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CSD
Communication for Social Development

april
2022

# Local Governments Capacities in Meeting Obligations in the Fight for Protection of the Environment

analysis

**Research Title:**

Local Governments Capacities in Meeting Obligations in the Fight for Protection of the Environment

**Publisher:** KFOS

**For the publisher:**

Communication for Social Development - CSD

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The original language in which the analysis was conducted in Serbian.

**Translation to Albanian and English:**

Bruno Neziraj

**Design:** *Innovation Media*

Print: 100

This publication was created within the OPEN project implemented by the Kosovo Foundation for Open Society (KFOS) in co-operation with the Communication for Social Development (CSD). The views expressed in this publication are those of the authors and do not necessarily represent the views of KFOS.

Year of issue: April, 2022

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# Forword

## About the OPEN Initiative

This research was conducted under the OPEN initiative. "Democracy, Openness and Prospects of the Serb Community in Kosovo – Open" is a new initiative of the Kosovo Foundation for Open Society (KFOS), initiated in 2020. Open is realized in cooperation with nine civil-society organizations that are active in the Serb community in Kosovo. A general objective of this new initiative is development of an open and dynamic space for discussion within the Serb community and between the Serb and other communities, as well as among institutions in Kosovo.

The initiative will focus on the analysis and estimate of the impact of civil-society and political organizations on the implementation of democratic principles and openness of the Serb community in Kosovo. Implementation of democratic standards and the openness of institutions, public policies, and important processes in their relations with the Serb community in Kosovo will be analyzed and estimated, as well a degree of openness of the Serbian community towards them. These analyses will assist in understanding the current position and prospects of the Serbian community in Kosovo, serving at the same time as a basis of their argumented advocacy among citizens, institutions, local and central authorities, and the international community. Experienced and established civil-society organizations will make eight (8) sectoral analyses with the purpose of meeting general and specific objectives.

## State of affairs and problem detection

Air pollution, limited water resources, limited waste management capacities, and uncontrolled urbanization and construction essentially create enormous pressures on the environment in Kosovo and thus endanger the living standards and health of people in Kosovo.

According to many studies, Kosovo is one of the most polluted regions in Europe[1]. These findings are current only for the last 4-5 years, i.e., since the installation of infrastructure aimed at measuring the quality of the environment in Kosovo. One of the most worrying items is air quality in Kosovo. Similarly, to neighboring countries, it is extremely bad during the winter and constantly sets negative global air pollution records. Thermal power plants that use coal as their primary fuel, lignite mines, heating of households with solid fuels, and car exhausts contribute the most to poor air quality.

In this analysis, we will focus primarily on the quality of the environment in Serb-majority municipalities in Kosovo south of the Ibar and the capacity of these municipalities to cope with environmental pressures.

Municipalities with the Serb majority population in Kosovo were established according to the Martti Ahtisaari plan. The budgets of these local governments were approved based on the number of inhabitants based on the 2011 census. Considering that the Serb community in Kosovo at that time partially boycotted this

1 https://balkangreenenergynews.com/bih-north-macedonia-most-polluted-countries-in-europe-report/

census, the budgets of local governments with the Serb majority population were significantly reduced compared to the actual situation on the ground, and thus the capacity of municipalities to effectively deal with environmental pressures was reduced. At the global level, practice shows that developing and underdeveloped countries invest very little in environmental protection and that there are small funds that would give environmental initiatives more room for action. The situation is the same in Kosovo. Although there is an extensive legal framework and understanding of environmental pollution, very little attention, both materially and in any other sense, is paid to environmental protection because the adopted laws and documents are often too ambitious and practically unrealistic. In municipalities with the Serb majority population, the situation is more problematic; lack of democracy, nepotism, and corruption significantly affect the lack of awareness about the importance of preserving the environment. Such tendencies of socio-political reality are supported by the analyzes made by the Open Initiative in 2020[2].



2 Miodrag Miki Marinković, Open 2020 Consolidated Report - Characteristics of an Open Society in the Serb Community in Kosovo, Kosovo Foundation for Open Society - KFOS, 2020

# The state of the environment in the Serb majority municipalities south of the river Ibar

The state of the environment describes the quantity and quality of physical phenomena (e.g., temperatures), biological phenomena (e.g., fish reserves), and chemical phenomena (e.g., CO2 concentration in the atmosphere) in a particular area. State indicators can, for example, describe forests and the stock of wild animals present in the forest, the concentration of phosphorus and sulfur in lakes and rivers, or the noise level in a neighborhood close to noise sources such as airports. The state of the environment changes due to the pressures exerted on the environment. Changes in the state of the environment affect the constituent parts of the environment.

## Air

Air is a crucial element for human health and, in general, our environment. Unfortunately, the air is constantly under the influence of pollution from numerous sources. Although air pollution mainly comes from human activities, it can also be caused by natural phenomena.

According to the Environmental Agency, the biggest polluters affecting air quality are energy, industry, and traffic. Since Gračanica does not have measuring stations to monitor air quality, and since it I a part of the Priština region, which is only 8 km away, the deviation from the parameters measured in Pristina is minimal.

In addition to the risks and pressures that affect air quality (energy, industry, traffic, lack of natural filters-forests), tailings, where the waste from the Kišnica mine is deposited significantly impact air quality in Gračanica. For example, the «phenomenon» of orange clouds is common throughout the year. In addition, winds and air currents often pick up waste that contains heavy metals and toxic compounds that pose a significant danger to human health and the environment.

## Water

Water is a vital resource for both economic development and public health. However, development directions of the society, which are manifested with several new types of production activities: intensive agriculture, expansion of settlements, urbanism, and other activities. This does not affect only the use of this resource but also pollution, which has proved to be a bad practice in these municipalities.

## Land/Soil

The continuous impact of human activities contributes to the degradation of the earth›s surface, causing harmful socio-economic and environmental consequences. The challenge is to prevent soil degradation and pollution with the help of specific soil protection measures and policies. Unfortunately, in all municipalities in which we conducted the

research, we did not find or observe any measures and policies to protect the soil from degradation and pollution.

## Waste

Waste is generated during daily activities. The development of technology resulted in creating several types of packaging and wrapping products and other materials whose packaging or wrapping goes into waste after use. Kosovo›s municipal waste output is on the rise. However, the amount of stored waste in Kosovo›s sanitary landfills is inadequate. In addition, there is still hazardous waste in Kosovo inherited from industrial and technological activities (Kišnica mine tailings).

## Driving forces

Driving forces - in terms of environmental protection- describe social, demographic, and economic developments in society and the relevant changes in lifestyle, overall levels of consumption, and production. The main driving forces are population growth and the development of its needs and activities. In fact, these are the main forces causing changes in the general level of production and consumption. Through these changes in production and consumption, driving forces exercise pressure on the environment.

## Demographic structure/flows

The number of inhabitants - According to the 2011 census, which Serbs partially boycotted, 10,675 inhabitants were registered in the Municipality of Gračanica. Out of this number, 7,209 were Serbs (67.53%), 2,474 Albanians (23.18%), 745 Roma (6.98%) and 247 other nationalities. The religious structure from the same census was as follows: 7,237 Orthodox, 3,190 Muslims, and 42 Catholics.

Age pyramid - Out of the total population in the Municipality of Gračanica, 5,418 are men and 5,257 women. Among men, the share of persons under 18 is 29.66%, respectively 1,607, while among women, it is 29.71%, with a total of 1,562 registered.

Based on municipal services, the OSCE estimates the population of Gračanica at 21,534, with a share of Serbs at about 85%.

Population Density - With the increase in Kosovo›s population, the average population per unit of land area has increased from 62.7 (1948) to 81 inhabitants/km² (2011).

The increase in the overall population numbers affects the environment in many ways, the most important of which are: impact on the level of production, use of resources, land exploitation, waste generation, and environmental pollution.

Migrations are also very present in the Municipality of Gračanica. Part of the population settling in settlement of Gračanica emigrates from the surrounding rural areas or from municipalities where Serbs are a non-majority community. In addition to Serbian, the Albanian community is also finding a place to create life in the Municipality of Gračanica, followed by the increase in population. However, when it comes to the emigration of minority communities, the young population is often the most economically disadvantaged.

According to the research report, Silent Migration of Youth from the Serbian Community, published in 2019 by the NGO Communication for Social Development (CSD), some of the following conclusions stand out:

- As to the reasons why respondents want to leave the Municipality, the vast majority cited poor security situation, poor political and economic situation, and slightly less than half of the respondents stated that the inability to find work is one of the main

motives for emigration.

- Three-quarters of respondents plan to emigrate from Kosovo. In contrast, as many as two-thirds plan to do so permanently. Moreover, 20% have already taken concrete steps towards emigration.

- 30% of respondents stated that they do not want to return to Kosovo if they move out.

- 72% of respondents support the emigration of Serbs from Kosovo, believing that the living conditions of the Serb community in Kosovo are unequal.

## Urbanism

Although rural, and with local authorities claiming that settlements and larger rural centers in the municipalities of Gračanica, Štrpce, Parteš, and Ranilug are becoming urbanized, these municipalities are suffering the consequences of urbanization of the neighboring municipalities. In the process of accelerated urbanization, Priština, Kosovo Polje, and Lipljan leave long-lasting implications on the environment, not only their own but also neighboring municipalities. Although compared to rural areas, these are urban environments that in some aspects provide advantages (density, assume less space per capita, are more efficient in distributing water, electricity, roads and have better waste services, etc.), their negative impact on the environment is much larger compared to rural areas. The adverse effects on the environment grow with uncontrolled emigration, which is manifested through: increase in population density (overpopulation) in urban areas, construction without any urban criteria in the suburbs, due to lack of infrastructure, waste collection services, uncontrolled waste disposal during construction, increased amount of untreated wastewater that ends up in the environment.

The proximity of surrounding cities, the configuration of the terrain, and the fragmentation of settlements in these municipalities are suitable elements for offenders. These municipalities often face illegal landfills (municipal and construction waste) at the border with neighboring municipalities, with industrial and municipal waste and unprocessed waters discharged into river and stream flows. Due to the low water level and flat terrain, they stay on the territory of the Municipality for the longest time, which directly endangers the environment.

## Traffic

Although it does not have local transport lines, which makes it difficult for the local population to move, the traffic in the territory of the Municipality of Gračanica is dense. Businesses and manufacturing in the industrial zone Obilić - Kosovo Polje - Priština - Lipljan, highways, and regional roads contribute to this. Traffic is very dense and is one of the primary sources of environmental pollution: air pollution due to the rapid development of the transport sector, high use of old cars, limited water supply, reduction of green areas due to the high degree of construction, etc. All these factors impact air and water quality, which are significant indicators of environmental pollution. Other municipalities with the Serb majority population, except the Municipality of Štrpce, which has similar problems due to tourism on the mountain of Brezovica, face these problems to a lesser extent.

## Use of land and coverage

One of the direct forms of impact on the environment is exploiting natural resources. The most common forms of exploitation of natural resources are related to the exploitation of water, soil, and wood mass.

The data show that most of the water is used by the public water supply system to supply potable water for households and for the needs of other consumers of public water supply and sewerage companies. Agriculture is also considered a development sector where water is used, mainly for irrigating agricultural land.

The highest land use in the territories of the municipalities that we included in this research is occupied by agricultural land, followed by construction land, water, and forests.

To prevent illegal construction and protect agricultural land, the Municipality of Gračanica in 2018 adopted the Decision to ban the conversion of agricultural land to construction land outside the permitted construction zone.

Although the percentage of forests in these municipalities is small, the use of wood mass is a challenge for municipalities.

In 2019, south of Gračanica, in the cadastral zone of Sušica, in a fire caused by human factors, tens of thousands of young seedlings of pine forest burned.

## Pressures (risks) on the environment

Environmental pressures describe developments in the environment that result in the release of physical and biological substances, resources, and land use during human activities. Pressures exerted by society represent a variety of processes that are created when environmental conditions change.

In order to facilitate the assessment of environmental impacts, it is practiced to group sectoral impacts according to economic activities, which in reality are treated as separate sectors.

Certain economic activities such as energy, industry, transport, etc., are without a doubt source with the most noticeable impact on the environment, while agriculture and forestry are on a different scale with the environment and, as such, depending on the state of the environment. In addition, tourism is an economic sector whose effects on the environment were recently also identified.

Monitoring the sectorial impact on the environment is an advantage, especially in development planning and drafting respective strategies. In addition to following sectoral impacts individually, it is also interesting to consider areas where there is an impact of joint actions of different sectors.

## Energy

Energy plays an essential and irreplaceable role in modern human life. However, its impact on the environment is also prominent. Any type of energy production has a significant effect on the environment due to the operations that accompany them, from the provision of the first thing (raw material) and transport to the process of production and the use of energy. Given that Kosovo gets its energy from burning lignite, the impact of burning lignite leaves consequences for the environment. The air distance of 20-50 km southeast of Obilić often does not represent an obstacle for the emission of harmful particles, dust, and compounds from the energy production process to reach the land and water in the entire territory of Kosovo through the air. 90% of households, institutions, industrial facilities, private companies, and restaurants in the municipalities we surveyed use non-renewable sources such as wood and coal to produce thermal energy. The use of renewable energy sources is not represented in these municipalities.

## Industry

Industry is the key to economic development, although, at the same time, it has the most significant impact on the environment. Due to industrial development, resources are spent, such as energy sources, water, and other resources. Emissions to water, air, and land are released from industrial activities. Waste production by many industries is another segment affecting the environment.

The structure of industry and technology has been, and continues to be, unfavorable due to the dominance of the extensive industry that relies on the exploitation of coal and metal ores. Many socially owned, privatized enterprises are not functioning or operate with difficulty due to outdated technology and lack of funding for modern technologies. The impacts of such companies on the environment are visible in the pollution of air, water, land, and waste. The amount of waste accumulated during industrial activities from the previous period is vast and requires investments for removal. For example, industrial waste - tailings in Gračanica, which was created during the period of active operation of the mine in Kišnica, is an «environmental bomb» which for decades is pending an adequate solution for remedy and removal. The existence of tailings, which contain toxic compounds and heavy metals, is a danger to the broader environment - air, land, water (flow of rivers Gračanka, Sitnica, Ibar, Gračanica Lake), but above all to human health.

703 companies are registered in the Municipality of Gračanica.

Although the Municipality does not record a significant percentage of industrial production on its territory, the Municipality of Gračanica faces waste generated by industrial plants outside its borders. Industrial processes such as pumping water from mine pits, cement and concrete production, rubber, plastic, food and meat processing, production of alcoholic and non-alcoholic beverages, production of paints and varnishes, etc. directly affect the environment (water, air, land, waste generation, noise emission and other effects on the ecosystem). Industrial activities increase environmental impacts through air emissions (SO2, NOx, Dust, and CO2). Discharge of untreated water into river flows (Gračanka, Sitnica, Žegovka) and occupation of land for depositing industrial waste create direct pressures that affect residents› environment and public health.

## Transport

This sector affects the overall quality of the environment, especially in urban and nearby areas, such as the Municipality of Gračanica. Most vehicles use diesel, which implies releasing emissions into the air, water, and land. Also, the construction of roads changes the landscape and the land. In the last 20 years, the road network in the Municipality has expanded significantly, including possible habitat degradation. Unusable vehicles also pose a severe risk to the environment.

The growth of population in Kosovo, an increase in the number of vehicles, and the need for movement are considered the main impetus for developing this sector and increased impact on the environment. Due to the rise in the number of vehicles, poor fuel quality is estimated as a driver that directly affects air pollution and the environment in general. Transport also affects the environment by occupying areas and changing purpose for the use of agricultural and other types of land.

Residents of the Municipality of Gračanica use cars as the primary type of transport, which is a consequence of the inadequate organization of urban transportation (lack of city bus lines). The most significant traffic in the Municipality takes place on highways,

regional and local roads that pass through the Municipality of Gračanica. The proximity of Priština, and the industrial zone, partly located on the Municipality territory, also contributes to traffic. Negative impacts are reflected in increased emissions of harmful substances into the air caused by fuel combustion (12% transport, 75% energy industry), increased noise, and vibration, which can have consequences for certain species, damage cultural and religious heritage.

Other municipalities south of the Ibar River also face this problem. There is no organized public transport in all these municipalities; therefore, transport is exclusively done by private vehicles.

## Agriculture

Since 2000, the number of Gračanica inhabitants is growing continuously. On the other hand, the number of inhabitants in surrounding municipalities has almost doubled. The growth of the population and increased need for food is considered the main impetus for developing this sector and its increased impact on the environment. Expansion of settlements and urbanism are characterized as drivers that directly affected the reduction of agricultural land (14% of agricultural land was converted into construction land during 2000-2015). To prevent this destructive trend and preserve agricultural land, the Municipality adopted the Decision to ban conversion of agricultural land into construction land outside the permitted construction zone.

Contrary to the reduced area of agricultural land, the amount of use of artificial fertilizers, chemicals, and other chemical products with an impact on the environment increased.

The municipalities of Parteš, Novo Brdo, Ranilug, and Klokot are municipalities where agriculture is almost the only source of income, except for public institutions. However, in these municipalities, apart from the Municipality of Novo Brdo, there are no Action or Strategic Plans to protect agricultural land and farmers, which significantly affects the trend of declining agricultural activities in recent years.

There is a severe problem in the Municipality of Ranilug due to the excavation of the river. In discussion with the local population, we learned that some companies are digging the riverbed of the Binačka Morava to sell sand illegally. The Municipality has been struggling with this problem for a long time but without success. The problem arises because the riverbed is excavated in hazardous locations. In some parts, the river dries up, which is a problem for farmers who use the river to irrigate their crops. On the other hand, the river slows down, causes floods, and creates ponds suitable for pollution.

The agricultural sector, which is the primary sector for food production, directly impacts public health. The quality of farm products, the quality of land used for food production, and the impact of pollution of the surface water with chemical products used in agriculture are just some of the forms of effects on public health. However, there are no specific data or research to assess this impact.

## Forestry

Forests are the most complex natural ecosystem with great ecological, economic, and health significance. Forests are a natural regulator of climate, protect water and air quality, and protect the soil from erosion and leaching of the productive layer. Also, forests are the most prominent collectors of CO2 on the Earth and the leading suppliers of oxygen to the atmosphere. Forests are renewable natural resources whose products can be used in the heating industry and for other applications. Forests are ecosystems in which many species of plants and animals

grow, which have great nutritional and medical significance for humans. Apart from preventing intense winds, forests also represent a setting for people›s rest.

The importance of all these elements must be a priority for all municipalities, like Gračanica, which have an extremely low percentage of forest area (450ha). When there is no possibility of afforestation, the alternatives are green belts, green streets, green lungs that need to be strengthened. However, the Municipality of Gračanica has not made any efforts to afforest certain areas and territories, where possible. For example, the forest near the village of Šaškovac burned down in 2019. Since then, the Municipality has not developed a plan to afforest this area.

Municipalities of Novo Brdo and Parteš, which have slightly larger forest areas, face illegal logging. After our interviews with them, we learned that these municipalities do not have foresters or the capacity to prevent illegal logging. Communication with the police is often very dysfunctional and slow. The reaction to a report of illegal logging is very slow and inadequate.

Ranilug and Štrpce also face similar problems but to a lesser degree.

# Goals of the study and the methodology

## Goals

The main goal of this research is to investigate the capacities of local governments with a Serb majority population in Kosovo, south of the Ibar River. Following these goals, we will try to concretize the research conceptually through the following objectives.

○○ Local governments advocacy in environmental protection.

This objective includes examining the competent municipal departments and their capacities to do their job that is closely related to environmental protection (Departments of Inspection, Public Services, and Emergencies, Budget and Finance, Agriculture and Forestry).

○○ Readiness and capacities of local governments to solve problems related to environmental protection

To this end, we want to examine whether municipalities have sufficient capacity to meet all legal obligations related to environmental protection.

○○ Are other institutions committed enough to preserving the environment?

This objective in particular includes controlling other public institutions in local government that are legally obliged to take care of the environment (police, private sector, judiciary, etc.).

○○ The functionality of institutional apparatus in preventing environmental threats

Finally, with this objective, we want to examine whether local governments have sufficient capacities to meet all legal obligations related to environmental protection.

# Methodology

## Methodology and structure of the quantitative sample

The face-to-face survey in the field was conducted in the period October-November 2021. A total of 500 Serb citizens were surveyed throughout Kosovo. The questionnaire consisted of 46 questions and covered a total of 6 areas. The sample was intentional, with quotas. The criterion for setting quotas was the size of the Municipality where they live. The reliability interval is +/- 5. Distribution by place of residence is as follows:

| **Municipality:** | | | | |
|---|---|---|---|---|
| | Frequency | Percent | Valid percent | Cumulative percent |
| Leposavić | 110 | 22.0 | 22.0 | 22.0 |
| Kamenica | 10 | 2.0 | 2.0 | 24.0 |
| Novo Brdo | 30 | 6.0 | 6.0 | 30.0 |
| Zubin Potok | 50 | 10.0 | 10.0 | 40.0 |
| Štrpce | 30 | 6.0 | 6.0 | 46.0 |
| Zvečan | 60 | 12.0 | 12.0 | 58.0 |
| Gračanica | 60 | 12.0 | 12.0 | 0.0 |
| Ranilug | 30 | 6.0 | 6.0 | 76.0 |
| Parteš | 10 | 2.0 | 2.0 | 78.0 |
| Klokot | 10 | 2.0 | 2.0 | 80.0 |
| North Mitrovica | 100 | 20.0 | 20.0 | 100.0 |
| **Total** | **500** | **100.0** | **100.0** | |

In the sample, there were a total of 60% men and 39.8% women. The average age of the respondents was 42 years. In addition, 5.4% of respondents in the survey had completed primary school, 47% secondary school, and 45% of respondents finished higher education, i.e., faculty. Of the total number of respondents, 25.9% are employed, 58%, respectively 42% are not working or retired. It is important to point out that given the fact that there are no official statistics on the demographic structure of the target population, i.e., the Serb population in Kosovo, we can only conditionally talk about the sample representativeness.

# Methodology and design of qualitative research

## Focus groups

**Time:** The research was conducted from October 2021 to December 2021

**Research instrument:** A 10-question talk guide

**Number of focus groups:** 6 focus groups

**Total number of participants:** 48 participants (8 participants in each focus group)

**Criteria for selection of participants:** Focus group participants were selected based on the following criteria: gender, age, place of residence, type of employment (here we tried to include primarily employees in public institutions, but also the private sector, as well as two participants from the civil sector and the media)

## Interviews

**Time:** The research was conducted from September 2021 to December 2021

**Research instrument:** 7-question interview guide, questions tailored to the interviewee›s profession

**Total number of interviewed persons:** 12 interviewees

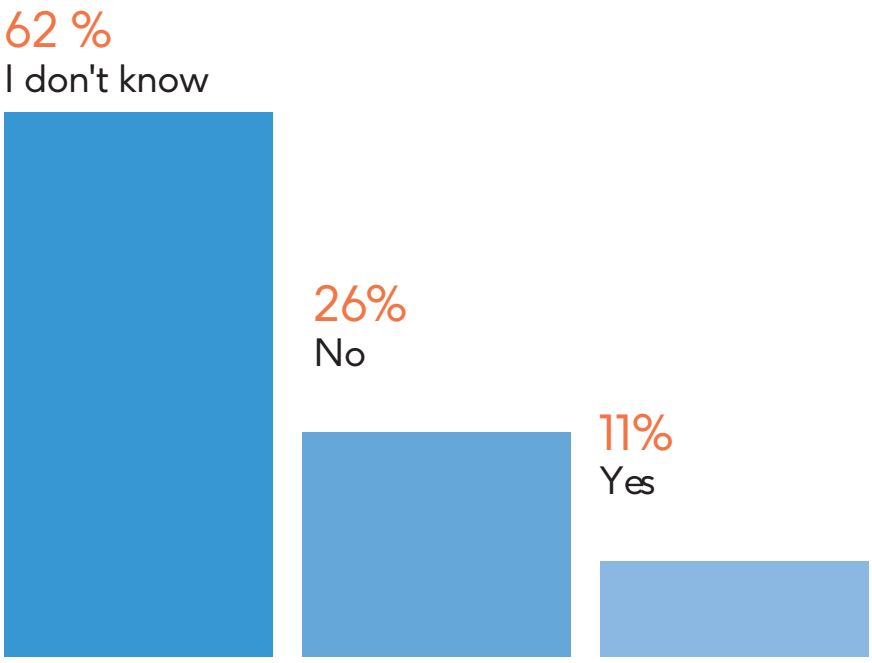
**Criteria for selecting interlocutors:**

Interviewees were mainly employed in local governments in sectors related to the research topic. A small number of people from the civil sector was included.

**Interlocutors:** All interviews were anonymous due to the sensitive socio-political situation in these municipalities

# Research results

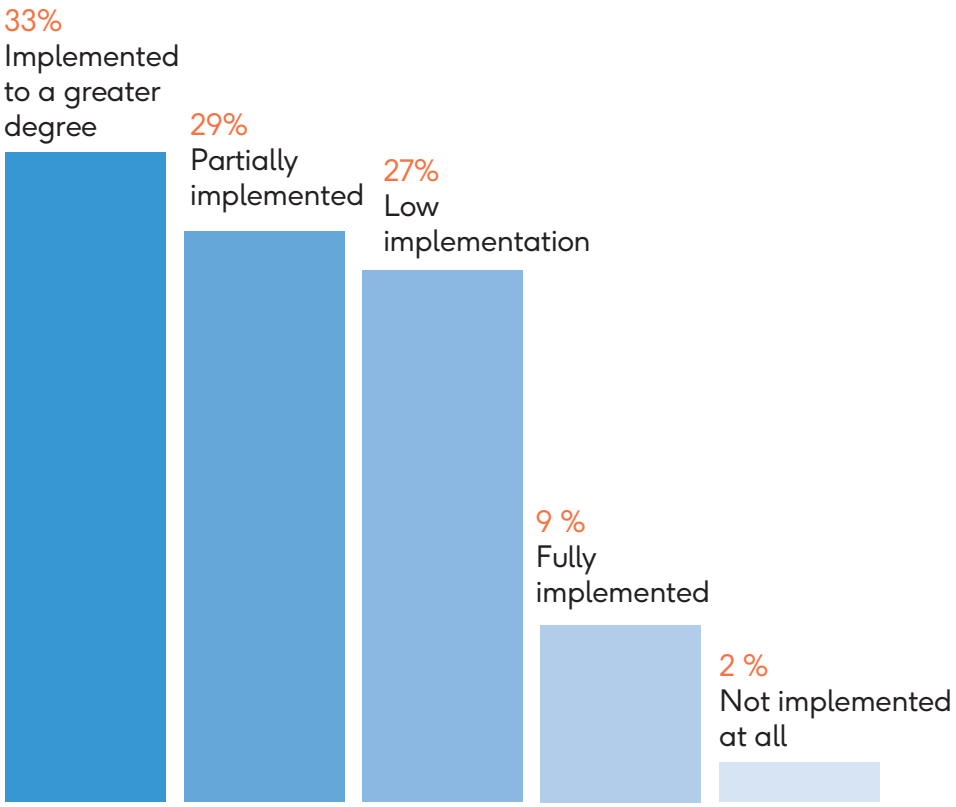
**O Graph 1:** Did your municipality adopt a strategy on protection of the environment or a local action plan




In-depth interviews and focus groups respondents pointed out that they were not aware whether their municipality had adopted any strategy regarding any environmental plan. When we asked them for a reason, we mostly answered that they did not know where to check for this information. In contrast, some focus group respondents answered that such information should be found on the official website. However, webpage navigation is often confusing. In interviews with people from local governments, we mostly came across the answer that strategies are drafted, but not adopted because there is a lack of funds for implementation.

In 62.8% of cases, survey respondents do not know whether their Municipality has adopted a strategic or local environmental plan. In comparison, 11% of them claim that their Municipality has adopted a strategy or action plan.

**O Graph 2.** If your municipality adopted a Strategic Document/Leap, please evaluate the implementation

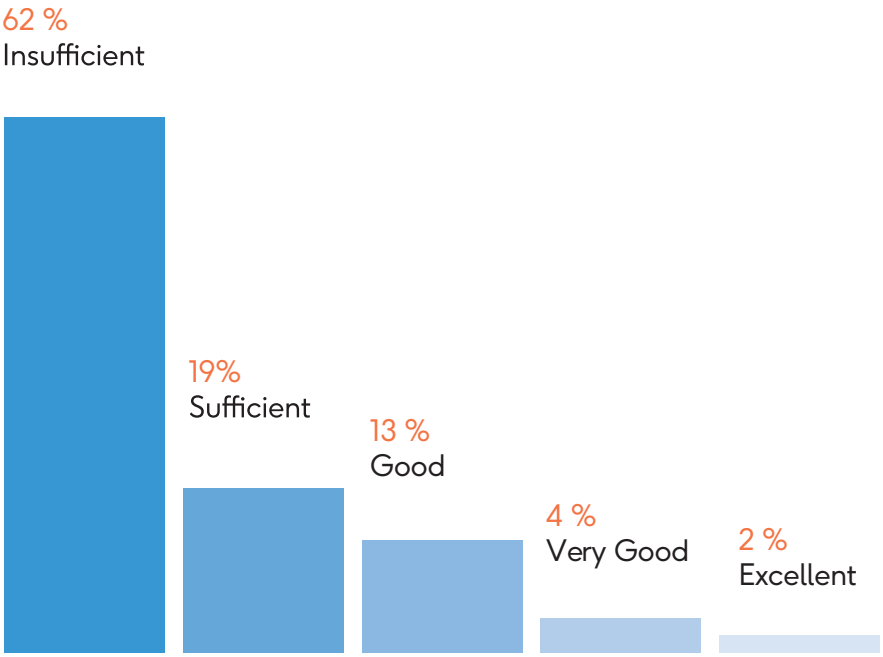



With in-depth interviews conducted in local governments with employees on the question of assessing the current implementation of the local environmental plan, we received mostly the same answers, i.e., that these action plans have no priority and that the focus of local governments in the last 4-5 years has been primarily on solving social and economic issues of their citizens. In 2019, the NGO Communication for Social Development monitored all action plans adopted by municipalities in the previous year. As to the implementation of the Local Environmental Action Plan, the ratings were relatively low, which unequivocally shows that municipalities do not meet fully their obligations regarding the implementation of these action plans. Furthermore, focus group respondents generally agree that the focus has not been on ecology but pandemics in the last few years. They believe that the Covid19 pandemic has significantly shifted the focus away from environmental issues.

In interviews with civil sector representatives, it was concluded that local governments do not have sufficient capacity and will to implement such plans.

Surveyed respondents have a divided opinion. 32.7% think that these strategies and action plans are being implemented. In comparison, 29% believe that they are partially implemented, and 27% believe that very little is being implemented.

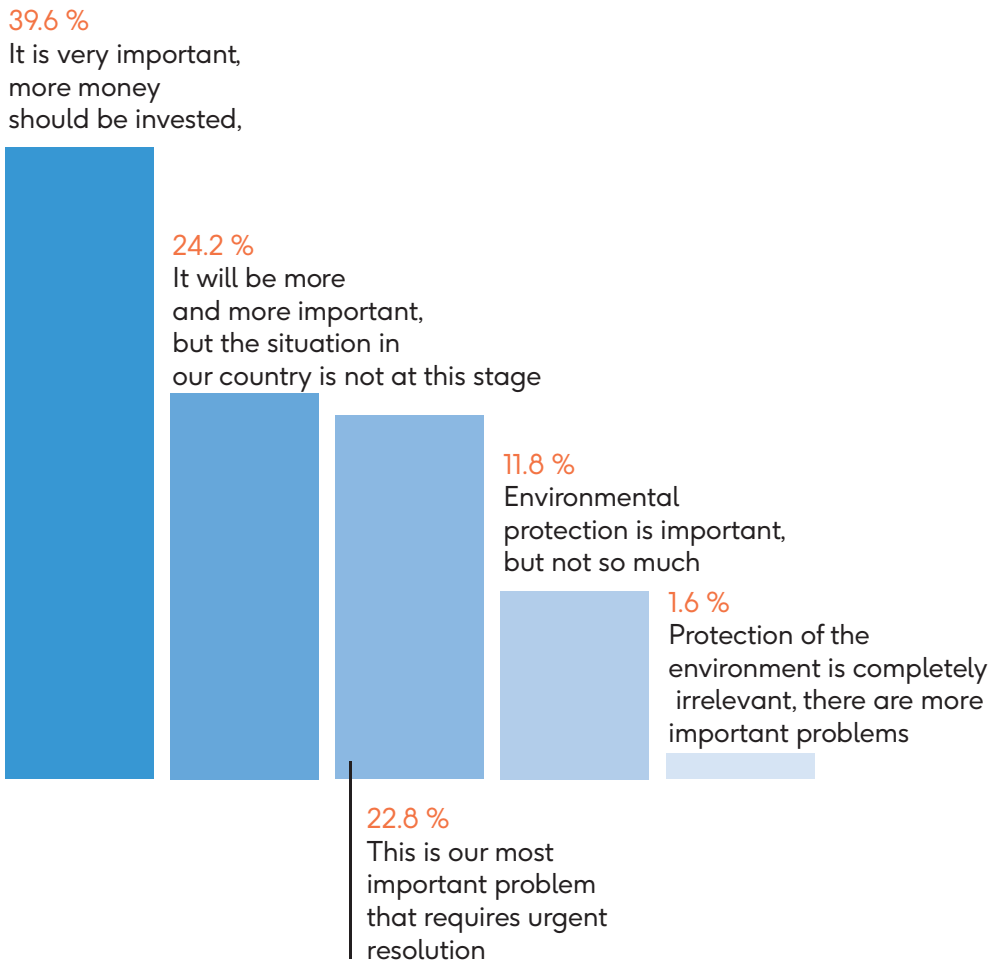
**O Graph 3.** Assess your municipality›s commitment to protection of the environment




Most focus groups respondents believe that local governments are not sufficiently committed to protecting the environment, which is evident by the situation on the ground. Most of them expressed that the environmental problems have only worsened in the last 20 years and are pessimistic about the future efforts of the Municipality to solve the issues. Gračanica focus group members were most eloquent. They presented in detail the problems, which have become bigger, and believe that the local government has failed to find any solution to these problems. On the other hand, respondents from Štrpce stated that the local government›s efforts are undermined by central institutions and the private sector when it comes to the problem of mini-hydropower plants. In-depth interviews with civil sector representatives indicated that the awareness of environmental protection is highly underdeveloped, that this is not important to people, and that this consensus of the population is transferred to local governments. Some also indicated that the political situation is such that local governments want to be as visible as possible for their citizens in their work. Therefore, topics that are not important to citizens are not essential for them either.

We asked citizens the same question in the survey, and 62% believe that local governments are not committed enough to protect the environment.

**O Graph 4.** How important is environmental protection to you personally and whether you consider environmental protection important



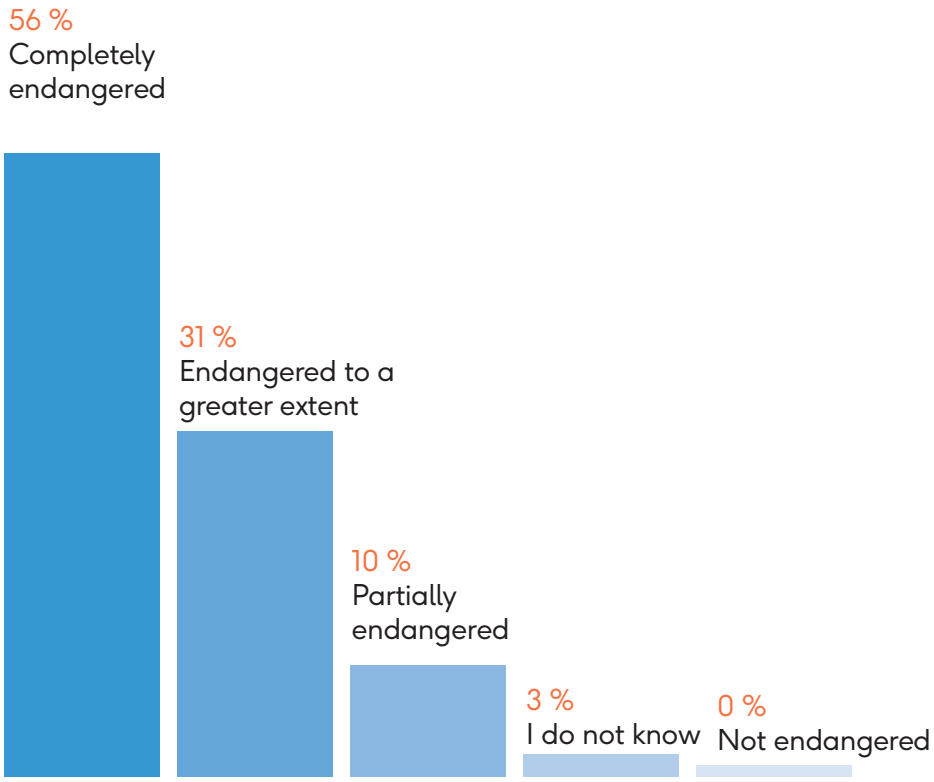

When we asked focus group participants is protection of the environment important to them, they all unanimously agreed that environmental protection is critical for them. However, they also said that economic and social issues are much more important to them, which confirms what was said in the previous question.

In in-depth interviews, representatives of the media and civil society believe that in underdeveloped municipalities with a high rate of displacement and a generally poor economic and security situation, we cannot expect people to worry too much, and that environmental protection is vital to them. «When you have such a situation on the ground where people do not see any future in these parts, their current environment simply cannot be a priority for them, and with that comes disregard for the environment.»

On the other hand, survey research shows a different picture, that 39.6% of respondents think that the environment is crucial for them. In comparison, 22.8% think that environmental pollution is the most critical problem to be solved.

Local government representatives in in-depth interviews pointed out that it is crucial to solve environmental problems and that this must be a priority because, as they say, it would reduce the emigration of the population.

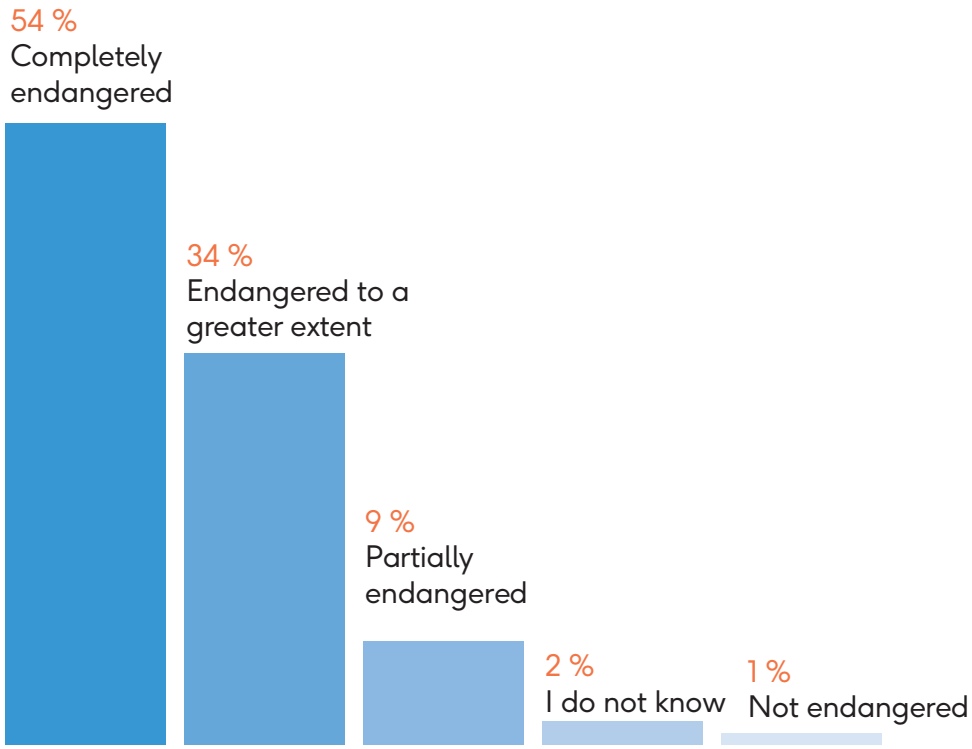
**O Graph 5.** In your opinion, to what extent is the environment endangered by the reckless treatment by citizens




The issue of waste in public areas in Kosovo has always been a problem. Culture and environmental awareness are relatively low, so it is not uncommon for new illegal landfill to appear after only two or three days in a recently cleaned public area. This picture is well known to everyone in Kosovo and the whole region. In addition, there are illegal landfills in almost every village, and in some even more than one. These are a problem, but the bigger problem is the landfills created in the riverbeds where reckless citizens constantly throw waste. Almost all respondents agreed that we are the biggest problem for the environment, i.e., our negligent treatment of it. Focus groups, in-depth interviews, and survey respondents show an unequivocal opinion and attitude that the reckless treatment of the environment by the citizens is one of the leading causes of poor environmental conditions. Through an in-depth interview with local governments representatives, more precisely the inspectorate departments, we learned that the entire system and mechanism is not working - poor communication with central institutions, lack of funds, lack of experts in the field, lack of workforce, and lack of policy have led to devastating results to any capacity to fight environmental problems effectively. Focus groups respondents have a similar attitude, i.e., that our reckless treatment of the environment starts from an inefficient system.

Respondents, 55.8% of them, think that reckless behavior of citizens is the main factor endangering the environment, and 31% of them believe that careless treatment of the environment affects it significantly.

**O Graph 6.** Impunity for entities that endanger the environment



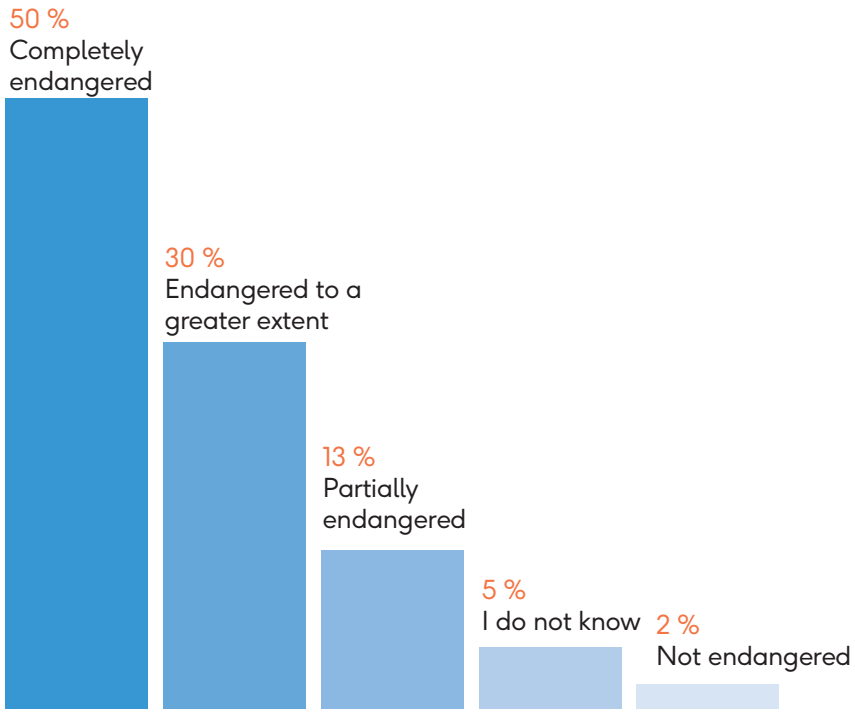

Punishing those who endanger the environment is one of the most effective mechanisms for protecting the environment. This mechanism is generally accepted in all developed countries. A comparison could be drawn between the strict implementation of measures and development of a country and the positive state of the environment.

This practice has not yet been implemented in Kosovo, as confirmed by in-depth interview respondents. «In smaller Serb majority communities and municipalities south of the Ibar river, the number of inhabitants is low, so everyone knows everyone. The reporting and punitive mechanism cannot be effective because no one wants to «harm their neighbor.» Hence, it is usually just a warning even when there are reports or situations in which someone needs to be punished. The biggest problem is with private entities that are not punished. If corruption is the reason for this, it is up to competent services to investigate.»

Opinions of focus group respondents were divided. While some felt that punishment could not solve the problem because people would always find ways to «circumvent» the mechanism, others believed that this mechanism was most effective if applied fully.

Survey respondents have the following attitudes: 54.2% of them believe that the non-punishment of subjects for endangering the environment has a negative impact on environmental protection. In comparison, 33.8% of them think that is a threat to a greater extent.

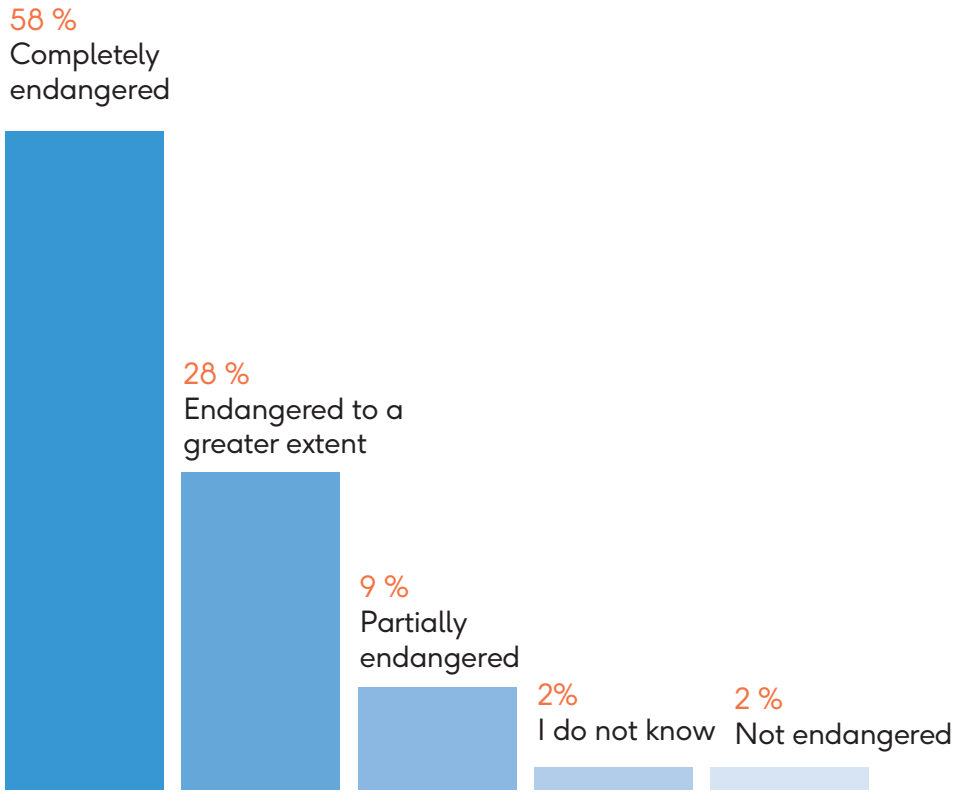
**O Graph 7.** Lack of logistical and budgetary resources for maintaining a healthy environment




In the conversation with the representatives of local self-governments and the civil sector in all municipalities, we concluded that local self-government does not have the necessary logistics or budget funds to fulfill their legally prescribed duties in environmental protection. This is especially visible in the municipalities of Klokot and Parteš. The annual budget of these municipalities is very small, and very little is allocated for logistics related to environmental protection, primarily mechanization and employed staff in public services. Klokot has almost no logistics, and the situation there is the worst, unmown green areas, waste not removed, it has come down to the fact that the population of this Municipality takes their waste to illegal dumps, and maintenance of public areas depends on the voluntary action of residents. There is mechanization and logistics in other municipalities, but much more is needed. In interviews with local utility companies, we received information on how much money is necessary for all activities of these public utility companies to be conducted efficiently.

The Municipality of Gračanica currently has the most developed utility service compared to other municipalities we have researched. In a conversation with the representatives of this utility company, we learned that it takes at least another 50% more budget to do their job with 100% efficiency. In addition to its revenues, this company has a part of the municipal budget, but all that is not enough for the company to work well. Considering that the Municipality of Gračanica had a budget surplus this year and that we have several sectors in the Municipality that lack material resources, it was concluded that the Municipality is not optimizing its budget. Focus group participants have divided opinions. In larger municipalities, they believe that there is logistics and enough material resources to take care of the environment and blame the nepotism and unprofessionalism of these utility companies for the tough situation. In smaller municipalities, focus group participants think that there is a lack of logistics and budget in their municipalities.

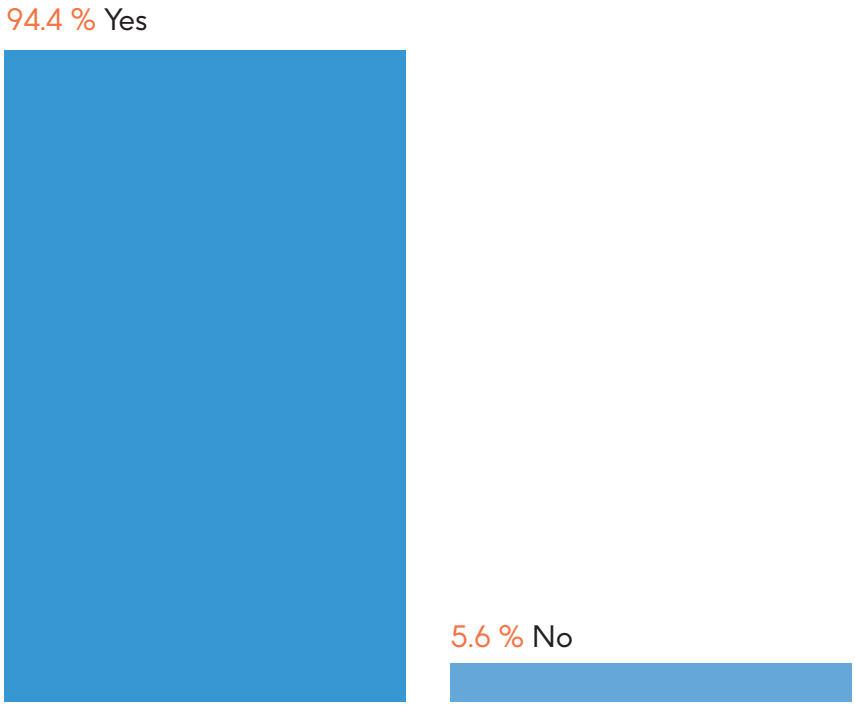
**O Graph 8.** Lack of awareness on importance of protection of the environment




Environmental protection awareness has been growing in the Balkans in the last ten years. As we stated in the description of the state of the environment at the very beginning, it is clear that the state of the environment in the region is appalling. However, following the example of European Union countries and striving for better standards, awareness is slowly rising in society, both in economic and democratic terms. However, although ecology awareness and environmental protection are gradually growing, the state of the environment in this area does not follow preservation trends. We asked our interlocutors in in-depth interviews whether environmental protection awareness is at a desirable level. The view is that awareness is not at the level it should be, given that some municipalities face catastrophic consequences of environmental threats, the population, and the public sector do not give enough importance to the environment or its effects on the population. Focus group participants have divided opinions. While some believe that awareness is at a prominent level but that there is no infrastructure to support this awareness, others believe that if there were awareness, there would be infrastructure. Everyone agrees that it is the task of the media›s, the civil sector, and predominantly local and central authorities to raise this awareness, however this is not happening.

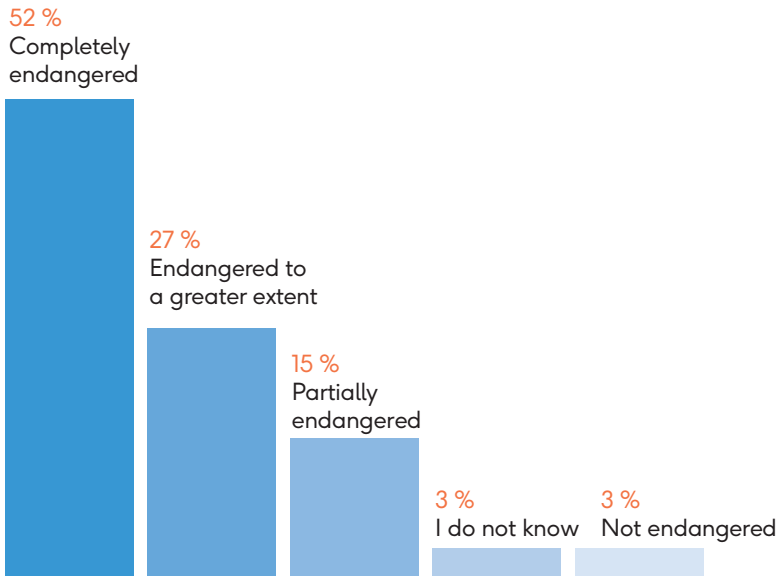
Survey respondents believe that lack of awareness of the environment and ecology is a risk to the environment, i.e., 58.4% of them, and only 2% of respondents share the opinion that environmental awareness does not.

**O Graph 9.** Have you ever reported any kind of environmental threat to any of the competent institutions?



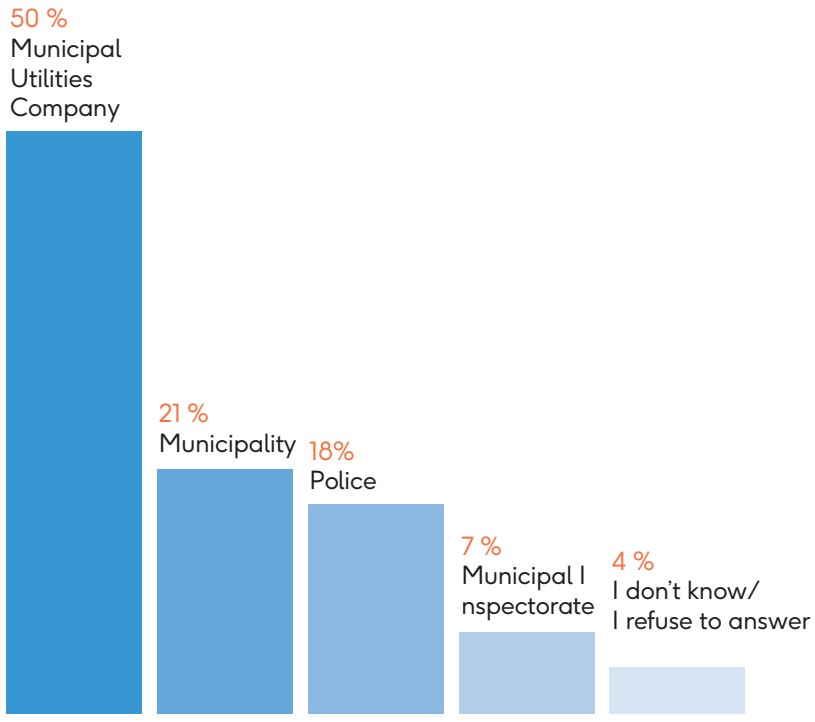

The problem with the non-functioning institutions in environmental protection is shown on this chart as well. Here we learned from the respondents whether they have ever reported any kind of environmental threat to competent institutions. Only 5.6% of them linked the problem to one of the responsible institutions, while 94.4% did not. We asked more specific questions to the focus group participants, where the vast majority of them witnessed the endangerment of the environment, but never reported it to anyone and believe that it is the job of the police and municipal inspection. However, in an in-depth interview with representatives of these institutions, they answered that they do not have enough people to go after all violators and that people generally try not to do such things in their presence, and to constantly inform citizens that they must report and document the violators, whether natural or legal persons, to react. This provided the broader picture that institutions cannot do this job efficiently. The interview with media and civil society representatives said this problem could be overcome by installing video surveillance and regular patrols of police and inspection services. In some municipalities, there is video surveillance infrastructure. However, it is not used for this purpose or is not functional.

**O Graph 10.** Lack of interest in local and central institutions in fulfilling their legal obligations



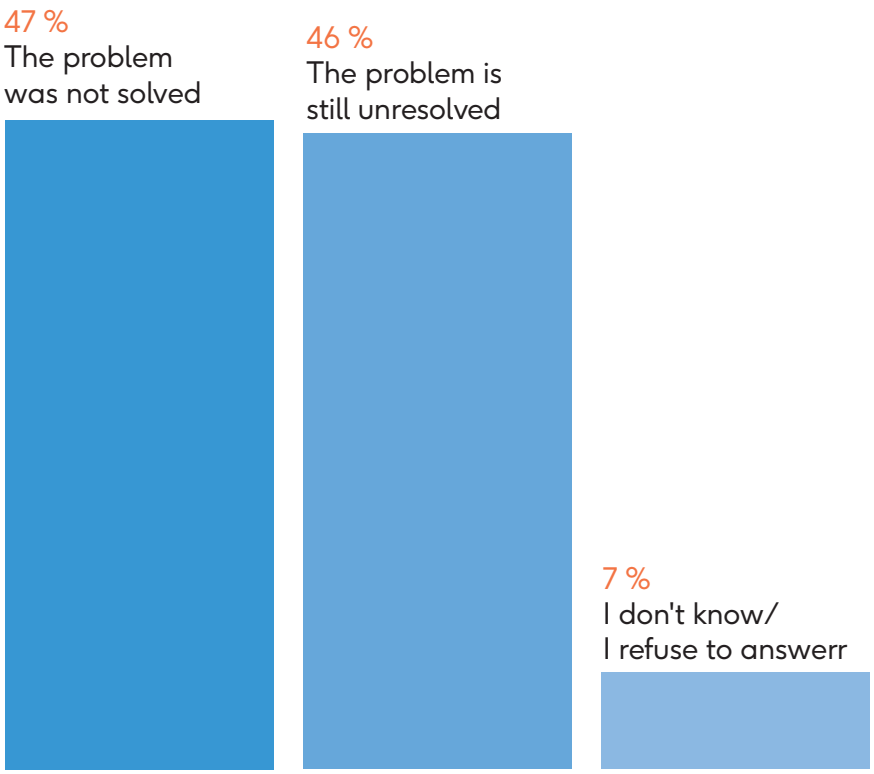

In the survey, 51.8% of respondents believe that the lack of interest of local and central institutions to meet their legal obligations completely endangers the environment, 27% of them believe that failure to meet their legal obligations is more threatening. 3% of respondents believe that non-fulfillment of their legal obligations does not endanger the environment, while 15% believe that it partially endangers the environment.

**O Graph 11.** If yes, where did you report



In a very small sample of survey respondents, who answered yes to the previous question, we asked them where they reported. 50% of them filed the report to the public utility company, 18% to the police, 21% to the Municipality, and only 7% to the municipal inspection or inspectorate department within the Municipality.

**O Graph 12.** What answer did you receive after the report/was the problem solved




Of the 500 targeted respondents, only 28 reported a problem, and of these 28, the problem was solved only in 13 cases. Considering the data from focus groups where almost every participant witnessed some kind of environmental threat by a natural or legal person, we get devastating results. We explained this phenomenon earlier in the analysis, explaining why the mechanisms do not work.

An in-depth interview with an expert in this field gave us the following answer. «Local and central institutions have to provide mechanisms that work. If one mechanism does not work, it either needs to be improved or try using another and so on until a mechanism that works is found. Obviously, this mechanism, like many other mechanisms, is not functional because it is not adapted to the social reality in which we find ourselves. If one mechanism works in one environment, it will not necessarily work the same way in another. For example, it is difficult to find a functional mechanism in terms of environmental protection in rural areas because the habits planted by the neighbors and parents are much more deeply rooted among the population in rural areas. Because of the small areas in which we live and all of us knowing each other, there are only a handful of reports, and problem-solving is not surprising. But that doesn›t necessarily mean we shouldn›t look for the right solution.»

# Conclusion

The research found that local governments in municipalities with the Serb majority population, south of the Ibar River, do not have enough capacity to protect the environment. Lack of communication with central institutions and lack of effective mechanisms is the biggest obstacle for all local governments.

The state of the environment in these Serb-majority municipalities is low. Many more budget allocations are required to solve the problems, and none of the local governments have such budgets. The budget is usually not planned well in municipalities that have a decent budget, so huge surpluses are created, which eventually means that the budgets of these local governments will be reduced. Municipal infrastructure in some municipalities is almost non-existent, so the problem of municipal waste is usually solved only when it reaches someone›s threshold. Agricultural communities, which are also engaged in animal husbandry, do not have appropriate places to dispose of dead animals and animals remains, so they often end up in riverbeds or the village borderline.

As far as legislation is concerned, municipalities do not adopt realistic local environmental action plans, and such plans cannot be implemented in essence. Also, in municipalities, there are no bodies to oversee the implementation of these plans; hence these are only on paper, signed, and voted on. As a result, fewer green areas exist, and urban plans in smaller municipalities generally do not exist. The municipalities covered by this research are predominantly rural, so the pressure on the environment mainly comes from the surrounding larger urban centers, spreading to these rural municipalities through uncontrolled construction. A combination of all circumstances leads to the conclusion that local governments cannot cope with all the pressures on the environment in the territory of their Municipality.

What was striking in the conversation with the directors of line departments is that problems in local governments are often transferred to higher levels, from local to central, and sometimes back. Such is an example of solving the issue of tailings in Gračanica. We received the answer that the local government has raised this issue several times with the central institutions. However, it was transferred to the private sector because that landfill was privatized. The issue would return to the local level and in a circle without any accountability.

In addition to all the above, another obstacle is municipal budgets formed based on the census that the Serbian population partially boycotted in 2011. This fact is often given as a reason for not solving the problems in general, not only environmental problems. Smaller municipalities budgets are insufficient. We will cite the example of the Municipality of Novo Brdo, one of the largest municipalities by area in Kosovo but one of the smallest in terms of population. Budget funds in this Municipality are overstretched, and this Municipality cannot cover its entire territory with quality waste services, as well as defend or bring under control illegal logging on its territory. With the current budget, such a thing is impossible logistically.

Respondents are not sufficiently familiar with environmental protection mechanisms. In addition, awareness of what is being done on this issue in their Municipality is minimal. Local governments regularly inform their citizens on their websites. However, some

information is difficult to obtain due to poor website navigation. This was also confirmed by the representatives of the civil sector who have difficulties in getting the correct information.

The positive thing in everything is that the local media cover this topic in great detail, so it is common for initiatives to be initiated by local governments based on their reporting.

# Recommendations

OO Significant budget allocations in environmental protection by local governments

The census will be conducted in 2022. The budget of each Municipality is formed based on the number of inhabitants in the Municipality. Since the 2011 census was partially boycotted, local governments could stress the importance of these censuses with a timely campaign, which in turn would provide more significant budget funds.

OO Greater transparency and intensive communication with central institutions regarding solving critical problems related to environmental protection and cooperation with neighboring municipalities in overcoming obstacles related to the pressure of larger city centers and municipalities on neighboring municipalities.

OO Better cooperation of local governments with the civil sector and experts in the field in drafting strategies and action plans that include environmental protection.

OO Local governments, police, and inspectorates should implement a more concrete and active policy of punishing entities that endanger the environment and encourage citizens to be more active in reporting them.

OO Draft long-term and medium-term environmental strategies to systematically solve ecology problems that require long-term solutions. Such as the problem of tailings, pollution of rivers, construction of ramparts in risky locations.

OO Increase human quality capacities in municipal departments related to environmental protection.

OO Establish a commission for evaluation of all legal and strategic acts that the local government is obliged to fulfill.

# CASE STUDY:
# **GRACANKA RIVER**

**Author:** Milena Zdravkovic

**About the author:**

Milena Zdavkovic is a graduated architectural engineer, a long-term socio-political activist from central Kosovo. Through her work in the Ministry of Environment and Physical Planning, work in the local assembly and numerous actions and projects of formal and informal groups, she has affirmed herself as a expert of the state of the environment in Kosovo.

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# Introductory Speech

Applying the ecosystem approach to complex water management problems is one of the most important challenges in the management of this renewable resource. Eco remediation - ecosystem remediation is an ecosystem management concept that includes three segments: determining the current state of watercourses, measures taken to improve the ecological status of watercourses, and monitoring changes that occur after the implementation of measures. In this paper, the focus is on determining the state of watercourses. The river Gracanka was chosen as one of the biggest eco-problems of the municipality of Gracanica, directly but indirectly affecting the pollution of the wider environment.

The Environmental Protection Agency at the Ministry of Environmental Protection and Physical Planning states in its annual report (2015 only available in Serbian) that the Gracanka River - The water quality of this river is continuously polluted as a result of pumping water from the Kisnica and Artana mines. This water has high values of electrical conductivity and sulfate ions. Dries during the summer.

In addition to these, which are included in the report and relevant, some facts have been institutionally circumvented, and which de facto affect the quality of water in the river Gracanka, and these are known and unknown industrial pollutants. Recommendations and solutions come precisely from the formation and localization of the problem.

## History of the river Gracanka

The municipality of Gracanica stretches on the eastern edge of the Kosovo valley, where the branches of Valetina and the slightly steeper branches of Stazevac on the river Gracanka rise slightly, and in the west, it extends to Sitnica. Gracanica is located 570 meters above sea level and is part of a tectonic valley that descended along the fault in the middle of the Tertiary. It is 10 km southeast of Pristina.

The river Gracanka, named after the monastery of the same name from the 14th century, flows through the settlements of Gracanica, Laplje Selo, Preoce, Gornje Dobrevo, and inflows into Sitnica at the exit from Donji Dobrevo. It is the largest river in the municipality of the same name, into which the Kravarica stream flows in the upper course of the basin from the northeast side from the direction of Ajvalija.

It springs below the dam of Lake Badovac and flows next to the tailings of the Kisnica mine, and then all the way to the estuary of the Sitnica through many populated places. While there was no lake, Gracanka was richer in water, from rivers and streams below the village of Labljana and the village of Mramora. The length of this river is 18, 50 km.

Gracanica Lake, also known as Badovacko Lake, is an artificial accumulation on the Gracanica River. It is located two kilometers east of Gracanica, built-in 1963-1966 to supply Pristina with drinking water. The 52 m high dam, 246 m wide, was built in Badovac strait, below mountain Androvac, near the Kisnica mine. When it is full, the lake is 3.5 km long and up to 500 m wide, its maximum depth is 30 m, and its total volume is 26 million cubic meters of water.

According to the testimonies of the locals, Gracanka once was a clear river from which tired farmers, breathless children after the

game, cattle after grazing, drank water. Water was used for irrigation, but also for watering cattle that were raised in every household in these parts. There is also evidence of a large fund of fish that were caught here for leisure by the locals, but also about other inhabitants of the river. Today, they say, even frogs moved out of these waters

From the sixties until today, the river Gracanka has suffered a huge burden of human activity. The constant urbanization of this area has led to a large number of new buildings, residential, business, industrial, which burdens the river watercourse and ecosystem in several ways. One of them is the insufficiently regulated sewage network, where all fecal waste is discharged without processing, the other is industrial waste, which is also discharged into the water without treatment.

The open wound of the municipality of Gracanica, which has about 20,000 inhabitants and the river Gracanka, is certainly an open tailing of mining waste from Kisnica, but also constant contamination of river water with mine wastewater that is discharged directly into the riverbed without any treatment.

## Mine Kisnica

The Trepca Mining and Metallurgical Plant used to be the backbone of Kosovo›s economy, and mining used to be the main branch of industry in Kosovo. At the peak of its activities in the 1980s, the Trepca plant employed 22,500 workers, and the average annual turnover of the company was 100 million US dollars.

Today, most of the Trepca plant›s facilities are closed, limited mineral exploitation is taking place, and the Trepca plant represents at the same time the greatest potential for Kosovo›s economic recovery and the greatest environmental challenge and source of poverty in Kosovo. The centers of the former activities of the Trepca plant in northern and eastern Kosovo carry a large legacy of toxic waste that threatens tens of thousands of men, women, and children.

Waste acids, dust particles, unsafe operation, and poorly maintained and unstable tailings pose a daily danger to those living nearby. Waterways are polluted in the most polluted areas, arable land is full of heavy metals that are transferred to food, and the air is clogged with dust that damages the lungs.

The plant includes 3 pools and mine chains. The Kisnica mine belongs to the southern chain.

## Hazardous industrial waste

This company produces a concentrate of lead, zinc, gold, and silver. During the work activities, several reagents are used that are necessary for the flotation process. The flotation warehouse contains reagents divided into classes with appropriate labels and inscriptions. The rooms in which the reagents are stored are not sufficient and safe. Some of them are quite corroded and need to be repackaged to prevent leaks as well as environmental consequences. Danger signs and other signs of emergencies have been placed at the entrance to the warehouse. Sodium cyanide (NaCN) is separated from other chemicals in storage in special metal barrels that are placed on a wooden pallet. However, it is desirable to place Sodium Cyanide in one suitable space. This reagent is used at 25 grams per ton. Protective equipment is used when working with reagents and workers working with these substances should be qualified. While, as far as the treatment of water is concerned, especially acidic ones, no action has been taken yet for their treatment.

Activity: Production of concentrates of lead, zinc, gold, and silver.

## Tailings

One of the biggest polluters in Gracanica is the mining and metallurgical plant «Trepca», which was founded in 1926.

Trepca is currently not safe for the health of the population living in the Ibar river basin. It is a complex of mining, flotation, metallurgy, chemical industry, and industrial processing. Now only parts of the mining area are working, some plants and the rest is at a standstill, but regardless of the parts that are working or what is at a standstill, Trepca has left behind a worryingly large part of dangerous tailings, from Ajvalija and Kisnica to Suva Ores in Raska. At a distance of 120 km, four flotation plants process ore from a dozen mines, and what remains behind them is insufficiently arranged and very dangerous.

Tailings also contain heavy metals, such as lead, zinc, arsenic, antimony, mercury, cadmium, bismuth, and these are poisons. These tailings also contain flotation reagents such as cyanides, various sulfates, and hydroxides, which together with the tailings are deposited at the Gracanica landfill or the landfill in Badovac.

Several key facts indicate a problem with solving a long-standing problem:

## List of chemical compounds

Gracanka, this river is endangered by the following:

| No. | Chemical compound | Chemical symbol | Quantity |
|---|---|---|---|
| | Calcium oxide | CaO | 4500 kg |
| | Sodium cyanide | NaCN | 5000 kg |
| | Copper sulphate | $CuSO_4$ | 1600 kg |
| | Sodium carbonate | $Na_2CO_3$ | 3000 kg |
| | Potassium Amyl Xanthate | KAX | 1000 kg |
| | Potassium ethyl xanthate | KEX | 1000 kg |
| | ferrous sulfate | $FeSO_4$ | 400 kg |
| | Zink sulfate | $ZnSO_4$ | 800 kg |
| | Dowfroth 200 | C10H22O4 | 2000 kg/l (type of oil/fat in liquid state, dark brown color) |

**O Table 1.** List of chemical compounds in "Flotation Trepca" - Kisnica

Open tailings just ten meters from the settlement, which is located on an elevated part of the terrain. As climates and atmospheric conditions are known, winds and precipitation are

frequent, which leads to the constant spread of waste within 20 km by air, while after rain and melting snow, water from tailings flows directly into the riverbed of Gracanka and thus endangers the Ibar river basin.

The open tailings pond is located only 1 km by air over Gracanica Lake. The water from this lake is supplied to the municipality of Gracanica and most of the municipality of Pristina, which speaks of over 100,000 people who use this source for drinking water.

## Other pollutants

In addition to wastewater coming from mine pits and open tailings, which with the help of atmospheric water transmits pollution to

1. Sewage, fecal water

2. Waste Industrial Water «Unknown Pollutant»

3. Wild landfills (municipal, construction, agricultural waste)

According to the Development Plan, which the public has access to, the municipality of Gracanica is almost completely covered by the sewerage network. However, much of the network was done in the 1980s, indicating an outdated network that often requires interventions. The network is designed for four times fewer inhabitants, and as the demographics change and the growth in this region, the network today suffers from increasing amounts of municipal wastewater. The problem arises when the network becomes clogged, resulting in a wastewater spill. But even that would not be a problem if all the wastewater was not discharged directly into the rivers, without any processing and purification in the collectors.

For the last seven years, Gracanica has often been in the public spotlight due to one endemic phenomenon, and that is the

«chameleon» river Gracanica. Namely, in the part of the flow-through Laplje Selo and Preoce, mostly in the summer months, and occasionally in the transitional seasons, a very unpleasant smell spreads from the river. Residents of this municipality, and especially these villages, regularly addressed many relevant institutions, inspections, municipalities, ministries. Water analyzes were performed on several occasions, based on which it was established that there are traces of heavy metals in the water, which is a consequence of flotation, but also chemicals that indicate the production of varnishes, paints, or paints. The problem is not solved. In the period when an unpleasant smell is felt, the river turns from orange to milky white, which is a consequence of washing away the tailings. If the problem was highlighted and received media attention, the problem would disappear, and after a while, the same thing would happen again. The polluter remained unknown, while it was only established that this polluted water comes from the direction of Ajvalija, which is not the competent cadastral zone of the municipality of Gracanica, but Pristina.

Improper waste disposal is still a stumbling block for the local population. Very often, riverbeds become collectors for waste disposal of various origins. Construction, agricultural, communal, bulky waste are unfortunately common in Gracanka.

## Impact on health

When it comes to public health, this aspect cannot be observed based on relevant facts. Inadequate treatment of pollutants and their impact on public health, as well as on the environment, has never been the subject of medical, scientific, and environmental disciplines.

In the period when the world is ruled by an epidemic of kovida19 and various accompanying infections of the respiratory systems, the local population is left to itself without any care of the competent authorities.

A study on a certain sample was conducted in North Mitrovica, where it was found that the level of heavy metals in the blood increased in most of the samples, which researchers associate with open tailings and a landfill on the outskirts of the city.

Given the same treatment of ore processing, outdated and inadequate processing technology, as well as a similar distance of waste disposal from the settlement, it is assumed that the results of possible research and testing of samples in the local population would not differ drastically.

Apart from the tailings that pollute the river, industrial waste of unknown origin creates additional risks for the residents of Laplje Selo. In the summer months, when the temperatures become unbearably high, the locals are prevented from ventilating their rooms in any way, because unpleasant odors from the outside additionally make the space stuffy and unbearable. The long-standing problem remains unresolved, although there are indications that water is being pumped from wells and water is being discharged to make water flow faster. This method has no future, it costs us a healthy resource, energy and does not seem to eliminate the problem.

## Solutions offered

When it comes to the offered solutions, several possible ones were placed in public, none of which saw the light of day, nor were they on the priority lists of the bodies responsible for the implementation of such projects.

Professor Aleksandar Ćorac, in several public discussions and debates on the topic of pollution, placed some of the results of his research and claimed that he had come to a possible scientific solution. One of the

preventions of further pollution is afforestation, ie the conversion of existing tailings into a plantation of a certain plant species that would absorb harmful substances accumulated in mine waste.

Recycling of tailings is also one of the offered solutions that bring with it benefits, ie the possibility of separating useful ore particles from mine waste, which due to poor processing and outdated technology in the processing process did not fully separate all ore capacity.

Another of the offered solutions for the prevention of river pollution was the relocation of tailings, which contributes to the local population, but certainly endangers another location. The disadvantage of this solution is the expensive investment in conveyor belts, the long period of implementation, and the lack of adequate locations at a tolerable distance.

When it comes to the direct quality of watercourses in Gracanka, so far there have been several possible steps that would contribute to positive results.

**Raising citizens› awareness of adequate waste disposal.** It should be noted that Gracanica was left to itself in the post-conflict period until 2010 in the context of garbage disposal and that the infrastructure for this process did not exist. By investing in infrastructure, by engaging garbage transport companies, this problem is brought under control.

**Paving the riverbed.** In order to urbanize rural areas, Gracanica and Laplje Selo, part of the riverbed of the river Gracanka is paved. Concrete and stone paving did not prove to be a good practice because natural filtration through the river ecosystem was prevented. Unfortunately, no impact studies on the existing ecosystem and water quality have been conducted to carry out this project. The problem of inadequate access to this type of investment without detailed research and studious research is not unknown, it is even a practice.

# The solution

Despite all the above factors that affect the pollution of Gracanka, the primary cause can be water that reaches Gracanka without adequate treatment from the mine pits. Although no detailed research has been done, this can be seen even on Google Maps. The watercourse of the river Gracanka, like a chameleon, changes color from the source to the mouth. The section located directly between the mine and the tailings, as well as the color of the water in the mine basins, indicates the first anomaly, which can be seen in the attached photos taken from public portals.


**O Figure 1:** Sedimentation and drainage complex in the Kisnica mine, Trepca

What is the solution?

## First step

OO Analysis of legislation on the responsibilities of all actors in the process of production, disposal, and disposal of industrial and chemical waste, as well as the law on environmental protection, protection of rivers and watercourses is the first step in the search for a solution.

OO Analysis of water quality, its contents, impact on the environment, impact on public health, impact on groundwater and the ecosystem is a step without which those responsible for the chain of pollutants cannot be found.

OO Public discussions that include all decision-making instances, the profession, and the local population are also an important segment on the road to a better environment.

OO Establishing much better communication and cooperation with central institutions, without which solving these problems is a Sisyphean job.

## The second step

The following are used for water purification: mechanical, biological, and chemical purification procedures.

Mechanical procedures are based on the removal of physical impurities in water and on the principle of the action of physical forces (gravity, pressure). Which procedure will be applied depends on the characteristics of the wastewater and the required degree of purification. Mechanical methods of water purification consist of removing macro and micro suspended particles from the water of organic and inorganic origin. For this purpose, the following are used:

- grates and sieves,
- deposition,
- flotation,
- filtering,
- centrifugation,
- sand settlers,
- fat catchers,
- primary sedimentation tanks and flow equalization basins. These plants also use devices for aeration of wastewater, which achieves better separation of inert particles, flotation of fats and oils, the introduction of a certain amount of oxygen into the water, as well as the desorption of some gases from the water.

## Grills and sieves

Larger, insoluble, and floating substances are removed from wastewater with the help of grates. Their role is to protect devices and pipelines from damage and congestion and to facilitate further wastewater treatment. The grilles block the supply channel and are placed vertically or at an angle, usually 40-70 °.

## Sedimentation

Sedimentation can be the previous and final stage of water purification. The use of grates and sieves, as well as sand precipitators and grease traps, can be considered as a deposition process with certain infrastructure facilities intended for this type of impurity separation. Infrastructure facilities are sedimentation tanks. The sizing of all types of sedimentation tanks depends on wastewater flow, the concentration of undissolved components, density and mixture of water and sediment, sedimentation kinetics. The disadvantage of horizontal and radial precipitators is that the water flow is pronounced, which causes additional resistance and prevents deposition, as well as the problem of sludge drainage. Vertical precipitators are used for this purpose.

An example of good practice, and in connection with cases of similar problems, is the example from Majdanpek, a mining basin in eastern Serbia. The paper presents the average annual concentrations of heavy metal ions in the wastewater of the Filtration Plant, Majdanpek Copper Mine. Based on chemical analyzes of wastewater samples, elevated content of heavy metal ions (Cu, Fe, Mn, Zn, Pb, Cd, etc.) was determined, which exceed the values of the maximum allowable concentration defined by the regulations of the Republic of Serbia. The obtained results were compared with the permitted concentration limits prescribed by the Rules of Procedure of the World Health Organization and Directive 98/83 / EC of the European Union, as well as with some literature data. At the end of the paper, a proposal is made to reduce the concentration of heavy metal ions in the wastewater of the filtration plant using ion exchange resin.

Industrial wastewater cannot be treated by conventional water treatment processes because it contains metal ions, as well as other chemical compounds that are biodegradable, which has a destructive effect on microorganisms that are active in the process of natural treatment. Improving the wastewater quality of the filtration plant can be carried out by using various adsorbents. Ionites, acrylic coal, silica gel, and zeolites are used for adsorption in liquids. Ionites as natural or synthetic adsorbents, of organic or inorganic origin, can be zeolites, clay minerals, ion exchange resins, activated minerals, etc.

They are practically insoluble in water or other solvents. They are divided into anions and cations, depending on the structure of molecules and reactions with ions that are in solution and that adsorb. Different types of cationic ion exchangers can be used to remove heavy metals from wastewater, such as Amberlite IR-120, Dowex 50, Duolite C-20, Lewatit S-100, etc.

In order to avoid large ore losses through wastewater, it is proposed to supplement the wastewater treatment process. It is desirable to make a mesh cage of adequate volume, depending on the average concentration of excess heavy metal ions and the quality of the ion exchange resin, which would contain the ion exchange resin. The network cage would be located at the level of wastewater in the sedimentation tank into which the overflow water from the thickener would flow. This would reduce the concentration of zinc, iron, and lead ions in the wastewater of the filtration plant. After a certain time of use, the ion exchange resin is supersaturated with bound heavy metal ions. The process of desorption of heavy metal ions from ion exchange resin is determined by the manufacturer, which in this case should be done with the cooperation of the company Trepca. One of the ways to purify the network with ionic resin is to regenerate the resin with a solution of sulfuric acid.

## The third step

In addition to improving water quality, all solutions offered so far should be considered, including relocation of mine waste and afforestation of tailings with adequate plants that absorb pollutants (liquid metals and toxic compounds) from the soil, for which there are scientific studies and feasibility studies by eminent experts in areas of health, environment, technology ...

# Recommendations

The recommendation to all individuals and legal entities is that the health campaign never stops and that we share air, water, and the environment with the same responsibility and consequences.

Specific recommendations to the actors involved in decision-making are:

- Responsible approach to establishing priority problems and solving them to protect human health and preserve the environment
- Responsible analysis and implementation of legal regulations and implementation of penal policies, including all instances and actors in the process of implementation and implementation of problem-solving
- Adequate professional and concise analysis of the problem
- Institutional networking, establishing communication between local, central, and international actors to protect basic human rights
- Raising citizens awareness of the importance of preserving the environment, but with a concrete example of good practice in which institutions will show that they approach this topic responsibly
- Increased budget funding for research, analysis, feasibility studies, projects, and their implementation in the field of environmental protection, which means reducing pollution and adequate wastewater treatment.

# Closing remarks

In the conclusion of this statement, it should be pointed out that the solutions to environmental problems lie first in the minds of leaders of local, central, international, and even non-governmental actors. The existence of priority lists for the elimination of pollutants should be imperative for anyone who has sincere intentions in preserving the health of the community and preserving the natural and healthy environment.

This goal can be achieved by the timely response, additional budget codes and funds for rehabilitation and response, additional engagement of experts for testing, design, research, compliance with zonal regulations, and penal policy in which there are no privileged or privileged.

**The OPEN initiative is supported by:**

KFOS

Fondacioni i Kosovës për Shoqëri të Hapur
Kosovo Foundation for Open Society
Kosovska Fondacija za Otvoreno Društvo