.	Programs for information exchange and knowledge sharing of good practices	√					
b.	Programs for providing advisory (extension) services on water management issues to end users	√					
c.	Programs for transferring improved and cost effective water saving technologies	√					
d.	Mechanisms for exchanging information between countries	√					
V) Financing of water resources management							
a.	Cost recovery mechanisms/progressive staff structures for all water uses	√					
b.	Subsidies for promoting water efficiency	√					
c.	Charges for water resources management (e.g. pollution charges)						√

4.1 Issues

In order to achieve the conditions for joint work of different institutions on development of system for risk management from natural disasters, Government of Serbia brought National Strategy for Protection and Rescue in Emergency Situations and National Program for Risk Management from Natural Disasters (National Strategy for Protection and Rescue in Emergency Situations, 2011 and National Program for Risk Management from Natural Disasters, 2015). The components of Strategy and Program are: institution development, identification and monitoring the risks related with natural

disasters, structural and non-structural risk reduction, early warning systems (for different sectors), a risk financing strategy and effective recovery. These documents enable the strengthening of regional cooperation platforms in the management of cross-border river basins, which is essential for water management.

The basic adaptation measures refer to the development of basic planning documents in the domain of water. These measures ensure a compliance of all other measures in the individual branches of the water sector. Programs for climate change adaptation in Serbia are included throw two Government issues, National Plan of Adapting to the Changed Climatic Conditions and Climate Vulnerability Assessment (The First National Plan of Adapting to the Changed Climatic Conditions for the Republic of Serbia, 2015. and Sekulic et al., 2012). According to National Plan of Adapting to the Changed Climatic Conditions and Climate Vulnerability Assessment (The First National Plan of Adapting to the Changed Climatic Conditions for the Republic of Serbia, 2015. and Sekulic et al., 2012) there are three specific adaptation measures: for water usage, for protection of harmful effects of water and for the water protection. The water usage represent the most important measure. In order to improve this measure there are plans for increase of retention capacity, measures to reduce specific water use in industry, in irrigation, etc., loss reduction in the water supply systems, monitoring improvement and for other non-investment measures.

4.1.1 References

National Strategy for Protection and Rescue in Emergency Situations 2011. Official Gazette of the RS, issue 86/11.

National Program for Risk Management from Natural Disasters 2015. Office for Assistance and Restoration of Flooded Areas, Belgrade, Serbia.

The First National Plan of Adapting to the Changed Climatic Conditions for the Republic of Serbia 2015. Ministry of Agriculture and Environmental Protection, Republic of Serbia.

Sekulic, G., Dimovic, D., Kalmar Krnajski Jović, Z., Todorovic, N. 2012. Climate Vulnerability Assessment – Serbia, World Wide Fund for Nature, Environmental Improvement Centre, Belgrade, Serbia.

4.2 References

Master Plan for the Development of Water Resources in the Republic of Serbia 2001. Jaroslav Cerni Institute for the Development of Water Resources, Belgrade, Serbia.

Strategy of Water Management in the Territory of the Republic of Serbia - Analysis and Research 2015. Jaroslav Cerni Institute for the Development of Water Resources, Belgrade, Serbia.

Strategy of Water Management on the Territory of the Republic of Serbia until 2034 2017. Official Gazette of the RS, issue 3/17.

Veljkovic, N. 2008. Indicators of Sustainable Development and Water Resources Management, Agency for Environmental Protection, Belgrade Serbia.

National Environmental Program 2010. Official Gazette of the RS, issue 12/10.

Water Law 2016. Official Gazette of the RS, issue 30/10, 93/12 and 101/16.

Decree on the Establishment of the Water Management Program in 2018 2018. Official Gazette of the RS, issue 13/18, 52/18 and 94/18.

National Program of Environmental Protection 2010. Government of Republic of Serbia, Belgrade, Serbia.

Strategic Impact Assessment on the Environment of the Operational Program for Economic Development for the Period 2012-2013 2011. Ministry of Finance, Republic of Serbia.

Convention on Cooperation for the Protection and Sustainable use of the Danube River 1994. Official Gazette of the SMN – international agreements, issue 4/03.

Law on the Ratification of the Agreement between the Government of the Republic of Serbia and the Government of Hungary on the Navigation of the River Tisa 2017. Official Gazette of the RS – international agreements, issue 2/17.

Framework Agreement on the Sava River Basin 2002. UN United Nations.

Program of Environmental Protection of the City of Nis with the Action Plan for the Period from 2017 to 2027 2017. Secretariat for Environmental Protection of the City of Nis, Nis, Serbia.

Law on Meteorological and Hydrological Activities 2010. Official Gazette of the RS, issue 88/10.

Denic, Lj., Cadjo, S., Djurkovic, A., Novakovic, B., Dopudja-Glisic, T., Veljkovic, N., Stojanovic, Z., Molovanovic, J., Domanovic, M. 2015. The status of surface waters of Serbia – analysis and elements for monitoring design, Ministry of Agriculture and Environmental Protection, Agency for Environmental Protection, Belgrade Serbia.

Decree on the Establishment of the Annual Water Status Monitoring Program for 2018 2018. Official Gazette of the RS, issue 35/18.

Ordinance on the Contents and Manner of the Management of the Water Information System, Methodology, Structures, Categories and Levels of Data Collection, and on the Content of Data who are Using for Informing the Public 2011. Ministry of Agriculture, Trade, Forestry and Water Management, Republic of Serbia.

Trajkovic, S. 2011. Development of a Hydro-information System for Monitoring and Early Warning of Drought, Ministry of Education, Science and Technological Development, Belgrade Serbia.

Decree on the Establishment of the Program for Meteorological and Hydrological Development and Research Activities for the Period from 2013 to 2017 2013. Official Gazette of the RS, issue 106/13.

Decree on the Amount of Water Fees 2018. Official Gazette of the RS, issue 14/18.

5 Infrastructure Development and Financing

Please indicate the current status of investment plans and mobilized financing for infrastructure for the development, management and use of water resources in your country, by checking one of the six columns for each line.

5 Infrastructure development for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
I) Investment plans and programs							
a.	Water resources included in national infrastructure investment plans					√	
b.	Irrigation					√	
c.	Energy/hydropower						√
d.	Groundwater (e.g. boreholes, pumps and treatment)	√					
e.	Flood management						√
f.	Water supply (domestic and industrial)						√
g.	Wastewater treatment					√	
h.	Desalination of seawater	√					
i.	Rainwater harvesting	√					
j.	Natural systems (e.g. wetlands, floodplains and catchment restoration)			√			
II) Mobilizing financing for water resources infrastructure							
a.	Financing for water resources included in national investment plans						√
b.	Financing for irrigation						√
c.	Financing for energy/hydropower						√
d.	Financing for groundwater (e.g. boreholes, pumps and treatment)	√					
e.	Financing for flood management						√
f.	Financing for water supply (domestic and industrial)						√
g.	Financing for wastewater treatment					√	
h.	Financing for desalination of seawater	√					
i.	Financing for rainwater harvesting	√					

j.	Financing for natural systems (e.g. wetlands, floodplains and catchment restoration)		√				

5.1 Issues

According to the Law on the Environmental Protection Fund (Law on the Environmental Protection Fund, 2011), environmental protection in Serbia was funded through Environmental Protection Fund until 2012. The Fund was abolished by the Law on Cessation of the Law on the Environment Protection Fund (Law on Cessation of the Law on the Environment Protection Fund, 2012), after 2012. Now, environmental protection is financing using principles "user pays", "polluter pays" and "liability", which are defined in Law on Nature Protection (Law on Nature Protection, 2018). Using these principles the funds are provided from the budget of the Republic of Serbia, the budget of the autonomous province and the local self-government unit, international organizations, financial institutions and bodies, European Union funds, etc. The characteristic of such system of financing is the inadequacy of dedicated funds and decentralized sources of funding, and the lack of implementation of financial instruments such as long-term loans. Also, there is a high dependence on the republican budget.

5.1.1 References

Law on the Environmental Protection Fund 2011. Official Gazette of the RS, issue 72/09 and 101/11.

Law on Cessation of the Law on the Environment Protection Fund 2012. Official Gazette of the RS, issue 93/12.

Law on Nature Protection 2018. Official Gazette of the RS, issue 36/09, 88/10, 91/10, 14/16 and 95/18.

5.2 References

Decision on the Opening of the Budget Fund for Waters of the Republic of Serbia 2011. Government of Republic of Serbia, Belgrade, Serbia.

Strategy of Energy Development of the Republic of Serbia until 2025 with Projections until 2030 2015. Official Gazette of the RS, issue 101/15.

Decree on Defining Program of Financing of Activities and Measures for Improvement of Efficient Use of Energy in 2014 2014. Official Gazette of the RS, issue 4/14.

Strategy of Water Management on the Territory of the Republic of Serbia until 2034 2017. Official Gazette of the RS, issue 3/17.

National Program for Risk Management from Natural Disasters 2015. Office for Assistance and Restoration of Flooded Areas, Belgrade, Serbia.

Decree on the Establishment of a Water Management Program in 2018 2018. Official Gazette of the RS, issue 13/18, 52/18 and 94/18.

Strategy of Water Management in the Territory of the Republic of Serbia - Analysis and Research 2015. Jaroslav Cerni Institute for the Development of Water Resources, Belgrade, Serbia

Ordinance on the Conditions for Allocation and Use of the Funds of the Budget Fund for Waters of the Republic of Serbia and on the Manner of Distribution of These Funds 2018. Official Gazette of the RS, issue 13/17, 79/17, 40/18 and 44/18.

Third Action Plan for Energy Efficiency of the Republic of Serbia for the Period until 2018 2017. Official Gazette of the RS, issue 1/17.

Decree on the Establishment of the Program for the Implementation of the Energy Development Strategy of the Republic of Serbia until 2025 with Projections until 2030 for the Period from 2017 to 2023 2017. Official Gazette of the RS, issue 104/17.

6 Sources of Financing for the Development of Water Resources

Please indicate sources of financing as well as financing trends over the last 20 years for the development of water resources in your country, by checking one or more appropriate columns for each line.

6 Sources of financing for the development of water resources		Data not available or not recorded	Not funding allocations made	Declining trend over last 20 years	Increasing trend over last 20 years	Highly variable and no clear trends
a.	Government budget allocation (as % of GDP) for water resources development				√	
b.	Grants and loans from aid agencies for water resources development					√
c.	Investments from International Financing Institutions (e.g. World Bank) for water resources development					√
d.	Investments from private sources (e.g. banks and private operators, non-profit) for water resources development	√				
e.	Revenues (e.g. from water use charges/tariffs) used for water resources development					√
f.	Payments for ecosystem services and related benefit/cost transfer schemes	√				

6.1 Issues

The Water Law defines the method of financing in water management (Water Law, 2016). Government of Republic of Serbia had allocated 0.5 % of GDP for water resources (water management, water protection, protection from water, water supply, water treatment, irrigation, dams, etc.) on the territory of Serbia, until 2004 (Petkovic, 2004). What is more, Petkovic claims that for development of water resources, for minimal development, the Government should allocate approximately 1 % of GDP, and for optimized development Government should allocate 2 % of GDP (Petkovic, 2004). Government of Serbia allocated approximately 0.6 % of GDP for water resources in 2018 (Law on the Budget of the Republic of Serbia for 2018, 2017, Annual Business Program for 2018 – Vojvodina Water, 2017, Business Program for 2018 – Serbia Water, 2018).

Economic price for drinking water (drinking water supply, water discharge and treatment are included) as main method of financing of Local Public Water Utilities in Republic of Serba is very low, for example in Belgrade about 0.6 €/m^3 and highest in Novi Sad, about 0.72 €/m^3, while real economic

price for drinking water should be 1.5 €/m^3 which would allow the water distribution system to function.

Serbia has signed a series of contracts with KfW Frankfurt am Main, for water resources development, i.e. for water supply, sewerage and wastewater treatment in the mid-municipalities of Serbia (Law on Confirmation of the Loan Agreement between KfW, Frankfurt am Main and the Republic of Serbia, Represented by the Minister of Finance for Water Supply and Sewerage Program in the Mid-Municipalities of Serbia V, 2017, Law on Confirmation of the Loan and Financing Agreement between KfW, Frankfurt am Main and the Republic of Serbia - Water Supply and Sewerage Program in Mid-Municipalities in Serbia I – Phase 2, 2010, Law on Confirmation of Contract on Loan and Financing between KfW, Frankfurt am Main and Republic of Serbia, in the Amount of 25,000,000 Euro, for Water Supply and Sewerage Program in the Mid-Municipality in Serbia II – Phase 2, 2011, Law on Confirmation of Contract on Loan for Water Supply and Wastewater Treatment Program in the Mid-Municipalities of Serbia III in the Amount up to 46,000,000 Euro between KfW, Frankfurt am Main and the Republic of Serbia, 2013). The contracts were signed in the period from 2010 to 2017. Contracts are being realized through subsidized interest rates provided from the low budget funds of the Federal Republic of Germany, intended for projects that meet development-policy eligibility criteria. The terms and conditions of the loan are comply with the OECD requirements.

Territory of Serbia is exposed to various forms of natural disasters of which the most frequent are floods, landslides and droughts. It is predicted that the economic costs of unfavorable natural events will increase in the future, taking into account increased concentration of the population in urban areas. Republic of Serbia concluded a loan contract with International bank for reconstruction and development for strengthening the legal and institutional framework for post disaster reconstruction and disaster and climate risk management, for strengthening the technical capacity for planning and implementing disaster and climate risk management activities and for reducing the fiscal impacts and strengthening the financial capacity (Law on Confirmation of Contract on Loan (Loan for Development Policies in the Field of Risk Management of Natural Disasters with the Option of Delayed Withdrawal of Funds) between the Republic of Serbia and the International Bank for Reconstruction and Development, 2017).

6.2 References

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7 Outcomes and Impacts

Please indicate to what extent improved water resources management has impacted economic, social, environmental and overall national objectives in the past 20 years in your country, by checking the appropriate columns for each line.

7 Improved Water Resources Management		Economic* development objectives impact in past 20 years	Social** development objectives impact in past 20 years	Environmental*** objectives impact in past 20 years	Overall national development impact in past 20 years
		1-5 low to high	1-5 low to high	1-5 low to high	1-5 low to high
a.	Improved policy, strategic planning and legal frameworks	2	2	4	3
b.	Improved governance and institutional frameworks	2	3	3	3
c.	Improved management instruments	1	2	3	2
d.	Improved infrastructure development	3	2	3	3

*Economic development objectives relating to economic growth, wealth, management of monetary assets, and economic sector development.

**Social development objectives relating to human development, gender considerations, such as poverty alleviation, health, education, and job creation.

***Environmental objectives relating to the conservation and sustainable use of natural resources, such as water, pollution control, nature, agricultural land, forest, and fisheries.

7.1 Key outcomes and impacts from water resources management measures

I) List the outcomes and key results achieved as a result of implementing integrated approaches to the development, management and use of water resources.

The Integrated water management system has enabled the implementation of the concept for adaptive management that over time should become the sustainable management system for water resources in Serbia. Serbian legislation for water resources is significantly harmonized with European legislation, related with water resources (Water Law, 2016). According to Strategy of Water Management (Strategy of Water Management in the Territory of the Republic of Serbia - Analysis and Research, 2015), water sector in Serbia by adopting systemic solutions, acquires the necessary professional (expert) potential with significant domestic and international references. Improved water resources management shows that the percentage of population connected to public water supply systems has a growing trend (at this moment approximately 81 % of Serbian population is connected on the water supply systems) (Strategy of Water Management in the Territory of the Republic of Serbia - Analysis and Research, 2015, Petkovic, 2004).

II) Briefly list the constraints or obstacles that your country has experienced in implementing integrated approaches to water resources management.

Insufficient investment in water sector in last 20 years caused number constraints (Strategy of Water Management in the Territory of the Republic of Serbia - Analysis and Research, 2015, Petkovic, 2004):

- water losses in water supply networks are large, because the networks are poorly maintained,

- water protection is the weakest part of the water management systems, i.e. the application of legislation in the treatment of wastewater (especially in industrial wastewaters),

- flood protection is the main problem in the area of protection from water. Maintenance of the existing systems for flood protection is minimal, which causes the reduction of systems functionality.

- irrigation systems cover the small parts of arable land and

- drainage systems have poor and unintentional maintenance, which causes the reduction of system efficiency.

Coordination and cooperation in the planning and implementation of program is unsatisfactory. Decentralized management, which is applied in developed countries, is at the beginning in Serbia.

There is not enough a full defined projects for whose implementation international funds could be sought.

Groundwater are not adequately covered in water monitoring (Strategy of Water Management in the Territory of the Republic of Serbia - Analysis and Research, 2015).

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8 Priority challenges

What are the priority water resources challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8A Priority water resources challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Water uses						
a.	Water for agriculture				√	
b.	Water for domestic use					√
c.	Water for industry			√		
d.	Water for energy			√		
e.	Water for ecosystems/environment			√		
f.	Water for growing cities					√
II) Threats to the resource						
a.	Floods			√		
b.	Droughts			√		
c.	Water scarcity (surface water)			√		
d.	Water scarcity (groundwater)				√	
e.	Water quality (surface water)			√		
f.	Water quality (groundwater)				√	

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Water uses						
a.	Water for agriculture				√	
b.	Water for domestic use				√	
c.	Water for industry			√		
d.	Water for energy				√	
e.	Water for ecosystems/environment		√			
f.	Water for growing cities				√	
II) Threats to the resource						
a.	Floods			√		
b.	Droughts		√			
c.	Water scarcity (surface water)				√	
d.	Water scarcity (groundwater)				√	
e.	Water quality (surface water)		√			
f.	Water quality (groundwater)			√		

What are the priority water management challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

8C Priority water management challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
I) Levels of management						
a.	Institutional capacity at national level			√		
b.	Institutional capacity at sub-national level			√		
c.	Transboundary capacity at international level				√	
d.	Transboundary capacity at national/sub-national level		√			
e.	Management through private enterprise	√				

f.	Stakeholder participation	√				
g.	Coordination between levels and types of management			√		
II) Management between sectors						
a.	Coordination between sectors at national level				√	
b.	Coordination between sectors at sub-national level			√		
III) Other governance issues						
a.	Legislation				√	
b.	Infrastructure development					√
c.	Financing of water resources management				√	
d.	Financing of infrastructure				√	
IV) Managing resource information						
a.	Monitoring the resource				√	
b.	Knowledge sharing			√		
V) Specific types of management						
a.	Disaster management				√	
b.	Climate change adaption management				√	
c.	Water use efficiency management				√	

8B Priority water resources challenge areas		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Un-changed	Slightly increased	Significantly increased
I) Level of management						
a.	Institutional capacity at national level		√			
b.	Institutional capacity at sub-national level		√			
c.	Transboundary capacity at international level			√		
d.	Transboundary capacity at national/sub-national level			√		
e.	Management through private enterprise			√		

f.	Stakeholder participation				√	
g.	Coordination between levels and types of management				√	
II) Management between sectors						
a.	Coordination between sectors at national level				√	
b.	Coordination between sectors at sub-national level				√	
III) Other governance issues						
a.	Legislation				√	
b.	Infrastructure development				√	
c.	Financing of water resources management				√	
d.	Financing of infrastructure			√		
IV) Managing resource information						
a.	Monitoring the resource			√		
b.	Knowledge sharing				√	
V) Specific types of management						
a.	Disaster management				√	
b.	Climate change adaption management				√	
c.	Water use efficiency management				√	

8.1 Issues

The most important task of the Serbian water management is to provide a water supply to the population (Master Plan for the Development of Water Resources in the Republic of Serbia, 2001). Current situation of water sector in Serbia is that price of water is low, that the losses in the water supply network are high and fee for water use (of 70 %) is insufficient. A special problem is that there is no control over many rural water supply systems.

According to the plans of Republic of Serbia (Master Plan for the Development of Water Resources in the Republic of Serbia, 2001, Law on Spatial Plan of the Republic of Serbia from 2010 to 2020, 2010), water supply systems are based on the construction of a large number of dams and artificial reservoirs, primarily for water supply. Numerous experiences from the international community and constant lack of the financial resources point to the lack of such strategy (Dokmanovic and Nikic, 2015). From this reason, it is necessary to adopt the new, functional and sustainable concept of water management based on groundwater, and artificial reservoirs should be a necessary only if there is not enough groundwater quality or quantity.

Groundwater covers 69 % of total water amount used for public water supply, at this moment (Polomcic et al., 2011). Groundwater is practically the only source for water supply for Central Serbia and Vojvodina. Also, groundwater is used for bottling as mineral water. The main problem with groundwater is the fact that they has not been sufficiently studied, i.e. that there is no data of their reserves, degree of exploitation, quality, etc.

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