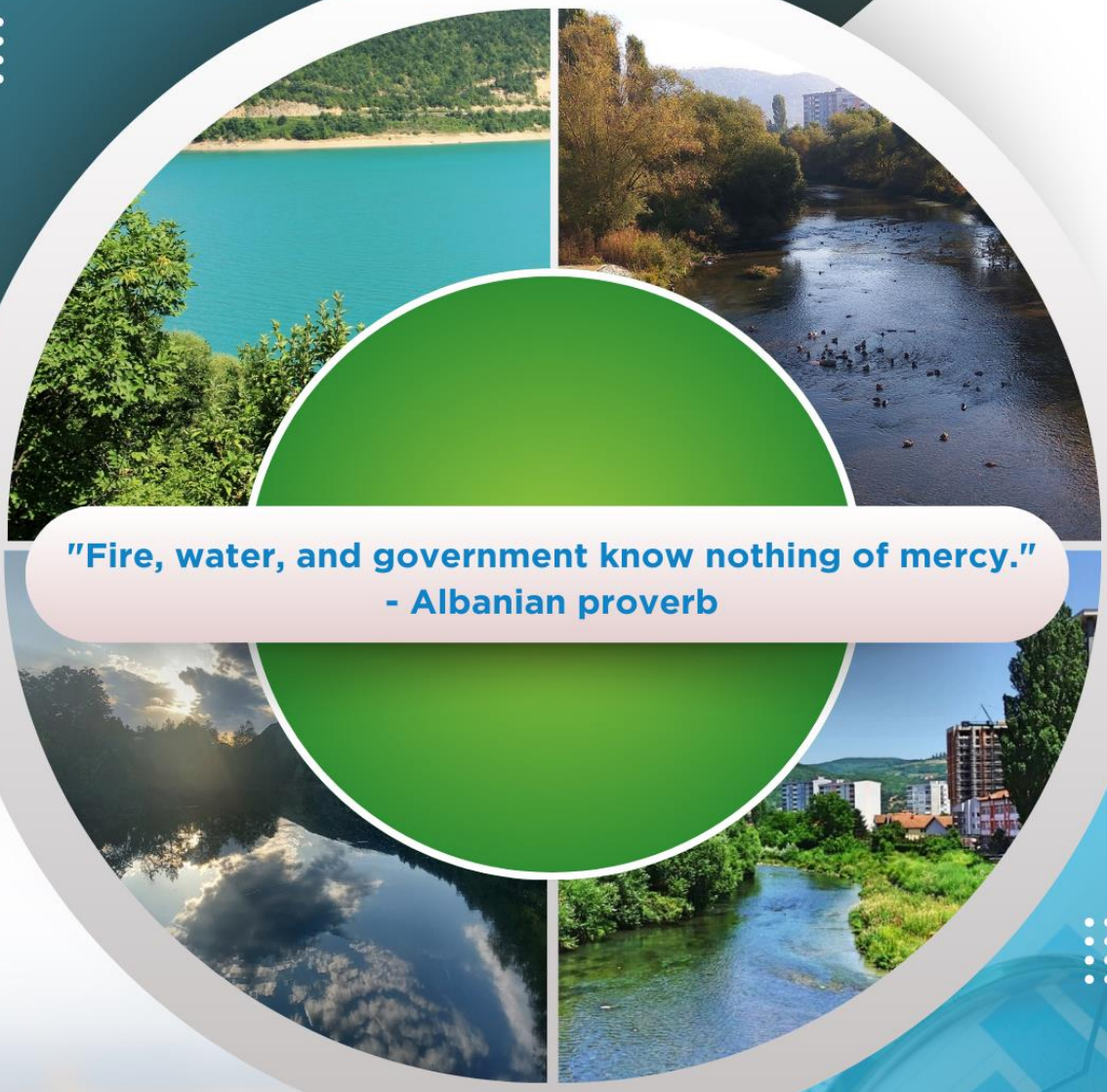
Advocacy Center for Democratic Culture

WATER SECURITY AND AVAILABILITY IN MUNICIPALITIES OF ZUBIN POTOK, NORTH MITROVICA, ZVEČAN, AND LEPOSAVIĆ



"Fire, water, and government know nothing of mercy."
- Albanian proverb

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MA- Environmental Policy and Governance

Integrated Water Resources Management in Kosovo

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Introduction

The non-governmental organization Advocacy Center for Democratic Culture (ACDC) was established in 2011 in North Mitrovica. The organization's goal is to promote the development of an inclusive society without discrimination, characterized by transparent institutions guided by the principles of the rule of law. The organization aims to nurture a society capable of defending its democratic institutions and upholding human rights standards against any violations. Its focus is on supporting equal access to justice for all and increasing the efficiency of legal processes, especially concerning fair trials and timely justice.

In pursuit of its goals and the values it advocates for, ACDC collaborates with individuals, organizations, and institutions, both at the local and central levels. Through years of experience, it has been shown that the most effective partnerships arise as result-driven endeavors that involve individuals, representatives of civil society organizations, and strong partnerships and collaboration with institutions.

The pursuit of the organization's objectives involves a strategic effort to influence decision-makers to change their policies based on the applicable legal framework in Kosovo and best comparative practices. Additionally, ACDC is part of government and municipal working groups that bring together a wide range of perspectives from other organizations to address specific issues within a limited timeframe.

With the absence of an institutional framework for water management, reliable water supply, sewage, and irrigation services, Kosovo faces significant challenges. This problem also spills over into the Northern municipalities, which still lack effective local policies to address these urgent issues.

As part of its mandate to create recommendations for local-level policies, ACDC, in collaboration with an expert in water conservation and environmental protection, has taken on the role of formulating recommendations for local policy, namely, the development of a comprehensive strategy for "Protection and Improvement of the Water Quality of the Ibar River and its Tributaries within the Municipalities of Zubin Potok, North Mitrovica, Zvečan, and Leposavić" as part of the project "Strengthening Environmental Awareness in Northern Kosovo."

Through this project, ACDC aims to support policy-making processes and decision-making related to water management. The foundation of water supply in the Northern Kosovo municipalities comes from the Ibar River and Lake Gazivode. However, due to the lack of municipal regulations providing guidelines for the formulation of appropriate local water management policies, the situation becomes very complex. ACDC, within the scope of this comprehensive strategy, seeks not only to contribute to society but also to encourage decision-makers to actively address these urgent and pressing issues.

The project is implemented within the program “Integrated Water Resources Management in Kosovo” (IWRM-K), funded by the Swiss Agency for Development and Cooperation (SDC) and the Government of Kosovo, and implemented by Skat Consulting Ltd. (Switzerland) in consortium with the Environment Agency Austria (EAA).

The influence of water and other resources on the development of communities in the north of Kosovo

The rich history of Kosovo is a derivative of abundant natural resources, the availability of quality soil, rare metals and minerals, and moderate climatic conditions. Among all these factors, water availability have historically played the most significant role in the developmental history of this region. The abundance of water in Kosovo in the form of a network of streams that are not significant natural barriers has created conditions for the development of society in Kosovo. Additionally, unobstructed mobility of military and trade routes has historically made Kosovo a highly significant geopolitical point and a battleground on the Balkan Peninsula.

Throughout history, and even today, Northern Kosovo represents a geographically unique area. It can be argued without reservation that the geographical and morphological characteristics of this area are likely the primary reason for the demographic distinctiveness of this region. In comparison to the rest of Kosovo, Northern Kosovo is a mountainous terrain interspersed with the valley of the Ibar River. Before the mid-20th century, this region was highly inaccessible during the winter months due to heavy snowfall and restrictions on movement between the areas on the left and right banks of the Ibar River due to the high water levels from early autumn to the beginning of summer in the next year. Such characteristics and terrain provide ideal conditions for the unhindered development of communities under the vertical monopoly of power by occupiers, such as the Ottoman Empire.

Geomorphic characteristics directly influenced the historical political organization of this part of the Balkan Peninsula and the concentration of the predominantly Serbian community in Northern Kosovo. The Serbian community, during the Turkish occupation of the Balkans, naturally developed in marginal areas far from the dominant influences of administrative and military administration. Evidence for this can be seen not only in the distribution of settlements and population but also in the dispersive patterns of settlement development and residential architecture with fortification elements on facades and space organization (scattered village fields and residential buildings as towers with gunports).

Northern Kosovo and favorable hydrological conditions also have another insufficiently researched characteristic that has shaped modern Kosovo: the historical legacy of early industry. During the summer months when rivers and streams dried up in Kosovo, caravans arrived in Northern Kosovo loaded with raw materials to obtain the necessary services in dozens of watermills or rolling mills. The Čečevska River in the Zubin Potok municipality is one such example and evidence of the first industrialization in technological terms. Besides archaic milling technology, the first hydroelectric power plant with a capacity of 2x750 kW (today lying at the bottom of Lake Gazivode in the village of Kovače) was built on this river between the two World Wars.

Today, the most significant hydrological feature of Northern Kosovo is the Ibar River and the water infrastructure located on it. The Ibar River is the only river in Kosovo that creates a hydrological surplus. This river hosts the most significant water infrastructure with capacities of over 70% of water reserves in Kosovo, upon which communities, economy, and industry in almost the entire Ibar River basin area in Kosovo depend. Considering the sensitivity of hydrological conditions in terms of the consequences of climate change in Kosovo and Kosovo's limited capacity to create more favorable adaptation models for climate change, it is almost paradoxical that the topic of integrated management of the Ibar River basin has never been raised in the Brussels dialogue, except for point 7 of the Washington Agreement. This paper does not intend to address issues in this aspect, except in terms of optimal usability, creating investment environments, and protecting community interests. However, for the purpose of building overall water security and accessibility, dialogue and communication are the keys to all solutions. In this

regard, it must not be allowed to postpone this issue indefinitely because the consequences of unresolved issues will pose threats to all communities in Kosovo.

The lack of water from renewable sources will be one of the greatest global challenges of this century. The Balkan region, which has a sensitive history of instability resulting from ethnic intolerance and doctrines of control over spaces occupied by members of other ethnic communities, should commence public dialog about shared water resources to ensure long-term sustainable water use.

The Anatomy of Water Resource Problems

Kosovo faces challenges in its water resources from renewable sources withwith limited inflow of international rivers water sources. The issues of water availability and the uneven distribution of economic activities and population create significant stress on water resources in Kosovo. Historically, investment environments in Kosovo have largely contributed to this strain, primarily within the Ibar River basin, which burdens one of Kosovo's two most significant rivers. Due to the spatial distribution of ethnic communities, this pressure on water resource also affects community relations in Kosovo. The interdependence between water system strain and interethnic tensions is an underexplored and under-debated topic in Kosovo. Instead of fostering desirable cooperation models and sustainable development mechanisms, political doctrines of control are gaining popularity, indicating inadequate utilization and distribution of the wealth generated by productive activities using this resource.

> *"Kosovo is uniquely dependent on internal water resources with a very low dependency ratio. The only water that enters the country other than in form of precipitation is the water that enters Gazivoda Lake from Iber river. This is around 300-400 MCM/year, or around 9 percent of total water resources in the country. The combination of low internal and externally produced water resources contributes to water scarcity."*
>
> WB 2018. (World Bank, 2018)

Water is a critical resource, and water availability is the foundation for socio-economic development. All productive activities depend on water availability and predictable hydrological patterns. Disruptions in hydrological cycles have significant economic and ecological consequences. In recent years, we have witnessed extreme water shortages and unprecedented droughts (in 2022) as well as periods of exceptional heavy rainfall, especially during the warm winter and spring of 2023. Data provided by EntsoE on hydro reserves for energy production shows extreme values over the past two years. In the Balkan region, according to EntsoE data (entsoe.eu), electricity production from hydro reserves surpassed the annual production of 2022 within just 26 weeks in 2023. These extreme disturbances in hydrological conditions should mobilize the public and political elites to take action to protect and preserve water and water resources in Kosovo. Initiatives for the conservation of water ecosystems to combat and adapt to climate change should be launched. Unfortunately, despite such extreme disturbances in hydrological systems, environmental protection issues still have a low priority in Kosovo's public sphere and political arena compared to other pressing matters.

Water pollution, both surface and groundwater, has a long history in Kosovo. In addition to the industrial legacy of mining and metallurgy, which still has the most significant impact today, water quality is increasingly affected by urban development, agriculture and more recently, economic activities in the private sector. Water availability in central Kosovo is becoming a growing problem, as highlighted by major global financial institutions (World Bank, EBRD, EIB, etc.). Therefore, it is illogical that there are no significant initiatives for water treatment and quality control in the Ibar River basin, especially considering

that this basin connects two nations historicall rivals on the Balkan Peninsula. Delaying the resolution of this issue could have security implications in the region.

Such development trends, in conditions of inadequate water resources for material and economic growth, do not foster a favorable investment climate or elevate the level of security in the region.

Ecological (In)justice

The hydrological network in the Ibar River basin, through its major tributaries such as the Drenica River, Priština River, Gračanka River, Lab River, and Sitnica River, transports pollution downstream directly into the Ibar River and subsequently into the Velika Morava River, Danube River, and the Black Sea. The Trepča Complex historically was the largest polluter in this part of the Danube River basin. While the reduction of Trepča's production activities has reduced the environmental consequences, they have not disappeared, as contamination continues today from mining waste disposal sites and ore tailings. However, a more significant impact on water quality and water availability comes from large water withdrawals in urban development, energy sector, Industry, and agriculture, as well as pollution that comes from agriculture and other economic activities in central Kosovo. All these productive activities in central Kosovo have effects on larger areas within the Ibar River basin.

When comparing the spatial distribution of water resources and the ethnic structure in Kosovo, it can be concluded that over 720,000 residents in Kosovo (World Bank, 2018) are supplied with water originating from areas where the majority of the Serbian population lives (Municipality of Zubin Potok). Furthermore, all pollution as a byproduct of certain productive activities in central Kosovo is transported back to the areas where the majority Serbian population lives, namely the municipalities of North Mitrovica, Zvečan, and Leposavić.

Setting aside all open political, geopolitical, and ethnic issues between the two communities in Kosovo, in the case of the Ibar River and the transport of pollution within and beyond Kosovo, there is an evident problem of environmental injustice, where one ethnic community suffers disproportionately greater economic damage and the consequences of water pollution in central Kosovo compared to the other community. The northern part of Kosovo serves as the water resource base for one-third of the population in Kosovo, as well as the majority of industry and the economy. Simultaneously, it acts as a collection point for all discharges and contaminations from Kosovo that are transported towards the Danube basin. All documents and analyses from national and international institutions highlight what is obvious, withholding clear legal determination of the issue (environmental injustice). Furthermore, all documents and analyses provide recommendations that such a situation is unsustainable and that initiatives should be launched to establish a mechanism for the joint management and utilization of the transboundary Ibar River basin. This culminated in a document resulting from the Washington Agreement (commissioned by the U.S. Department of Energy and conducted by the Pacific Northwest National Laboratory) titled "Possibilities for Using the Water Resources of Lake Gazivode," dated 2021.

This document will not get into the transboundary characteristics of the Ibar River and challenges of any kind that go beyond the national framework and jurisdiction that local governments in northern Kosovo may or may not have. This paper and the proposed measures aim to suggest mechanisms of collaboration and activities that must be initiated in local governments and across the entire Ibar River basin as a connected water area to ensure water availability and the optimal health of water ecosystems in Kosovo. The conditions for action in this field are not favorable today, as they have not been in the past few decades. Nevertheless, acute problems in this area threaten to escalate with increased mistrust between communities, which could result in an unpredictable and insecure future. Trust between communities can only be built on respect for interests, dialogue, and cooperation between communities, as well as the identification of responsibilities. The principle of environmental justice must be the cornerstone for

building sustainable development, including ethnic and economic relations in Kosovo. Open dialogue and a communication mechanism supported by technology for data collection and analysis should be the means to create the necessary efficiency toward sustainable solutions.

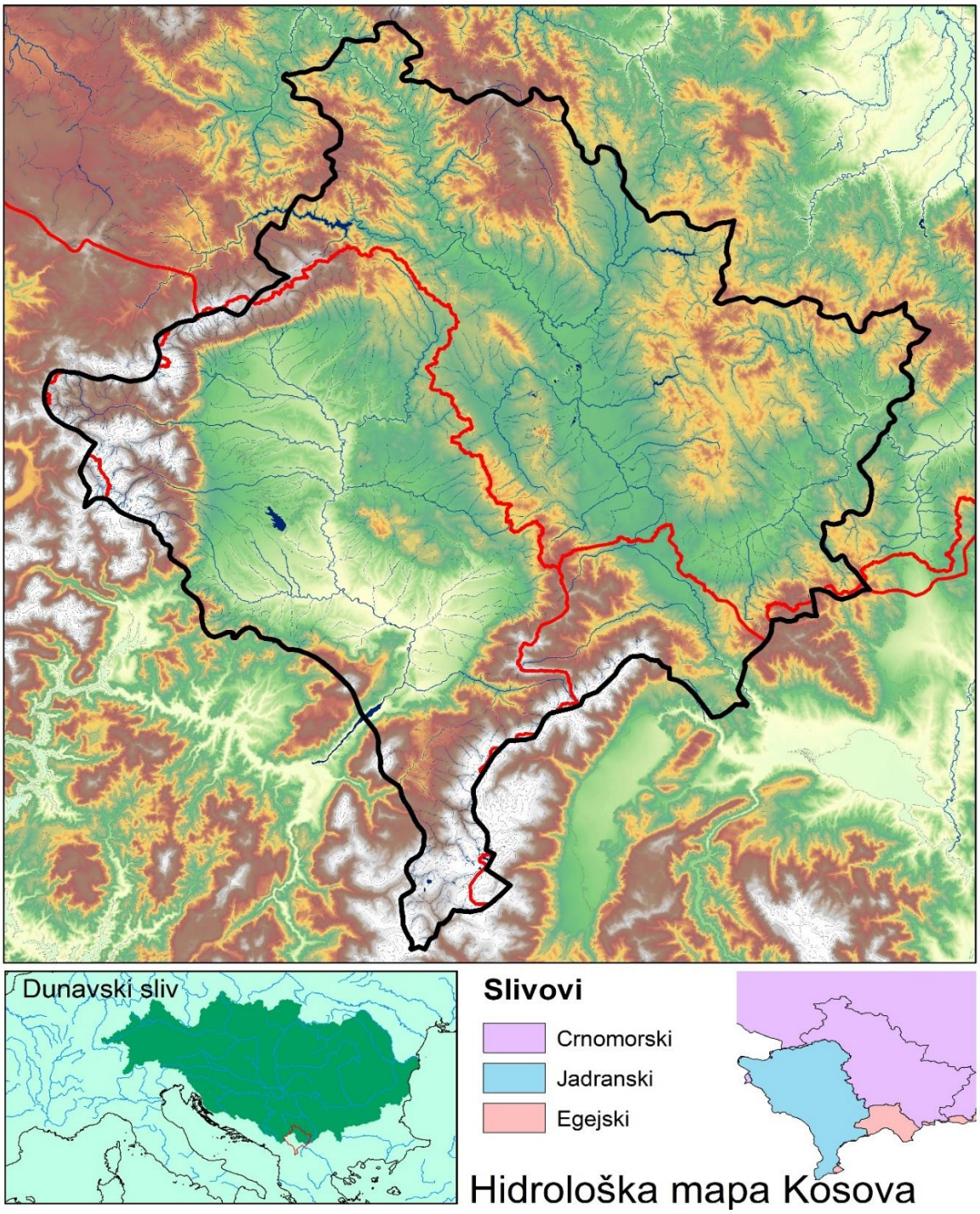


Figure 1. Hydrological map of Kosovo.

Geomorphological characteristics

Geographical location

The municipalities in northern Kosovo are part of the statistical region of Mitrovica, which consists of the municipalities of Mitrovica, North Mitrovica, Srbica, Vučitrn, Zubin Potok, Zvečan, and Leposavić. According to data from the Kosovo Statistical Office, this region covers an area of 2,052 square kilometers and has a population of approximately 224,121 inhabitants. The subject area of this document includes municipalities with a Serbian majority: Zubin Potok, North Mitrovica, Zvečan, and Leposavić, which, according to the Kosovo Statistical Office, encompass an area of 1,001 square kilometers and are estimated to have a population of 39,150 residents (it is assumed that the actual population is much higher), classifying northern Kosovo as an area with the lowest population density in the entire region.

These municipalities are geographically located along the course of the Ibar River, which flows from its source in Montenegro to its confluence with the West Morava River in Kraljevo. The Ibar River is divides mountain ranges on the right bank of Mokra Gora and Kopaonik from Mitrovica downstream to Leposavić, and the the left bank Rogozna Mountain along the entire course on the Kosovo side.

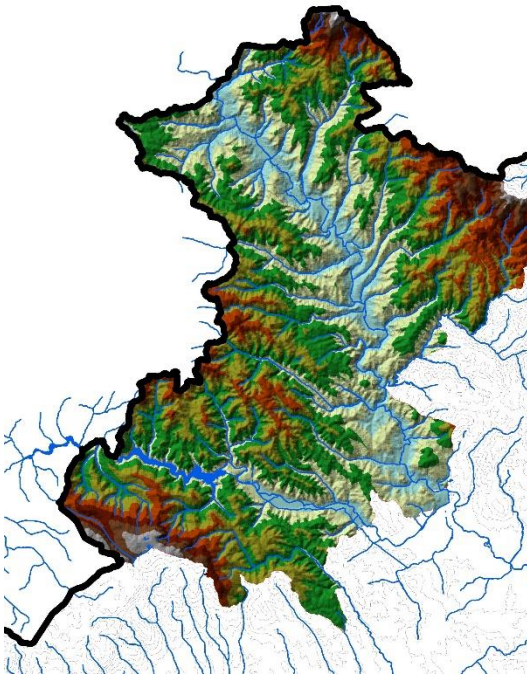


Figure 2. Topography of northern Kosovo.

Almost the entire territory of these municipalities is located within the Ibar River watercourse and the Black Sea basin, with the exception of a part of the Zubin Potok municipality where the Crepuljska River (later known as Klina) originates and flows into the White Drin, forming part of the Adriatic basin.

The area of these municipalities is predominantly mountainous, and most of the population lives in rural areas, with the economic base being the exploitation of natural resources and environmental services (agriculture, livestock farming, and forestry in Zvečan and Leposavić, mining and metallurgy). An exception is the municipality of North Mitrovica, which is the only major urban area with a service-based economy and serves as a regional center for providing services to the communities (higher education, secondary and tertiary healthcare services, etc.).

Hydrological Capacities of Kosovo - Analysis

In Kosovo, there are four major rivers: Ibar, White Drin, Lepenac, and Binačka Morava. They also represent drainage channels towards three different sea basins:

- Ibar and Binačka Morava flow into the Danube / Black Sea basin..
- White Drin flows into the Drin / Adriatic Sea basin.
- Lepenac flows into the Vardar / Aegean Sea basin.

Other significant rivers in Kosovo include Sitnica, Lab, Pecka Bistrica, Decanska Bistrica, Mirusa, Klina, Nerodimka, and others. The Nerodimka River presents a unique and rare natural phenomenon: bifurcation, or the splitting of the watercourse and its entry into two basins (Sitnica in the north and Lepenac in the south), making it a natural water corridor between two basins (Black Sea and Aegean Sea). Table 4 provides the hydrological potentials of the most significant watercourses in Kosovo.

rIVER	P Km²	O km	L km	Q m³/s	Flow l/s/ km²	Slope %	Annual flow x10⁶ m³	Effective precipitation (mm)	Average precipitatin mm	Runoff coefficient
Beli Drim	4340	409,8	111	61,7	:	2,1	1946	452,5	900	0,508
Ibar	4044	436,8	90	36,4	6,39	0,3	1148	218,4	782	0,301
Lepenac	653	130	50	8,4	14,91	4,6	190	469,8	912	0,516
B. Morava	1564	216	76	8,7	5,59	1,5	330	188,8	736	0,256
Adriatic Basin										
Black Sea Basin										
Aegean Basin										

Table 1: Hydrological potential of rivers in Kosovo, Kosovo Agency of Statistics (ask.rks-gov.net)

These values represent the quantities after water exploitation in Kosovo. From the provided table, it can be concluded that the Adriatic Basin is the most significant in Kosovo. It covers approximately 41% of Kosovo's territory and represents 45% of the available water capacity in Kosovo, but it also has the highest runoff coefficient.

In terms of water exploitation, Kosovo has a very low available quantity of water from renewable resources per capita. This is primarily due to high population density and low average rainfall. Compared to other parts of the Danube Basin, Kosovo has smaller amounts of available water from renewable sources. In the World Bank document "Danube Water Program (World Bank Group, 2018)," Kosovo is classified as one of the stress micro-catchments in terms of renewable water availability, alongside the Czech Republic (Figure 3).

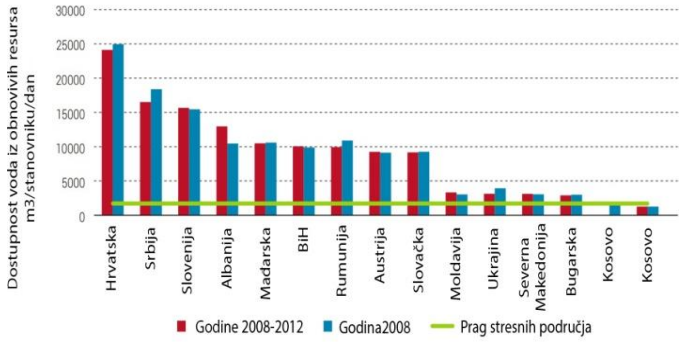


Figure 3. Availability of water from renewable sources (World Bank Group, 2018)

Of all the rivers in Kosovo and the region, relative to its capacity, the Ibar River basin has the most developed infrastructure. In its course, in the Zubin Potok municipality alone, there are three reservoirs on the Ibar River: A. Lake Gazivode, B. Pridvorica Dam, and C. Prelez Reservoir, which serves as the feeder for the Trepča plant's flotation process with a capacity of 1 m3/s.

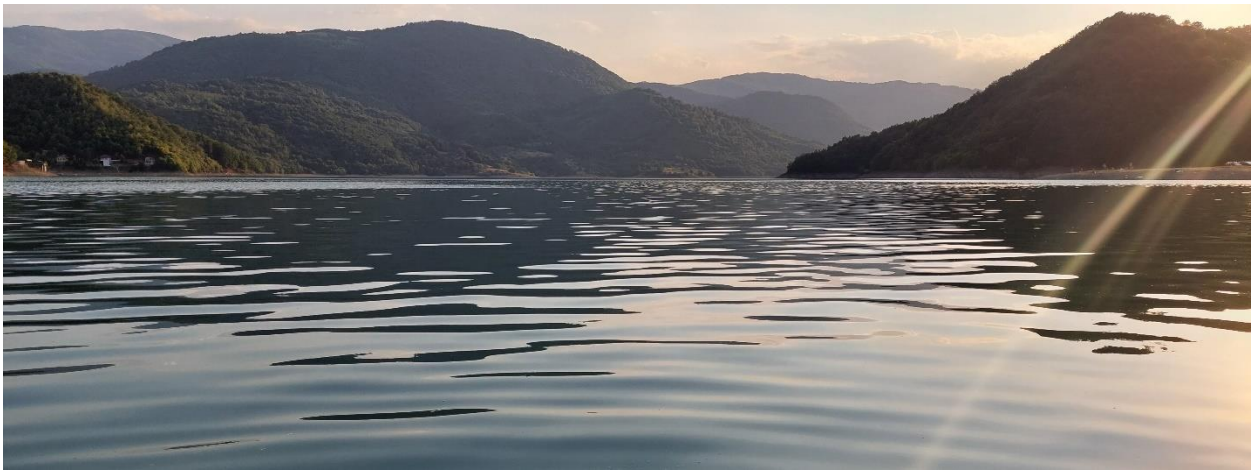
The Gazivode Dam and Lake (also known as Ribarićko Lake, and recently referred to as Ujman in official documents and media reports in Kosovo) were built to supply central Kosovo with water for agriculture, industry, and electricity production.

There are seven artificial reservoirs in Kosovo: four in the Ibar River basin (Gazivode, Pridvorica, Baltlava, and Badovac, with Prelez not included in this database), two smaller ones in the Binačka Morava basin (Prilepničko and Livočko), and one in the Beli Drim basin (Radonjićko).

Reservoir	Capacity	Resources u %
Lake Gazivode	390.000.000,00	69,02 %
Radonjićko Lake	113.000.000,00	20,00 %
Lake Badovac	26.400.000,00	4,67 %
Batlavsko Lake	30.000.000,00	5,31 %
Prilepničko Lake	4.200.000,00	0,74 %
Livočko lake	1000000,00	0,18 %
Pridvoričko Lake	490.000,00	0,09 %
Total	565.090.000,00	99,13 %

Table 2. Reservoir Capacity, Kosovo Statistical Office (ask.rks-gov.net)

Kosovo also has a large number of natural reservoirs, glacial lakes, and isolated water systems, including groundwater rivers, with unique aquatic ecosystems. These currently lack any protection and are of interest to the scientific community and biodiversity.



The Ibar River

The Ibar River, as well as the Binacka Morava River, are part of the Velika Morava River basin and both belong to the Danube River basin, specifically the Black Sea basin. Nearly half of Kosovo's territory is part of this basin, making it one of the two most significant hydrological systems in Central Europe (the other being the Rhine River basin).

Figure 4. Danube Basin

The Ibar River originates on Mount Hajla near Rožaje in Montenegro from a karstic spring. As a mountain river, it flows through a gorge throughout its course in Montenegro. It flows west to east from its source to Ribariće, and then, as a lowland river, it flows through the Ibar or Stari Kolašin valley to the Zvečan (upper Ibar) and the fortress. Near Mitrovica, it makes a bend and redirects its course south to north until it joins the West Morava River in Kraljevo. In Mitrovica, it receives its right tributary, the Sitnica River, which is the longest river in Kosovo.

The water quality at the source is typical of karstic spring sources, but its quality significantly deteriorates as it flows through populated areas in the municipalities of Rožaje. On the right bank of the river in the gorge between Rožaje and Bać, there is a landfill site, "Mostina," from which waste reaches directly into the Ibar River, which carries it into the Gazivode reservoir.

The right tributaries of the Ibar River in Kosovo include the Čečevska River, which flows directly into the Gazivode reservoir, as well as the Zubodolska River, Zli Potok, Sitnica, Bistrica, and Drenska River. The left tributaries include the Varaška River and Lučka River, which also accepts the Bubska River in its course, Jagnjenjička River, Koriljska River, Banjska River, and Jošanička River.

The most significant tributary of the Ibar River in Kosovo is the Sitnica River, which originates north of Uroševac and flows along the central axis of the Kosovo Valley, from south to north, accepting the Lab River as its right tributary, along with many other smaller and larger streams. This tributary represents the main source of pollution of the Ibar River in its lower course because it connects all industrial centers and major towns and cities in Kosovo (Kišnica Mine – Gračanica with its tailings, Feronikl – Glogovac, the towns of Uroševac, Priština, Kosovo Polje, Obilić, Vučitrn, Mitrovica, Power Plants A and B, Fafos in Mitrovica, and Trepča in Zvečan, Leposavić, and Rudnik).

The total area of the Ibar River basin in Kosovo is 4,040 km2 (Kosovo Statistical Office), which is approximately 37% of Kosovo's territory. The length of the Ibar River course in Kosovo is 102.1 km (In some documents and statistics, this value is shown as 89.5 km).

River	Hydrological station	R (km^2)	Qmin,95% (m^3/s)	Q (m^3/s)	Qmax, 1% (m^3/s)
Ibar	Rožaje			2,5	
Ibar	Bać	405,2	0,2	5,6	545
Ibar	Ribarići	850		10,32	
Ibar-Lepenac	Pridvorica			-3,5m^3/s	
Ibar	Prelez	1109	1,29	12,52	416,9
Ibar	Prelez		0,8	13,39	452,80
Kanal-Trepča	Prelez			-1,0 m^3/s	
Sitnica	Nedakovac	2590	0,30	12,9	482,2
Ibar	Leposavić	4701	2,81	31,39	1030,0
Ibar	Raška	6268	5,24	41,65	1137,0

Table 3. Hydrological Parameters of the Ibar River at Measurement Point

Source of Information	(Hrvačević, S., 2004)	(Government of MNE, 2001)	Measurement Points:Pridvorica-Prelez	(Government of Kosovo, 2015)	(Jaroslav Černi, 2000)

On the river Ibar, the most significant water management installation in this part of the region is located. In the municipality of Tutin, in the settlement of Ribariće, the river Ibar flows into the Gazivode reservoir at an elevation of 692.70 meters above sea level. The head dam and the Gazivode reservoir were constructed in the 1970s, with a reservoir capacity of 390 million cubic meters of water. This artificial dam isolated the upper and lower Ibar water systems and, in ecological terms, caused irreparable environmental damage to the ecosystem of the Ibar river basin. What we see today and can observe in terms of ecosystem health is almost entirely a human-made ecological system. In the upper upstream part of the dam, some endemic species (bleaks and carp) have survived, but new species have been introduced, promising better yields and catch quality for fishing associations (pike-perch, catfish, and more recently, silver carp), as well as many other species, many of which are invasive.

Downstream from the head dam of Gazivode, although the river Ibar has commendable water quality characteristics, it lacks a high-quality aquatic ecosystem. This is primarily because the Ibar river flows out from the bottom of Lake Gazivode, resulting in nearly identical water temperatures throughout the year and the absence of seasonal influences critical for ecosystem health. As the Ibar river is released from the bottom of Lake Gazivode, the temperature fluctuates between 4 and 9 degrees Celsius at the main outlet, which is not conducive to the development of aquatic ecosystems.

Furthermore, between the head dam of Gazivode and the confluence of the Sitnica River in Mitrovica, there are three additional vertical barriers on the Ibar River that hinder sediment transport and the connectivity of watercourses for aquatic ecosystems (Pridvorica Dam, Prelez Dam, and the recently constructed reservoir and aqua park in the Suvi Do settlement).

Availability of Water

There are two factors that affect the availability of water: hydrological potential in the area and population density. Kosovo falls into the category of areas under water stress based on both factors, with a higher emphasis on population density.

According to the adopted methodology and indicators from the Forum on Natural Resources in 1989 (Falkenmark, 1989), the threshold for water-stressed and sustainable micro-catchments concerning available water from renewable sources is 1700m3 per capita per day. Kosovo falls into the category of crisis micro-catchments with limited water quantities based on this criterion, as documented in publications by the World Bank on Water Supply Safety in 2018 (World Bank, 2018) and the National Water Strategy of Kosovo 2017-2035 (Kosova, 2017). The "World Water" website (www.worldwater.io) provides an interactive display of areas in the world facing water scarcity according to the same methodology, making it evident the extent of the water scarcity problem in Kosovo today and in the future.

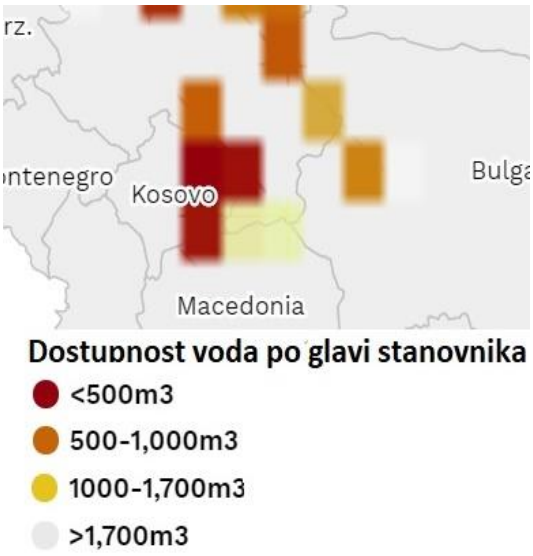


Figure 5. Water availability stress areas www.worldwater.io

In Kosovo, the highest population density and the largest concentration of industrial activities are found in the Ibar River basin. Therefore, in addition to having the highest utilization of water resources, especially in northern Kosovo, the highest level of economic activity and pollution originating in the Ibar River basin is transported back to northern Kosovo through the Sitnica and Lab rivers.

Apart from pollution transport on the Ibar River basin, there is also a noticeable high level of water resource withdrawals from the Ibar River with a growing trend at the expense of water outflow from the river downstream. This further strains all economic systems downstream, as the quality and usability of surface and groundwater from northern Mitrovica to the outflow point of the Ibar River in Jarinje endanger the economic interests and public health of the Serbian community.

Such practices create injustice in the exchange and distribution of environmental services and disproportionately distribute the costs of productive activities in Kosovo, mainly to the detriment of one community, which should be openly debated in the public sphere.

Precipitation

Given that Kosovo has no significant amounts of transboundary waters except for the Ibar River, the hydrological situation in Kosovo is determined by the quantity and intensity of local precipitation. Data on precipitation from various sources do not coincide. The Kosovo Institute of Statistics provides data for annual precipitation, as shown in Table 2.

Zona / Godina	2015	2016	2017	2019
Kosovska Dolina	696.7	754.2	591.9	561.9
Metohijska Dolina	683.9	948.7	701.1	696.9

Tabela 4.Godišnje padavine , Zavod za statistiku Kosova

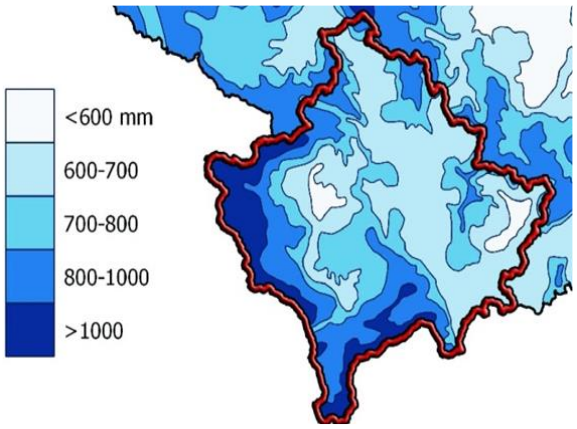


Figure 6: Average Annual Precipitation

Digital and thematic maps, depending on the source, period, and measurement methodology, also provide different information, but all data agree that the eastern part of Kosovo is the area with the lowest precipitation levels in the region (below 600 mm/year). The National Water Strategy of Kosovo 2017-2036 claims that the average precipitation across the entire territory of Kosovo is 596 mm, which is the lowest number among all researched values. The average precipitation amount in all basins derived from the data in Table 4 is 768.02 mm/year. Figure 6 is an isolated segment from the scientific work of the group of authors in the publication "Water Resources in the Western Balkans" (Blagojević, 2018).

Climate

The majority of Kosovo's territory, including the north, falls within the continental climate of the temperate zone. A smaller portion of southern Metohija belongs to the Mediterranean and continental climate. This diversity of climatic conditions means that on the territory of Kosovo there are specific and different climatic features, but at the same time with diverse biological characteristics.

Northern Kosovo is characterized by climatic conditions influenced by high altitudes and higher levels of precipitation, especially snowfall during the winter months. In terms of hydrological conditions, this environment showcases the strength and hydrological resilience of the Ibar River basin because snow serves as a solid-state water reservoir for most of the year. The slower melting of snow replenishes the sources of mountain rivers with fewer fluctuations in flow, which is not the case for torrential rivers.

Anthropogenic Influences on Kosovo's Hydrological Cycles

Economic and industrial development, as well as all productive activities in Kosovo, have their negative effects on the hydrological characteristics of Kosovo. Just like anywhere else on the planet, economic growth generates higher demand and thus creates greater stress on water resources from ecosystems. In this regard, water resources in Kosovo are the most sensitive sector. Considering the limited availability on one hand and a large population, high population density, and macroeconomic indicators (poverty) on the other hand, pressure on the water sector is expected to increase in the coming period.

It is therefore surprising that there is no responsible way of managing resources, not only regarding water but also in other areas, which can have unforeseeable impacts on Kosovo's hydrological cycles. We will mention some:

Development and construction in valleys, especially in urban areas in Kosovo, have seen an unprecedented growth trend since 1999. Besides radically altering watercourses (concrete canals) and narrowing riverbeds and banks, changes in land use from agricultural to construction have a significant negative impact on hydrology. While industrial waste had the most significant impact on poor water quality characteristics before 1999, the influence of untreated wastewater is more pronounced today.

Agriculture and rural development are sectors where international institutions have significantly invested in Kosovo over the past two decades. In addition to increased extraction of surface and groundwater for agricultural production, all other activities in rural areas have highly negative effects on hydrological cycles (e.g., illegal deforestation).

Climate change and alterations in climatic and hydrological cycles have already been observed in Kosovo. Extended periods of drought, more frequent flash floods, as well as forest fires, pose a threat not only to property and the environment but also to human lives in Kosovo.

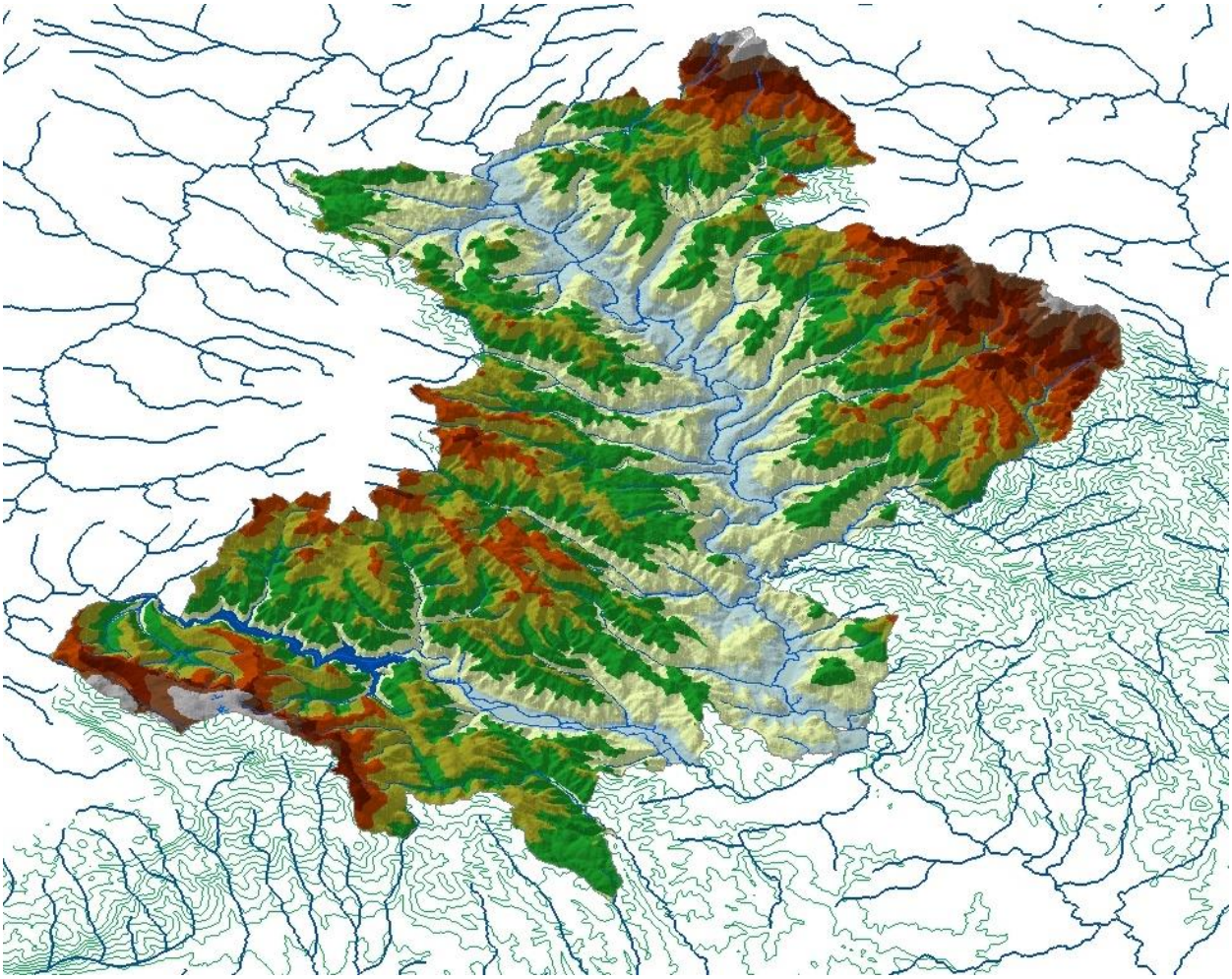


Figure 7. Topographic and hydrological representation of municipalities in northern Kosovo

Municipalities with a Serbian majority in northern Kosovo:

Zubin Potok Municipality

Zubin Potok Municipality is located in the northwestern part of Kosovo in an area known as the Old or Ibar Kolašin. It covers an area of 333.5 km² and is one of the larger municipalities with the lowest population density (around 45 inhabitants per square kilometer). The municipality consists of 63 villages and settlements, with Zubin Potok being the largest and serving as the administrative, cultural, and

economic center. Other major settlements include Velji Breg, Zupče, Brnjak, Bube, Lučka Reka, and Čabra. There are a total of 64 inhabited places in the municipality.

In terms of geomorphology, the terrain of the municipality is characterized by the Mokra Gora and Rogozna mountains, separated by the course of the Ibar River and the Gazivode reservoir. The upper course of the Ibar River within the municipality is characterized by the Gazivode reservoir with a capacity of 380 million m^3, while downstream, the Ibar flows through the Radičpolje alluvial plain and Zubačka Valley, where the territory of the municipality ends.

The unique geomorphological characteristics of high environmental and ecological value are most pronounced along the Ibar River, which cuts through two mountains: Mokra Gora and Rogozna. The Rogozna terrain was primarily formed by tectonic influences, and due to pronounced geological activity, the soil composition is rich in mineral resources. The Mokra Gora terrain, often referred to as the "beauty of the Balkans" as described by Jovan Cvijić, was also shaped by tectonic changes but exhibits pronounced karst and glacial elements and formations.

Zubin Potok Municipality shares borders with the following municipalities: -Kosovska Mitrovica to the west, Zvečan to the north, Novi Pazar and Tutin to the east, and Istok and Srbica municipalities to the south.

In hydrological terms, Zubin Potok Municipality is one of the most significant points in the region. Within its territory are located the most important water management facilities in Kosovo, starting with the Gazivode headwater dam and reservoir. Not far below the hydroelectric power plant, there is the compensatory Pridvorica reservoir. The Pridvorica reservoir houses the water diversion installation into the Ibar Lepenac canal, a telescopic-type canal that is 40 km long and supplies water to the energy sector, industry, agriculture, and the needs of the population in central Kosovo. The capacity of the Ibar Lepenac canal is designed for a maximum of 6 m^3/s, but the optimal water delivery capacity is 3.7 m^3/s. Several kilometers downstream from the Pridvorica reservoir is the Prelez dam, constructed by the Trepča combine, with a canal capacity of 1 m^3/s for the flotation needs of the combine. This dam is currently obsolete, and the water from the canal is not being used by the intended consumer.

These highly concentrated water management capacities unfairly place Zubin Potok Municipality in the focus of interests that generate unnecessary instability and tensions. Considering the nature of water resources, which are fluids originating from where the water resources come from, the solutions imposed in terms of water resource control and management by central institutions will not have positive long-term effects.

In addition to the Ibar River and the Ibar Lepenac canal, the following rivers and tributaries of the Ibar on the left bank are significant within the municipality: -Lučka River (with its tributary Bubska River), Duboki Potok, and Jagnjenička River. The tributaries of the Ibar on the right bank are: -Brnjačka River, Čečevska River, Zubodolska River, and Zli Potok.

Zubin Potok Municipality is located within the watershed of the Black Sea and the Adriatic Sea. In the area of the village of Velika Kaludra, the Crepuljska River, which downstream of the village of Donji Srmac is called Klina, originates from a karst spring. This river is part of the Adriatic watershed. It used to be abundant in migratory aquatic species, especially eels, which were plentiful in the summer when the rural population was active and needed a higher protein intake in their diet. The construction of the Feriza dam and reservoir (Kukës, Albania) has permanently interrupted this corridor of aquatic species from the sea to the Crepuljska River.

North Mitrovica Municipality

North Mitrovica Municipality is a newly established municipality resulting from the Ahtisaari Plan. The municipality was formed by the decision of the Government of Kosovo and the Law on Administrative Boundaries on February 20, 2008 (2008/03-L041). However, the formation and organization of the municipality in a political sense had to wait for the first agreement on the normalization of relations in 2013 when the first local elections were held, and the first assembly of this municipality was constituted.

The municipality covers an area of less than 5 km² on the left (north) bank of the Ibar River. The territory of the municipality consists mostly of built-up land with a high degree of parcel development and utilization. It is estimated that around 15,000 residents live in the municipality, along with at least 5,000 individuals who are students or employed in some educational, healthcare, or other service-related activities that are developed in this sole urban area where the Serbian community is the majority. All these unregistered citizens equally, and often even more, burden municipal, traffic, and other infrastructure systems, and they contribute to the increased demand on already strained public service systems (water supply, sewage, electricity supply, etc.).

At the administrative border between North and South Mitrovica municipalities, the Sitnica River flows into the Ibar River, and it is the most polluted river in Kosovo. Sitnica carries untreated wastewater waste, including all cities and settlements in the Ibar Valley in Kosovo (Gračanica, Lipljan, Uroševac, Priština, Obilić, Podujevo, Vučitrn, and others), as well as industrial waste from the Kišnica mine tailings in Gračanica, ash and organic matter from thermal power plants in Obilić, tailings from the Feronikl plant in Glogovac, industrial heritage of battery and Fafos factories in Mitrovica, and many others.

Upstream on the Ibar River, in the Suvi Do settlement, within the zone designated for sports and recreation, South Mitrovica municipality, with the support of international donors, built a headwater dam and a water reservoir. The purpose of this area seemed to be the development of riverside areas along the Ibar River and the creation of an investment in the environment for the development of sports and entertainment services. Facilities such as the aqua park, entertainment centers, and other amenities developed either spontaneously or purposefully as derivatives of this major infrastructure project.

What is notable is that, regarding the implementation of this project, there was a complete lack of cooperation and involvement of all communities, as well as experts in terms of environmental impact. There is no evidence that not only North Mitrovica Municipality but also other municipalities north and south of the entire Ibar River basin, which connects water resources and the health of aquatic ecosystems in a much broader area, are consulting regarding the implementation of this and other projects. By creating an artificial barrier in this water area with favorable characteristics for improving the quality and health of the ecosystem, aquatic species are restricted in their movement, and they can only migrate upstream along the Sitnica River.

North and South Mitrovica municipalities share the border on the Ibar River, and given that this dividing line has been a conflict area in recent history, it is almost illogical that there is no mechanism for communication and cooperation in solving wastewater treatment and waste management problems. Greater attention must be given to this, and incentives for cooperation in the preservation and improvement of water quality and the environment in both municipalities must be created.

Zvečan Municipality

Zvečan Municipality is located immediately adjacent to North Mitrovica Municipality downstream of the Sitnica River into the Ibar River. It covers an area of about 123.01 km² and includes the town of Zvečan with 35 populated places. Historically, the economic base of the municipality was the metallurgical industry, as the settlement of Zvečan originated as a workers' residential area of the Trepča company.

The territory of Zvečan Municipality is situated between Zubin Potok Municipality to the south and Leposavić Municipality to the north, along the ridge of the Rogozna Mountain from the Zvečan fortress northwest toward Novi Pazar. This strip of land was historically known as the Imperial or Turkish road, serving as one of the most important transportation corridors in the Middle Ages, connecting Skopje to Sarajevo or Dubrovnik when the Balkans were part of the Ottoman Empire.

Zvečan Municipality abounds in historical and archaeological characteristics that display diversity. Within the territory of the municipality, one can find cultural, economic, and technological interactions among different peoples and influences. The municipality is home to sites of Neolithic settlements along the banks of the Ibar River, archaeological remnants from the Roman era, and medieval architecture and heritage from the Nemanjić period with technological and metallurgical influences from the Saxons who built their Gothic church at the entrance to the Old Mine (Stari Trg). In more recent history, the influence of industrialization between the two world wars provided significant momentum and created environmental complexes and urban compositions that can also be found in Welsh settlements in Great Britain. Although this industrial legacy was significant in socio-economic development, it caused the greatest damage in terms of the quality of water resources, not only within this municipality but also more broadly, as industrial remnants, including tailings, pose a threat to public health and the health of ecosystems downstream from this municipality.

Within the territory of Zvečan Municipality, significant tributaries of the Ibar River are on the left bank: Kozarevska River, which flows past the Žitkovac settlement, Koriljska River, and Banjska River. On the right bank, several streams flow, including Leskov, Radevački, Doljevački Potok, and Grdeč. The mouth of the Bistrica River is located right on the border with Leposavić Municipality.

Among the unique hydrological characteristics of the municipality, the Banjska springs in the Banjska settlement stand out. These springs have been developed historically and were used for medical treatments and rehabilitation. Additionally, there is an undeveloped source of thermal-mineral water in the village of Joševik.

Critical points that have the capacity to threaten water quality, and thus public health and cause economic harm to downstream communities, include the industrial heritage of the Trepča company with its smelter, tailings, and pyrite deposits, as well as the Žitkovac tailings. Apart from these metallurgical industry landfills, the partially rehabilitated Balaban landfill on the right bank of the Ibar River near the main road and the issue of untreated wastewater from the Zvečan settlement and other upstream settlements also have a significant impact.

Leposavić Municipality

Leposavić Municipality is the northernmost municipality in Kosovo and is one of the larger municipalities in terms of its area, covering approximately 540 km². It has the largest population, estimated at over 18,000 residents (OSCE). The municipality is vertically divided by the Ibar River valley, with the Rogozna Mountain on the left bank and the Kopaonik Mountain on the right bank. Besides Leposavić, larger populated places in the municipality include Sočanica, Lešak, and Ibarska Slatina. There are a total of 72 populated places within the municipality.

Leposavić Municipality is abundant with small rivers and tributaries of the Ibar River, including significant ones on the left bank: Vučanska River, Grkajska River, Jošanička River, Vračevska River, and Trebićka River. On the right bank, there are several streams, including Bistrička River, Veliki Potok, Ceranjska River, Zrički Potok, Sočanička River, Dobravska River, Leposavska River, Tvrđanska River, Ostrački, and Bistrički Potok.

Leposavić Municipality has a mixed economic activity, but mining and metallurgical activities dominate, with several active mines and flotation facilities. In the territory, there are several industrial tailings sites that pose a threat not only to the quality of surface and groundwater but also to air quality, as particulate matter is emitted after prolonged dry periods.

The municipality of Leposavić also has exceptional hydrological characteristics, such as thermal-mineral springs in the village of Vuča. It is likely that these hydrological comparative advantages were the reason for the existence of the Roman city of Municipium Daranorum in the Sočanica settlement and other archaeological traces in the immediate vicinity of this settlement. There is evidence that certain parts of the Sočanica settlement still use springs whose catchment was organized and formed in Roman times.

In Leposavić Municipality, there are no significant water management facilities, except for the water supply systems of Leposavić and Lešak, which draw water from the slopes of Kopaonik, and the Sočanica settlement, which relies on sources in the highlands above the settlement. Recently, a derivational mini-hydropower plant was constructed on the Bistrica River, right on the border between Leposavić and South Mitrovica municipalities. The project location is on the Bistrica River, which forms the border between the cadastral municipalities of Borčane in Leposavić Municipality and Selaci in South Mitrovica Municipality.

Unfortunately, the water abundance in Leposavić Municipality is most threatened in the vicinity of the Ibar River, where pollution concentrations transported in this part of the Ibar River's course are most pronounced. The Ibar River in Mitrovica receives its tributary, the Sitnica River, which is probably the most polluted river in the region. Besides industrial pollution and agriculture upstream from Mitrovica, the largest settlements in Kosovo, starting from Priština, through Vučitrn, Podujevo, and Mitrovica, discharge their untreated wastewater directly into watercourses. All this pollution accumulates in Mitrovica and is transported downstream by the Ibar River. The first retention areas and floodplains of the Ibar River are located at the beginning of the flat course of the river in the territory of Leposavić Municipality, from Ibarska Slatina to Lešak. In this part of the river's course, the Ibar River shows elements of a partially lowland river because it meanders in a relatively flat valley, and all material and sediment is deposited on large areas that are mainly agricultural land. The historical legacy of industry, agriculture, and urban development in Kosovo's Ibar basin can thus be analyzed in the sediments of the soil in this municipality.

Settlements in Leposavić Municipality are forced to use drinking water sources in the tributaries of rivers on the Rogozna and Kopaonik mountains, which are not always reliable and do not have the capacity to meet the demands of the economy, industry, and communities. Therefore, the drinking water supply problem remains an acute economic issue and does not contribute to creating a favorable investment climate in the municipality.

The water from the underground flows of the Ibar River currently represents the only source for irrigation in the Ibar River valley, and the impact of the pollution of the Ibar River on the quality of agricultural products and the health of people and livestock is an inadequately explored area.

Leposavić Municipality's territory is, therefore, a funnel and the last stop in Kosovo in the outflow of the Ibar River toward its confluence with the West Morava River in the city of Kraljevo. This pollution and concentration of all polluters are the most diverse because all pollution from the entire Ibar basin upstream, including the Sitnica River, is collected in this municipality. Pollution is transported in the form of floating waste, but even more problematic is the transport of substances with sediments.

Biological-hydrological characteristics of significant importance

Northern Kosovo, as mentioned, is predominantly a mountainous area, but it is also highly diverse in terms of its geomorphology and hydrology, shaped by the origin and geological composition of the mountains.

The Mokra Gora mountain in the south is a typical karst area with karst elements such as sinkholes, basins, caves, and swallow holes. The plateau of the mountain abounds in geomorphological features and relics from the ice age, including sinkholes, basins, caves, and swallow holes (e.g., Savina River).The pressure of ice age ice layers has made the soil impermeable, so nearly the entire surface of Mount Mokra Gora is a vast wet meadow resembling a wet compost or a drier marshland. This geological peculiarity serves as a kind of regulatory mechanism for hydrological processes, as it acts as a water storage reservoir and provides stability and abundance to the springs on the northern slopes of Mount Mokra Gora in the municipality of Zubin Potok, and even more so on the southern slopes in the municipality of Istok. The origin of the name of the settlement "Istok" is commonly misunderstood as a cardinal direction. The accurate interpretation of the name's origin is "water spring", meaning that the settlement of Istok got its name because it represents the point where water "springs." The correct translation of the name of this settlement into Albanian should not be "Istog" (which has no meaning in any language) but rather "Burimi," which means "water spring."

Mount Mokra Gora is naturally connected to the broader area of the Prokletije mountain range in Kosovo and Hajla, along with Mount Žljeb in Montenegro, which is the largest reservoir of biodiversity in this part of Europe known as the Balkan Park. This vast area abounds in high-quality species of flora and fauna, some of which are on the list of endangered species.

Mountains Rogozna and Kopaonik owe their origin and composition to active geological volcanic activity, which indicates the availability and concentration of mineral resources. The geological history of this area is also evident in the large number of thermo-mineral springs in the municipalities of Zvečan and Leposavić, some of which have been only partially utilized. The most significant springs are in Banjska and Joševik in the municipality of Zvečan and Vuča in the municipality of Leposavić.

The evidence of the richness of this area is best described by the fact that diverse communities have been inhabiting and shaping this area for almost 5,000 years continuously. The development of settlements and communities began in the Neolithic period at the Valačka Stena site, evolving through Roman influence, Serbian medieval influence, and continuing with Ottoman influence, and finally framing in the last century with environmental and technological influence from the British in the field of lead and zinc ore exploitation. The rich history of this area is directly correlated with the availability of valuable minerals and metals. Toponyms, village names, and hamlet names on Mount Rogozna provide an interesting description of the wealth of this region with the frequent use of the word “gold” that is on Serbian “zlato” (Golden Laz, Golden Horn, Zlatište, Zlatar, etc.).

Unlike the mountain springs and sources on Mount Mokra Gora, the sources, streams, and rivers in the area of Mounts Rogozna and Kopaonik have larger fluctuations in hydrological cycles. This is due to the terrain composition, type of terrain, namely the large extent of erosive areas, and the absence of forests. Streams and rivers in this area exhibit torrential nature, and it is not unusual for them to dry up during the summer period.

The uniqueness and privilege that the municipality of Leposavić possesses is that the southern sides of Mount Kopaonik were historically part of the Kopaonik National Park, and as such, due to unfavorable investment climate and general uncertainty for investment, it remained an untouched nature reserve. The richness of plant and animal species represents a unique characteristic of this area and imposes an obligation on local leaders to pay more attention to the preservation and enhancement of ecosystem health in this area. Nature and wildlife are highly endangered by human impact, as humans selfishly appropriate disproportionately large amounts of water for various purposes at the expense of valuable diversity.

Demographic Basis and system water stress

The Statistical Office of Kosovo estimated that in 2021, Kosovo had a population of 1,772,971. Kosovo has a significantly higher population density compared to the region, with over 160 inhabitants per square kilometer. For comparison, the population density in the EU in 2022 was around 109 inhabitants per square kilometer (ec.europa.eu/eurostat).

Kosovo also exhibits an interesting age distribution with nearly precise standard deviation among comparative values. All statistical estimates and projections indicate that the population and number of inhabitants will plateau in the future, but the trends in economic development and settlement patterns within the Ibar River watershed territory will not yield the same effect. In this regard, considering the developmental trends and climate changes, it is expected that the Ibar River watershed area, as well as the Lepenac and Binačka Morava rivers, will become increasingly stressed in terms of water availability in the near future.

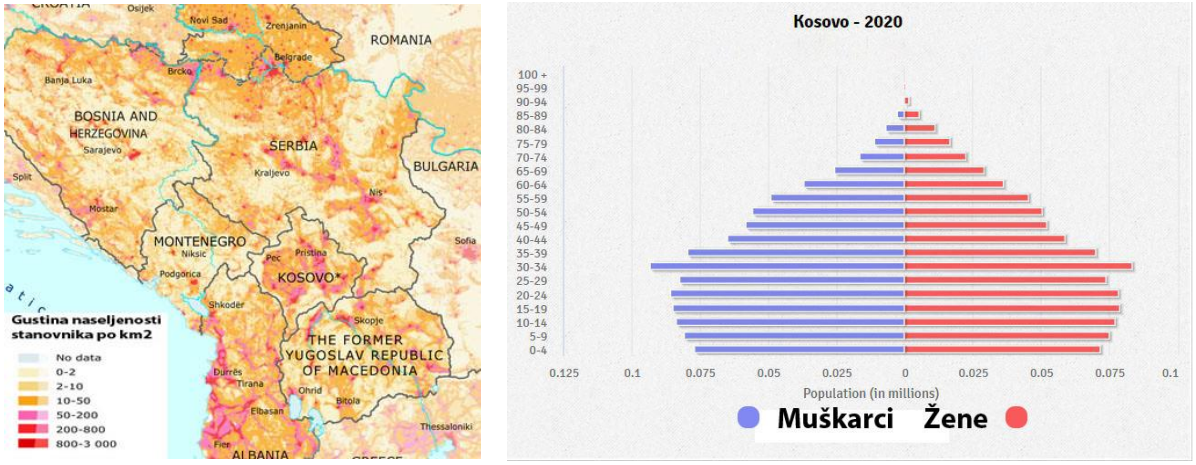


Figure 8 Demographic Characteristics

Population density (www.eea.europa.eu) and age structure of the population in Kosovo (indexmundi.com)

The population in Kosovo is distributed fairly evenly across the two most significant watersheds. However, in the analysis of resource allocation and impact on hydrological system stress, the distribution of population and economic activities exert the most pressure on the Ibar River watershed. Evidence for this assertion can be found in the 2018 World Bank document (World Bank, 2018). The table below provides some indicators of stress on the Ibar watershed in Kosovo.

According to the World Bank document, the Ibar watershed in Kosovo covers 36.75% of Kosovo's territory and houses over 40% of Kosovo's total population. For comparison, data from the same document yields similar results for the White Drin watershed (41.43% of the territory with around 37.64% of Kosovo's population). Hydrological values for all watersheds are presented in Table 5. What demonstrates the stress on the Ibar watershed is the low runoff coefficient, which is exceptionally small for the Ibar, at 37%, while for the White Drin, which has the largest hydrological capacity, the runoff coefficient is over 50%.

Considering that pollution generated throughout the Ibar River watershed accumulates in the municipalities in the north of Kosovo, the issue of environmental justice in terms of access to quality living conditions is undoubtedly relevant. Unfortunately, the legal framework offers limited room to address this problem and adequately compensate the communities in northern Kosovo for the costs incurred from pollution in economic activities or the consequences for public health.

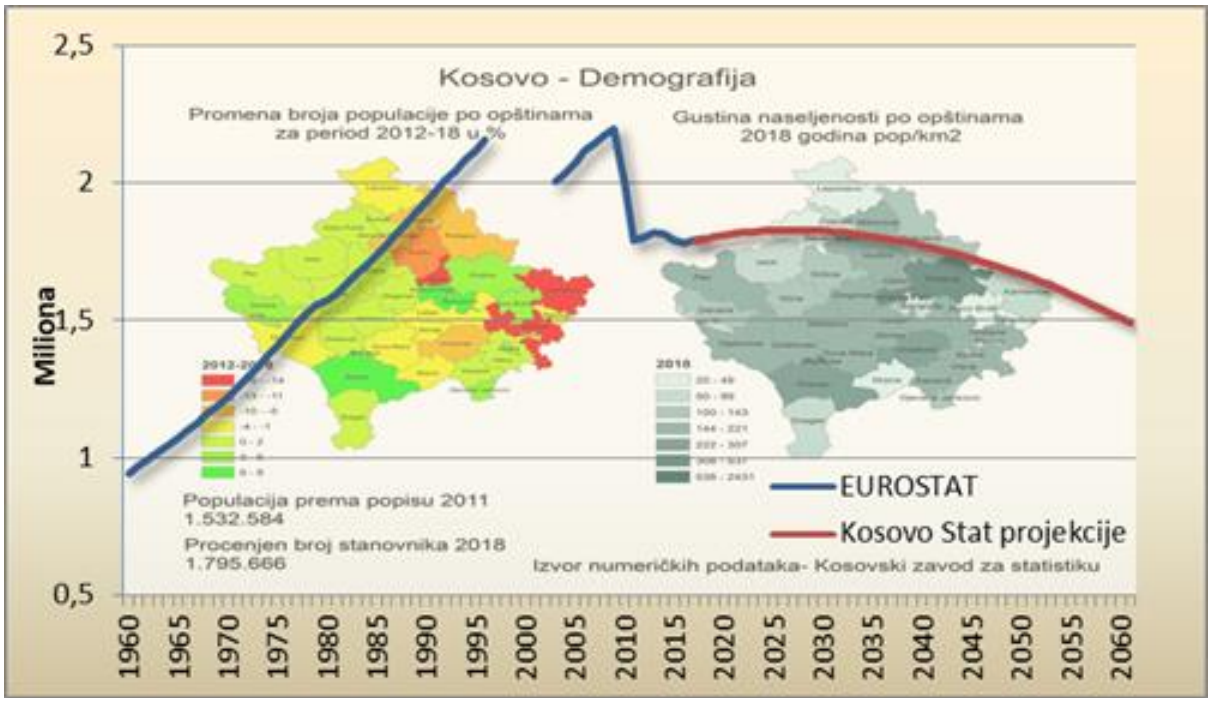


Figure 9. Demographic trends in Kosovo

River Basin	JM	White Drim	Plavska River	Lepenac	Binačka Morava	Ibar Kosovo
Area (km2)	(km²)	4.519	252	582	1.546	4.009
Population (no.)	no.	670.000	35.000	160.000	190.000	725000
Population Density	/km2	148	139	275	123	181
Water Balances						
Annual Precipitation	(mm/g)	839	1076	842	677	693
Annual Precipitation per Basin	[Milion m³/g)	3791,44	271,15	490,04	1046,64	2778,24
Average Discharge	(m³/s)	61,01	4,71	8,7	10,8	32,6
Discharge	(Milion m³/g]	1924,01	148,53	274,36	340,59	1028,07
Runoff Coefficient	%	50,75%	54,78%	55,99%	32,54%	37,00%

Table 5. Surface Water Balance of Kosovo (World Bank, 2018)

However, there is room within political processes to identify clear responsibilities and to find adequate solutions that will redistribute resources from productive activities that generate contamination on the ground towards the communities that suffer the greatest damage.

Land Use and Its Impact on Water Resource Quality

Forests

Kosovo covers an area of approximately 10,887 km2. Through spatial analysis of available raster data using GIS platform, we conclude that forests cover about 4,550.89 km2, which is nearly 42% of Kosovo's territory. The area of the four municipalities in northern Kosovo is 1001 km2, representing slightly less than 10% of Kosovo's territory. However, this area is rich in critical resources that form the material basis for social and economic development in central Kosovo. Almost 70% of the northern Kosovo territory is covered by forests, which accounts for over 15% of Kosovo's total forest reserves. The Global Forest Watch (www.globalforestwatch.org) interactive platform provides data for smaller forested areas but with nearly identical proportions in forest reserves (16% of the forest fund is located in the four municipalities in northern Kosovo).

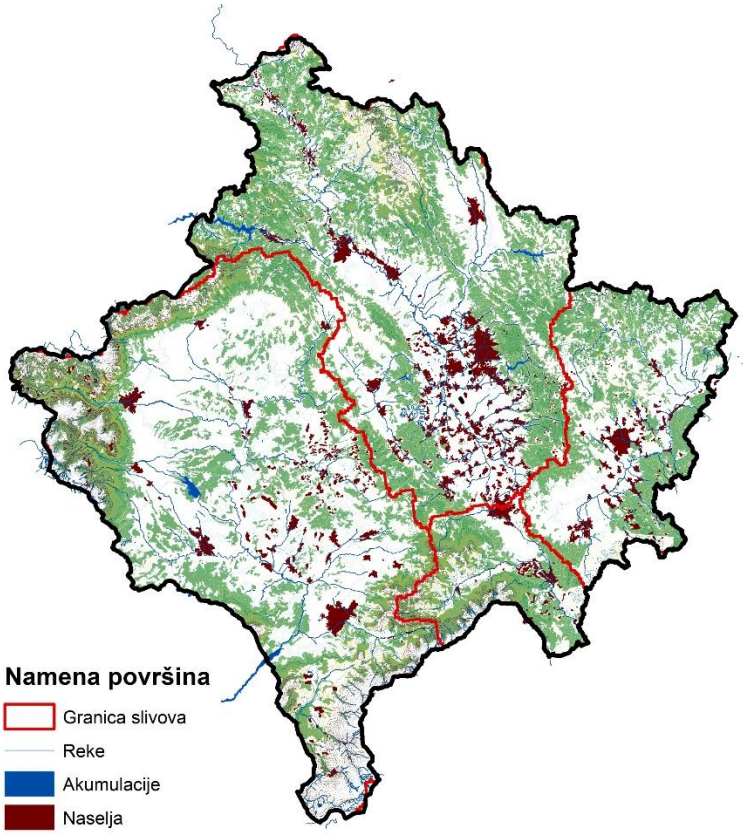


Figure 10. Land Use in Kosovo.

Unlike forests, water and water resources are an even more extreme pattern for analysis, as the most significant part of Kosovo's economy relies on water resources originating from water management facilities in northern Kosovo. It has been noted that the largest settlements and major economic activities are situated within the Ibar River watershed, further straining the hydrological capacities of the entire watershed.

The condition of forests and the forest fund in Kosovo is at its lowest level in modern history. While responsibility and culprits can easily be identified, the real problem of deforestation and illegal logging stems from the overall poverty and macroeconomic parameters in Kosovo. Despite the development and growth of Kosovo's economy, firewood remains and continues to be the cheapest energy source in Kosovo. However, what is relevant for this analysis is the synergy between forests and hydrological cycles and disturbances that become increasingly apparent and evident in a very short period of time.

Forests are a unique system that generates soil, produces oxygen, provides refuge and habitats for animals. Critical in terms of hydro-meteorological cycles, forests, with the soil they provide against erosion, store excess water from rainfall and reduce the risk of flash floods. The disappearance of forests in certain areas leads to landslides, major floods causing damage to property and infrastructure

Figure 11. KO Čečevo Zubin Potok image a. GFW (globalforestwatch.org), b. Orto 2010, c. 2020

throughout Kosovo. In recent years, floods have become more frequent all over Kosovo and could be avoided if the forest fund were in optimal condition.

Forests and forested areas are a completely neglected segment in spatial planning, left to negative trends of misuse for which everyone bears responsibility. Market mechanisms and interests that have driven unsustainable practices of forest and ecosystem destruction in northern Kosovo for over two decades are also beyond the boundaries of the municipalities in northern Kosovo, as the market for timber, whether for firewood or as raw material in the construction industry, extends beyond these municipalities. Given that the transport and trade of these raw materials are legally regulated in Kosovo, it can be concluded that responsibility for all consequences cannot be local. However, solving this problrm can be local if administrative or fiscal mechanisms are established, but in the meantime, it is necessary to view all problems dynamically and consider the interests of all actors influencing the disappearance of the forest fund in Kosovo, including northern Kosovo.

Urbanization

In addition to the loss of the forest fund, Kosovo has witnessed an intensification in the trend of urban development, involving the conversion of land from agricultural, forested, or other uses into construction land. This trend has seen stable growth and shows no signs of slowing down, especially in the suburbs of the cities of Pristina and Kosovo Polje, which have now become a true metropolis in Kosovo. This development has led to changes in porosity over large areas, creating additional challenges to river flow capacities and underground water reservoirs. Surface waters after rainfall have thus become threats in the plains of central Kosovo, and flood-prone areas of the Gračanica River have become a seasonal regular

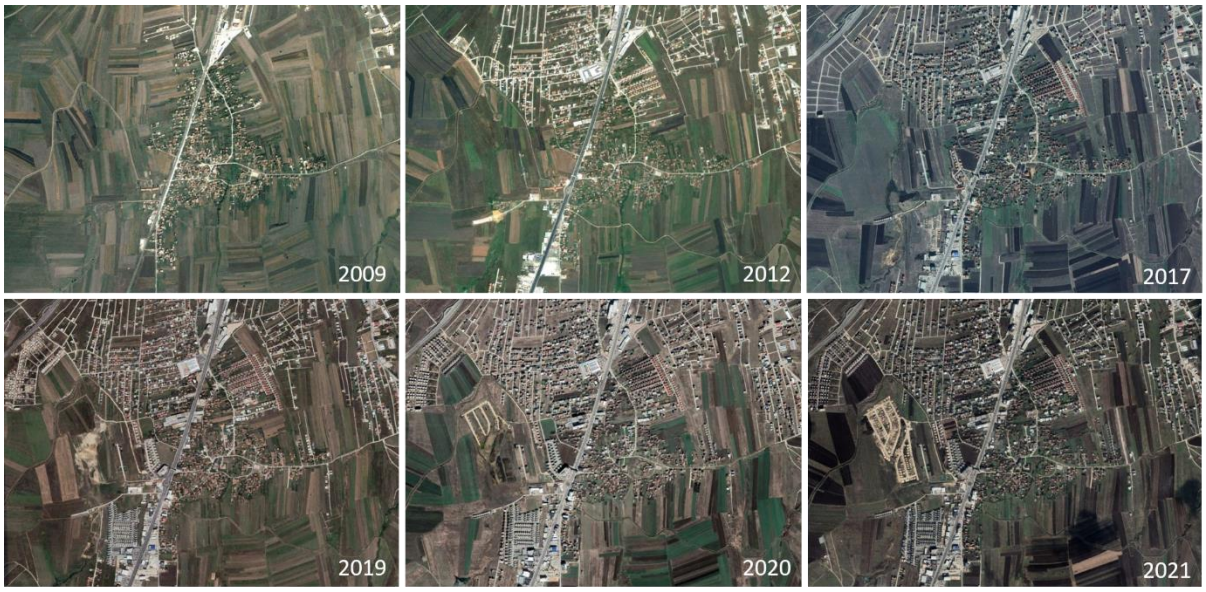


Figure 12. Čaglavica settlement. Change of land use in the period 2009-2021

occurrence. Considering that this plain is directly contaminated by airborne particles from the Kišnica mines and the Kosovo A and B power plants, the role of transporting contamination from this area downstream is more than evident.

In addition to soil impermeability and increased intensity and frequency of floods due to inadequate surface water control infrastructure during periods of frequent rainfall, urbanization has also led to increased release of municipal and industrial wastewater. This problem is becoming an acute issue and threatens to completely destroy existing reserves and stocks of drinking water in both surface and groundwater in Kosovo. This problem is not isolated to a single area in Kosovo; rather, it is a direct threat to public health across Kosovo. The lack of wastewater treatment systems has long been recognized, and although some initiatives to address this problem have been initiated, considering the scale of the problem and the scarcity of financial and human resources, this problem will take a long time to resolve. In terms of wastewater control and management in the area covered by this document, the municipality of Zubin Potok has gone the furthest. In the previous period, it built two WWTPs (wastewater treatment plants) in the settlements of Gazivode and Velji Breg (using aerobic digester technology) and began the process of constructing collectors and WWTPs for the Zubin Potok settlement. Other municipalities in northern Kosovo are considering possibilities and are awaiting opportunities for support in implementing such projects, as well as the realization or completion of other projects in terms of waste management and disposal (Srbovac Regional Landfill).

Industrial heritage

Industrial heritage poses the widest threat, not only to local ecosystems but also to the entire Black Sea basin (mining tailings, ash from thermal power plants, industrial/municipal wastewater, etc). Outdated and inefficient technologies in industry, energy, and agriculture are still in use across the Balkans, and a complete lack of management and control of air, soil, and water pollution prevails. The impact of the energy sector on the environmental quality in Kosovo is significant, yet Kosovo still struggles to escape energy poverty. What is happening before our eyes is an ecosystem collapse that has nearly entirely eliminated habitats for wildlife, and reports on public health threats in pollution-affected areas are already becoming a political issue.

Despite this alarming situation, no initiative has been launched to address these problems, which have broader implications than just their location of origin, from the perspective of common interests. Given that relations and distrust between communities are at historical highs, where trivial matters often have a disproportionately large impact, changes in environmental conditions, whether accidental or intentional, can, like any other trivial reasons, have the potential to create new conflicts. For this reason, it is illogical to ignore and avoid environmental problems, even within the technical negotiations between Belgrade and Pristina. Even more illogical is the indifference of central institutions in Kosovo to the problems and costs that pollution disproportionately creates in areas inhabited by minority communities.

Considering that water ecosystems are the most endangered in Eastern Europe and that hydrology is very sensitive to disruptions brought by climate change, cooperation in protecting water resources should be an imperative for the entire Western Balkans region. Almost half of Kosovo's territory belongs to the Black Sea/Danube basin, with the Ibar and Binačka Morava rivers both flowing out of Kosovo into Serbia through areas predominantly inhabited by Serbs. Kosovo is thus compelled to align the interests of the Serbian community and the right to access clean and safe water within its national interests. This move serves to reduce opposition on domestic grounds while also bolstering arguments on the international stage, such as gaining access to organizations like the International Commission for the Protection of the Danube River (ICPDR) (icpdr.org/).

However, there is no comprehensive analysis of the environmental quality in Kosovo, as it is logical that such an analysis would create political issues domestically. If a correlation between pollution and increased incidence of diseases, for example, in the vicinity of thermal power plants were proven, the problem would become merely political, without practical solutions or alternatives to existing energy sources at affordable prices. Nevertheless, this should not be an excuse for negligence and indifference. The illustration in Figure 13 depicts critical contamination points that significantly impact the water quality in the Ibar River, requiring attention in all current and future investment projects.

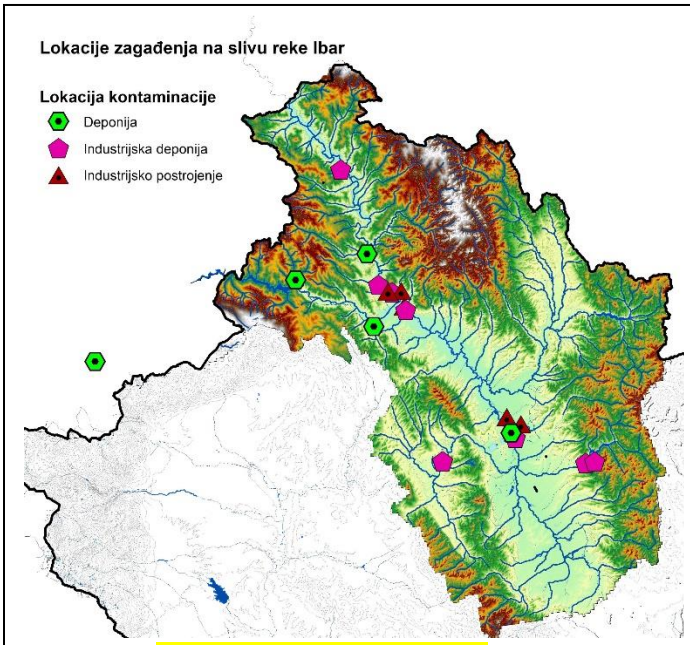


Figure 13. Ibar basin Areas of Concerns

The illustration of critical areas highlights 18 locations that have a significant influence on

the water quality in the Ibar River Basin, and consequently, in the Ibar River itself, as it flows through the Leposavić municipality. One critical point is located beyond Kosovo's borders in Montenegro, in the Rožaje municipality, where the Mostina landfill is situated directly on the banks of the Ibar River. From this landfill, waste is washed away by the water flow and transported downstream to the Gazivode reservoir.

Central Kosovo hosts several industrial facilities, such as Feronikl, thermal power plants, and mining waste sites like the Kišnica mine. Within this region, several sanitary landfills are located, the effects of which need to be monitored and controlled. Additionally, there are several tailings ponds from the Trepča complex, Fafos, and battery factories.

The extent of the problem and the scale of activities required for the remediation of these sites surpass local and national capacities. A comprehensive analysis of the situation is necessary, along with the development of an action plan for remediation to eliminate contamination transport. In this sense, regional cooperation and support from international financial institutions are essential. New approaches and innovative solutions are needed, which can stem only from educational institutions with institutional backing.

Inter-Ethnic (mis)trust

After decades of communication and dialogue absence between the two communities, the process of dialogue and the participation of the Serbian community in Kosovo's political processes have brought about a wave of optimism. This optimism initially led to the creation of collaboration and communication mechanisms aimed at easing citizens' lives and removing barriers that had limited economic development.

Environmental issues, or topics directly related to the environment, have never been part of the dialogue, neither directly nor indirectly, except for one exception in the Washington Agreement, which pertains to the study of the Gazivode hydrotechnical management mechanism (Washington Agreement, Point 6).

The circumstances of the frozen conflict and the absence of cooperation under the constraints of limited natural resources, coupled with insufficient investment and poverty in Kosovo, are taking their toll on societal and economic development for all communities. Furthermore, climate change and inadequate spatial and resource management are creating new risks within an already turbulent region. These factors together are causing significant adverse impacts on the environment, which cannot be isolated or localized to a single area. Through hydrological cycles and air movements, negative environmental impacts are transported to other areas, so activities in one area cause ecological and economic damages in another.

Contaminations and pollution primarily exist due to the economic inability to establish mechanisms and improve technologies for mitigating environmental impacts. There are instances when pollution and excessive resource exploitation are deliberately directed against the opposing side, placing environmental issues on par with the pursuit of political interests. Several examples of this nature exist in northern Kosovo. The most evident is the prohibition of access and use of the Grmovo regional landfill for members of the Serbian community, which dates back to 1999. Municipalities in the north, with predominantly Serbian populations, were forced to find temporary (poor) solutions and use inadequate sanitary landfills to keep waste management under some control. This acute problem, threatening both the population and agriculture along the Ibar River, has persisted since the arrival of the international mission in Kosovo and remains unresolved to this day, despite economic support from international institutions.

Trends of escalation and de-escalation are becoming increasingly frequent. Like other issues, problems are postponed indefinitely, deepening the divide between communities and the distrust of citizens towards central institutions.

Water Management Challenges

Regulatory Framework for Water Management

The supreme authority responsible for crafting water management policies in Kosovo is the Inter-Ministerial Water Management Council (IMWMC) (Article 15 and 16 b of the Water Law No.04/L147). This body consists of five members headed by the Prime Minister. The Council has its secretariat and offices in Pristina and reports directly to the Ministry of Spatial Planning and Environment. This ministry holds the

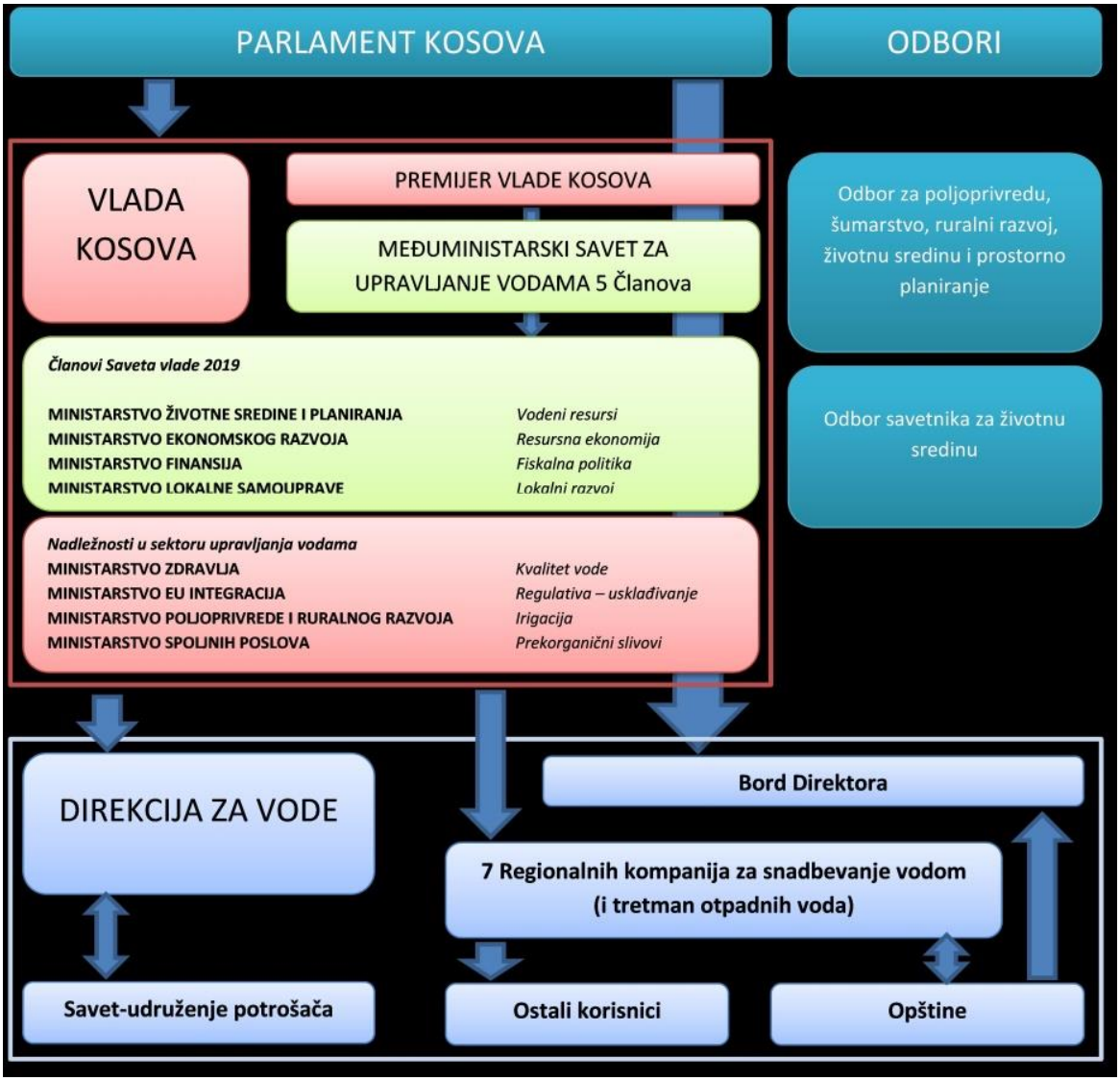


Figure 15 The organizational structure of the Water Directorate(www.arru-rks.org)

majority of responsibilities for implementing water management policies, both directly and through its agencies, such as the Environmental Protection Agency (www.ammk-rks.net). The Council also includes a representative from donors, and in the current composition, the Swiss Cooperation Office (SKAT, 2019) is represented. They bring a team of experts in water management and their work is funded by institutions or the donor community in Kosovo.

This governance mechanism, with direct responsibility, should ideally yield the most favorable outcomes and define the financial and investment framework for solving water-related issues and protecting water ecosystems with ultimate accountability. However, the socio-political and economic market ecosystem is not currently favorable for addressing environmental issues at the level of universal principles, let alone principles that safeguard community interests.

The document "First Review of the State Water Strategy of Kosovo 2023-2027" (Government of Kosovo, 2017) also provides a list of laws and regulations related to water management.

Nr	Law
1	Law No. 04/L-147 on Kosovo Waters
2	Law No. 03/L-087 on Public Enterprises
3	Law No. 05/L-042 on the Regulation of Water Services
4	Law No. 06/L-039 on the Geological Survey of Kosovo
5	Law No. 03/L-025 on Environmental Protection
6	Law No. (No. 03/L-233) on Nature Protection
7	Law No. 06/L-035 on Hydrometeorological Activities
8	Law No. 03/L-040 on Local Self-Government
9	Law No. 02/L-078 on Basic Health
10	Law No. 04/L-174 on Spatial Planning
11	Law No. 02/L-9 on Agricultural Land Irrigation

Administrative Instructions and Regulations Required by the Water Law

1	Article	8-	AI MZSPP No. 05/2016 on the Regulation of the State of Water Resources
2	Article	18	-Regulation (VRK) No. 11/2014 on the Work of the Inter-Ministerial Council on Waters
3	Article	22	-AI MZSPP 09/2016 on the Organizational Structure and Additional Tasks of the Regional Administration for River Basins
4	Article	42	-AI MZSPP No. 09/2017 on the Design, Construction, and Operation of Dams
5	Article	47	AI MZSPP No. 19/2015 on Protection from Harmful Effects of Water
6	Article	48	AI MZSPP No. 04/2016 on Criteria and Procedures for the Protection of Watercourse Banks and Reservoirs
7	Article	54	AI MZSPP No. 11/2016 on the Determination, Method, and Procedures for the Protection of Erosion Areas
8	Article	58	AI MZSPP No. 16/2017 on the Classification of Surface Water Bodies
9	Article	59	AI MZSPP No. 17/2017 on the Classification of Groundwater Bodies
10	Article	60	AI No. 02/2022 on the Conditions, Methods, Parameters, and Limit Values for Discharging Polluted Waters into the Public Sewerage Network and Water Bodies
11	Article	65	AI MZSPP No. 02/2016 on the Method for Determining the Acceptable Ecological Flow
12	Article	66	AI MZSPP No. 15/2017 on Criteria for Defining Sanitary Protected Areas of Water Sources
13	Article	66	AI MZSPP No. 12/2015 on the Establishment of Criteria for Protected Areas for Strategic Purposes
14	Article	68	AI MZSPP No. 20/2015 on Criteria for Swimming Areas
15	Article	71	AI MZSPP No. 03/2018 on Procedures for Water Permits (including Article 12)
16	Article	81	AI MZSPP No. 12/2013 on the Water Information System
17	Article	92	Regulation (VRK) No. 06/2021 on the Structure of Water Charges
18	Article	95	AI MZSPP No. 26/2013 on the Determination of Methods for the Identification and Form of Authorization of Water Inspection

International organizations, particularly financial institutions, have mechanisms that set the framework for supporting or financing projects while safeguarding interests beyond the investment area. These mechanisms, such as World Bank OP protocols, EU directives and IPA protocols, USAID - 22 CFR 216, etc., are desirable, useful, and welcome. However, the real responsibility and ownership of the consequences of decisions made or not made ultimately rest with the competent institutions.

Local Self-Governments:

This level of governance plays a critical role in managing water quality and protecting water resources. The consequences of pollution are mostly felt locally, and at this level of authority, the pressures and interests of communities are most clearly expressed in political processes. If the source of contamination is local, the responsibility is clear, making it a part of local political processes and leadership struggles. However, in the majority of cases, problems are either inherited or transported from another environment through watercourses, rendering local jurisdiction and responsibility irrelevant to solving these problems. In the absence of cooperation mechanisms and support from central institutions, problems in local environments cannot and will not resolve on their own. Therefore, connecting on mutual interests and fostering communication between local institutions, businesses, and institutions with direct authority is a prerequisite for economic growth and development with minimal impact on the quality of the environment.

In summary, even though local self-governments have limited authority and capacity to improve water quality, the majority of problems and both political and economic pressure manifest at the level of local self-governments. The review of the water strategy and the action plan for 2023-2027 outlines the responsibilities of municipalities within the following scope:

- Municipalities are responsible for providing water services and carry out their responsibilities through RVPs (Regional Water Utility Companies) based on service contracts that define mutual rights and obligations.

- Municipalities are responsible for water resources, such as protecting against harmful water impacts; safeguarding riverbeds, shores, and canals in urban areas; identifying erosive areas within urban environments; regulating streams and rivers in urban areas; allocating spaces for washing in collaboration with the Ministry of Environment, Spatial Planning, and the National Institute of Public Health; issuing water permits for specific activities with administrative instructions; allocating financial resources for water management, management, and development of water resources in urban areas; carrying out inspection supervision through authorized municipal water inspectors, as well as aligning their urban/regulation plans with River Basin Management Plans.

- Municipalities are responsible for the network of atmospheric waters.

Overview of the Water Strategy 2023-2027 (Government of Kosovo, 2017)

The jurisdiction of municipalities is clearly limited to local issues and does not extend to addressing significant problems that originate outside their territory. To overcome this problem, collaboration and communication with central institutions and organizations are necessary, which is the key to success. Collaboration and the strength of the economy, including the financial resources needed to address accumulated environmental problems, are crucial for creating a "better tomorrow" in Kosovo. Currently, this kind of collaboration does not exist, making the civil sector the only entity capable of focusing on issues, analyzing the activities of political elites, corporate entities, and even specific communities and administrative units.

In the absence of market-driven leadership ideas, but rather narratives based on national and populist priorities, the civil society will have the short-term and long-term role of shaping information collection, data measurement, information exchange, and even initiating activities in crafting public policies, strategic legislation, and other plans that enhance environmental quality and eliminate potential threats to regional stability. The civil society must not be a passive observer of activities that create environmental injustices, especially towards other ethnic groups (whether intentional or unintentional) at the local, national, and regional levels.

If there is no institutional will and financial resources to bring environmental problems into the public space, civil society can build an information basis by gathering data from the field, utilizing information technologies (measurement sites, applications, telemetry systems), as well as collaborating with individuals and groups that possess direct on-site information (angling associations, hunters, forest product collectors, tourism organizations, etc.).

The international community can donate funds to initiate activities in this field, but the goal is for national institutions and agencies to eventually take over the funding of these activities and thus take ownership of the achieved objectives.

Educational institutions:

Plans and programs focusing on sustainable development and ecology must be enhanced both in primary education and in higher education institutions. Ideally, programs and curriculum content should be harmonized at the Balkan level, aiming to create a generation capable of using modern technologies to solve common problems.

Innovations, technological advancement, circular economy, and energy efficiency are only a few segments that can create a new economic force and establish new economic bases in Kosovo. The transformation of the economy and economic activities with minimal capital investments is possible, especially in contaminated areas where agricultural food production is impossible. Remediation technologies for contaminated areas need to be implemented, and large areas of remediated industrial heritage sites can be used as platforms for investments in solar power plants, wind farms, or even for the development of tourist products.

Conclusion

Regarding water resource management, although local communities, particularly the citizens of the Zubin Potok municipality, suffer the absolute loss of land value due to the mismanagement of water resources, they do not benefit from the profit distribution of these hydrotechnical facilities on the Ibar River. On the other hand, the strain created in this basin by excessive water extraction, coupled with the pollution that is transported through watercourses back into the other three municipalities with Serbian majorities in northern Kosovo, is unjust, unsustainable in the long run, and poses a threat to becoming another point of contention between communities.

Kosovo has the obligation to objectively address this problem of environmental injustice and take responsibility for solving accumulated problems to enhance the environmental conditions in northern Kosovo. Municipalities with Serbian majorities in northern Kosovo have the opportunity to utilize social cohesion to create a common policy and exert necessary pressure through their representatives in the political processes of central institutions to improve water quality. These municipalities can also establish mechanisms for collaboration and coordination regarding the monitoring and management of water resources in their areas to understand the degree of burden on the Ibar River basin.

Water resources and water availability are just one aspect of the problem; however, goals need to be more ambitious than that. The ultimate goal for all water systems, including the Ibar River basin, should be the revitalization of river flows and groundwater quality in Kosovo. This goal, when translated into local terms, such as in the Gračanica municipality, should be the "revitalization of the Gračanica River, involving clean water for restoring the fish population, enhancing riparian areas, wetlands, and meadows as habitats for wetland species."

In the long term, goals should focus on the connectivity of water ecosystems to improve the health and quality of water ecosystems. Changes in technological approaches to managing atmospheric waters and flood management are necessary, involving the creation of retention basins and floodplains that would mitigate peak flood waves in populated areas in Kosovo. Conditions need to be improved to revitalize fishing areas with endemic species. The definition and elimination of risky activities in coastal areas are necessary. The key and principle of spatial planning along the coast should be solutions based on natural cycles and rhythms (Nature-Based Solutions), which could result in financial products (loans) offering lower insurance premium rates.

However, most importantly, a public debate in the media and institutions about the problems and risks related to water availability that Kosovo is facing is imperative. In this regard, the distribution of resources and populations among different ethnic groups must be seen from the perspective of creating opportunities for cooperation rather than control, aiming to build conditions for establishing lasting peace and a prosperous future for all communities.

Proposed measures and jurisdictions for improving the water resources on the teritory of the municipalities

	Measure	Performer	Deadline	Alocation of the funds
1.	Scope and map pollution inventory with geolocated points of contamination	ZP, SM, ZV, LP	12 months	Own capacities
1.1	Identify and map contaminated areas			
1.2	Create a baseline analysis of the state of the quality of fish species and the degree of endangerment of endemic species	ZP, SM, ZV, LP University	24 months	Own capacities
1.3	Create an analysis of the condition and impact on surface and underground water by sanitary and industrial landfills and illegal dumpsites	ZP, SM, ZV, LP	24 months	Own capacities
2.	Form an inter-municipal taskforce for monitoring water resources. (in the future it may be a sector within the ZSO)	ZP, SM, ZV, LP	6 months and beyond	Own capacities
2.1	Organize taskforce bi-monthly meetings at directorate level as a mechanism for information exchange	ZP, SM, ZV, LP	Appointment of members	Own capacities
2.2	Form a working group on the framework of this body for the development of project proposals and coordination of activities with central institutions and international institutions	ZP, SM, ZV, LP	6 months and beyond	Own capacities
2.3	Establish a working group for action in cases of natural disasters, floods and fires in the north of Kosovo	ZP, SM, ZV, LP	18 months	Own capacities
2.4	Organize training and exercises for first responders and action in case of natural disasters	ZP, SM, ZV, LP	24 months	Own capacities

	2.5	Formation of a common spatial planning basis for the use and purpose of land along the banks of the Ibar River and important tributaries to overview problem of connectivity of water systems	ZP, SM, ZV, LP	24 months	Own capacities
	2.6	Engage civil society and other institution into the working group	ZP, SM, ZV, LP	24 months	Own capacities
	2.7	With the professional support of the Department of Biology, define fishing grounds on surface water bodies in municipalities in the north of Kosovo	ZP, SM, ZV, LP University	24 months	Own capacities
	2.8	Improve the fish inventory in the waterways with endemic species	ZP, SM, ZV, LP University	26 months	Own capacities
3		Improvement of water quality in the territory of municipalities			
	3.1	Put into operation the existing wastewater treatment plants in the municipality of Zubin Potok	ZP,	6 months	Own capacities
	3.2	Carry out evaluation of the efficiency of the wastewater treatment plant in Zubin Potok and evaluate the possibility of replicating the technological type in other areas	ZP, SM, ZV, LP	18 months	Own capacities
	3.3	Create an analysis of the impact of particulate and air pollution on water resources in the territory of 4 municipalities in the north of Kosovo	ZP, SM, ZV, LP	24 months	Own capacities
4		Arrange the hydrological base on the territory of the municipalities in the north	ZP, SM, ZV, LP	12 months and beyond	Own capacities
	4.1	Acquire and install stationary water flow and quality measuring devices at 7 locations in the north of Kosovo (3 ZP, 1 SM, 1 ZV and 2 in LP)	ZP, SM, ZV, LP	24 months	Project funded or with the support of civil society
	4.2	Together with the existing air pollution measuring points, create a unique portal for monitoring and informing about the characteristics of water and air	ZP, SM, ZV, LP University	24 months	Project unded or with the support of civil society

	4.3	Create a spatial plan of flood-protected zones of four municipalities in the north of Kosovo	UniversityCivil Eng..	12 months	Project funded
	4.4	Create an investment and hydrology design of dike for flood protection	UniversityCivil Eng.	18 months	Project funded
	4.5	Create an analysis of the state and safety of local infrastructure in response to natural disasters with an investment plan.	UniversityCivil Eng.	24 months	Project funded
	4.6	Create an investment plan for the control and management of storm water	ZP, SM, ZV, LP	36 months	Project funded
	4.7	Make a plan and analysis of the needs for drinking and technical water in the territory of 4 municipalities in the north of Kosovo	ZP, SM, ZV, LP	36 months	Project funded
5		Improvement of the environment and adaptation to climate change			Project funded
	5.1	Renew the forest fund by planting new forests with endemic species	ZP, ZV, LP	36 months	Project funded
	5.2	Start revitalization activities of erosive areas with forests	ZP, ZV, LP	48 months	Project funded
	5.3	Creation of retentions in floodplains with terrain planning and conservation activities in the formation of wet forests and meadows	ZP, ZV, LP	48 months	Project funded
	5.4	Removal of unnecessary barriers on watercourses and improving connectivity of river courses	ZP, ZV, LP	48 months	Project funded
	5.5	Raising the awareness of citizens about the preservation of the quality of water resources and ecosystems	ZP, SM, ZV, LP	12 months	Project funded

Proposed Measures and Areas of Cooperation between Municipalities and Central Institutions and Organizations

Municipalities - North of Kosovo	General Interest	Central Instituions
Create a forum for the protection and improvement of water quality in the Ibar river basin. Forum Derivatives	Improving water quality is a prerequisite for creating conditions for sustainable communities and improving public health	Support the initiative and ensure representativeness and participation of public institutions, companies and agencies. Taking an active part and suggests topics and activities
	It is desirable to have the participation of local and central institutions throughout the Ibar River basin, educational institutions, civil society organizations, donor representatives, and particularly representatives of public institutions (energy, water management, municipal services, etc.	
	Produce measures to restructure economic activities and types of agricultural production to those that have a lower intensity of water use	
	Proposals for revitalization activities that have an impact on hydrological regimes (groundwater, coastal areas, forests, etc.) as well as proposals for defining protected zones	
	Analysis of the state of contamination sources and proposed measures for the revitalization and remediation of industrial heritage sites (tailings, ash pits, municipal and industrial waste, etc.)	
Formation of an inter-municipal body for monitoring water quality on the Ibar River	Defining critical points for measuring the availability of water as well as measuring the chemical and biological characteristics of water.	Support to the local self-government initiative through the mechanism of the Regional Authority for River Basins (Article 21. Law #04/L-147)
	The methodology should be defined according to the minimum criteria of the regional authority for river basins	

		Activities should preferably be carried out with the support of the international community with an open data base from measuring stations	According to the same model, organize the monitoring of the water flow regime at the water measuring stations Sitnica, Lab, Prištevka, Gračanka, Nerodimka, etc.
		Create an inventory of problems and define critical points and sections, measures and actions to improve water quality	
		Creation of legal solutions, regulations and plans for the management of the river basin of the river Ibar in the lower reaches	
Define and monitor fishing and spawning areas on flowing and stagnant waters in order to preserve and create a stable ecosystem	Analysis of ecosystem health and inventory of ecological species and their needs	The establishment and development of national representative fishing associations is a priority for the development of sport fishing, but also a prerequisite for monitoring the health of aquatic ecosystems	
	Work and cooperation with water management institutions (Lake Gazivode) in order to create optimal conditions for the preservation and development of water ecosystems (control of the seasonal water regime)		
	Work and cooperation with local institutions throughout the basin for the removal of barriers and the creation of fish ways at water points with the aim of revitalizing water ecosystems		
	Preparation of studies and plans for the stocking of river courses and lakes with special reference to the protection and promotion of endemics		
Request for participation in the work of the inter-ministerial council for water management	Participatory approach will provide conditions for cooperation and creation of joint investment programs and investment climate	Resistance to reforms and strengthening the influence of the Serbian community in political and management mechanisms	
	The participation of representatives of municipalities in the north of Kosovo can be informally proposed by the Prime Minister personally or as part of a donor organization team in the Council.		

	The potential of cooperation and communication at this level can have positive effects on the improvement of the water management base not only in the north of Kosovo, but also in the field of integrated management of the Ibar river basin along its entire course.	
	This cooperation mechanism can play a critical role in future cross-border cooperation initiatives with watersheds, whether it concerns the negative impact that Kosovo produces on other countries (Article 24. Law #04/L-147), whether it concerns the negative impact that Kosovo suffers from other countries (Article 25. Law #04/L-147)	
Take part in cross-border programs and in the field of development and improvement of ecological conditions	The possibility of solving the problem of floating waste is possible with the partnership of the EU, the World Bank or some other financial program	Cooperation and communication with Montenegro and international institutions in order to create optimal development conditions with minimal impact on the quality and availability of hydrological regimes in the flow
	Launch a cross-border initiative between the municipalities of Zubin Potok and Rožaje on the implementation of sustainable municipal waste management systems and rehabilitation of the Mostina landfill with the creation of a wastewater treatment system in Rožaje	
Build flood protection measures	Developing joint program of restoration of the forest fund. Coordinated implementation of afforestation and revitalization of forests in order to reduce the effect of torrential streams and the occurrence of landslides	Build flood protection measures
	Spatial plans define retention areas and other flood zones	
	Introduce a mechanism of communication and data exchange with water-valued companies in order to reduce the consequences and damage from floods	

Form a mechanism of communication information platforms ondevelopment projects at all levels in the entire Ibar river basin	In cooperation with educational institutions and the institute for public health, as well as local civil society, provide a network of water flow and quality measurement stations on the Ibar River	Expected resistance to the initiative because the findings can identify the responsibility and causes of water pollution
	Provide public insight through digital platforms for all projects that require environmental impact analysis.	
Work on the formation of a fiscal compensation mechanism for discharged water	This theme has the capacity to create lasting peace between communities in Kosovo.	There is no legal and fiscal mechanism nor the political will of the majority to talk about it
	Some recommendations and ideas are presented in the InTER 2015 proposals (InTER, 2015).	

Blue – Lokal initiated interest	**Green – Expected positive reaction to initiated interest**	**Yellow – Expected negative reaction to initiated interest**

Annex 1

Sector Laws and Sub-Legislative Acts Overview of the State Water Strategy 2023-2027 (Government of Kosovo, 2017)

Law i	
Law No. 04/L-147 on Kosovo Waters	This law regulates issues related to water resource management and defines the roles and responsibilities of competent institutions (Ministry, Regional River Basin Directorate, Inter-Ministerial Water Council, and municipalities) concerning water resource management. This law establishes that the principles of river basin management and the principle of user and polluter pays will be applied in Kosovo to adopt EU standards and policies in water resource management.
Law No. 05/L-042 on Regulation of Water Services	Amended and supplemented by Law No. 06/1-088. This law regulates water services, including water supply, collection and transportation of wastewater, and wastewater treatment. The law establishes the Regulatory Body for Water Services (ROVU) as an independent regulatory authority that directly reports to the Assembly. It sets up a legal framework for regulating water services, including licensing, tariff determination, service standards, consumer rights, service termination, etc. The law explicitly specifies that responsibilities for investments in water services are carried out through Regional Water Supply Companies or the relevant ministry responsible for public enterprises.
Law No. 03/L-087 on Public Enterprises	This law defines the legal framework for exercising property rights in public enterprises (PEs) and regulates corporate governance in these enterprises. It divides into (i) central PEs (including RWCs and regional irrigation companies) of which the shareholder is the Government of Kosovo (GoK) through the ME, and (ii) local PEs in which municipalities are shareholders. The representation of municipalities on the management boards of RWCs is regulated by Regulation No. 02/2013 on criteria for establishing local public enterprises and the participation of municipalities in the boards of regional water companies.
Law No. 06/L-039 on the Geological Survey of Kosovo	This law defines the competencies, duties, and functions of the Geological Survey of Kosovo, including activities in the field of geological sciences within the territory of the Republic of Kosovo. Concerning water, it regulates the jurisdiction for hydrogeological investigations and research, groundwater, mineral, and geothermal waters.
Law No. 03/L-025 on Nature Protection:	This law regulates an integrated environmental protection system, risk reduction to life and human health, based on the concept of sustainable development. The law marginally deals with the management of wastewater. It sets conditions for obtaining an environmental permit issued by MESPPI for all facilities and objects subject to Environmental Impact Assessment (Article 31.2).
Law No. 03/L-233 on Nature Protection:	This law regulates a general system for the protection and conservation of nature and its values. In terms of water, it aims to protect and preserve biological and landscape diversity in aquatic habitats.
Law No. 06/L-035 on Hydrometeorological Activities	This law defines the manner of conducting hydrometeorological activities, early warning systems, expertise, products, and services offered by these activities to support local and central institutions, the public, as well as international and regional institutions with information.

Law No. 03/L-040 on Local Self-Government	This law stipulates that municipalities are responsible for "providing and maintaining public services and Municipal services, including water supply, sanitation, and drainage, wastewater treatment." Municipalities have transferred these powers to RWCs through service contracts, except for drainage, which remains the exclusive responsibility of municipalities.
Law No. 02/L-078 on Public Health	Amended and supplemented by Law No. 08/L-048. This law defines the institutions responsible for public health protection, and in this context, the responsibility for monitoring drinking water quality is assigned to the National Institute of Public Health (NIPH), which monitored the quality of drinking water through Administrative Instruction (AI) No. 10/2021 on water quality for human consumption.
Law No. 04/L-174 on Spatial Planning	This law defines the fundamental principles of spatial planning, conditions, and methods for space creation and arrangement, types, flow, and content of plans, competencies of central and local administrative bodies for the preparation and implementation of spatial planning documents, administrative oversight for implementing this law, as well as activities undertaken in spatial planning and territorial organization in the Republic of Kosovo.
Law No. 02/L-9 on Agricultural Land Irrigation	Amended and supplemented by Law No. 03/L-198 and then by Law No. 08/L-094. This law regulates the organization and management of agricultural land irrigation and drainage. The law defines the authorities and responsibilities of different parties concerning irrigation and drainage, as well as the establishment and registration of irrigation companies and irrigation fees.

Annex 2

Fire at the sanitary landfill in Lučka Reka

Waste, license plate stickers

Garbage on the banks of rivers

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