Mitrovica Environmental circumstances and the roadmap to societal aspects of climate change

TITLE OF THE REPORT:
Mitrovica Environmental situation and the Roadmap to Societal Aspects of Climate Change

PROJECT:
Mitrovica Goes Green

PUBLISHER:
7ARTE

AUTHORS: Gresa Ferri, Damir Gashi

Mitrovica, Kosovo
May, 2023

Table of Contents

1.0 INTRODUCTION.... 4
2.0 METHODOLOGY.... 5
2.1. Primary Data Collection.... 5
2.2. Secondary Data Collection.... 6
2.3. Data Analysis.... 6
3.0 NATIONAL LEGISLATION, DIRECTIVES, PROGRAMMES.... 6
4.0 INTERNATIONAL LEGISLATION, DIRECTIVES, PROGRAMMES.... 8
4.1. EU Green Agenda for the Western Balkans (GAWB).... 8
4.2. Paris Agreement.... 8
4.3. Aarhus convention.... 9
4.4. Approximation with the EU legislation.... 10
5.0 CLIMATE CHANGE CONCEPT AND REALITIES IN KOSOVO.... 11
5.1. What is climate?.... 11
5.2. Climate change vs. Global warming.... 11
5.3. Climate change causes.... 11
6.0 ENVIRONMENTAL SITUATION IN MITROVICA.... 12
6.1 Physical environment.... 13
6.2 Overview of biodiversity.... 20
6.3 Economy.... 21
7.0 POTENTIAL ENVIRONMENTAL THREATS IN KOSOVO/MITROVICA.... 21
7.1 The consequences of deforestation.... 22
7.2 The consequences of agriculturally-related pollution.... 23
7.3 The consequences of industrial pollution.... 24
7.4 The consequences of poor waste management.... 27
8.0 SURVEY ANALYSIS ON MITROVICA CITIZENS' PERCEPTION OF CLIMATE CHANGE.... 27
8.1. Gender.... 27
8.2. Environmental issues.... 28
8.3. Climate Change as a threat to personal health and safety.... 28
8.4. Likelihood of recommending to a friend the activity that will help reduce global warming.... 29
8.5. Awareness on the existence of global and local policies to reduce climate change.... 30
8.6. Environmental policies in the country.... 30
8.7. Sufficiency of environmental policies in place.... 31
8.8. Platforms informing on climate change.... 32
8.9. Environmental issues importance.... 33
8.10. Level of agreement with the statements on climate change.... 33
8.11. Issues of concern.... 34
9.0 SOCIAL ASPECTS OF CLIMATE CHANGE.... 35
9.1 Societal engagement and citizens' perspective change.... 35

9.2. Bridging the Mitrovica climate gap....36
9.3. How is this relatable to our focus group, citizens of Mitrovica?....37
10.0 References....39

1.0 INTRODUCTION

Climate change is undoubtedly a priority challenge for humankind, posing environmental, public health, and economic stability risks. Its impacts are increasingly apparent as communities experience difficulties. It is essential to initiate measures that will counteract climate change's adverse effects, safeguarding the environment and encouraging the development of low-carbon, high-productivity economies, developing and implementing strategies for adaptation to climate change, and ensuring that communities are prepared and resilient in the face of this global phenomenon. A lack of understanding and awareness of climate change's severity, causes, and consequences can lead to misinformed decisions and limited influence on political agendas, environmental priorities, and adopting sustainable practices at individual and community levels. Therefore, an important aspect in combating climate change is the citizens' perspective and awareness level on it and the approximation of science and research to citizens as critical tools for shaping a proactive and informed approach to addressing this global challenge. Citizens' perspective on interpreting scientific evidence related to climate change is essential in guiding public opinion, policy-making, and collective action. This may not always hold true for Kosovo, as many citizens are not adequately informed about climate change issues. The limited public awareness and trust in scientific evidence may pose challenges to implementing climate change mitigation and adaptation strategies effectively.

In this report, the authors aim to delve deeper into citizens' perspectives on climate change, focusing on the case of Mitrovica. Mitrovica is specific due to its unique geographic location and socio-political dynamics, which make it particularly vulnerable to the impacts of climate change. As the town is divided along the Ibar River, with a mix of ethnic communities, Mitrovica faces unique challenges in addressing environmental issues. The region is experiencing more frequent and intense heat waves, prolonged droughts, and increased flooding emergencies (the two latest large-scale flooding events occurred in Mitrovica in January 2021 and January 2023), all of which strain the town's already poor infrastructure and resources. Collaborative efforts among local and international stakeholders are crucial for building resilience and promoting sustainable development in Mitrovica to ensure its diverse population's well-being and livelihoods. The report will explore the factors that contribute to the limited public awareness and understanding of climate change issues and the potential barriers to trust in scientific evidence.

The report will examine the current environmental legislation in place, the environmental situation, and parameters as a starting point for the climate characteristics of Mitrovica, showcasing the survey on the state of awareness of the citizens of Mitrovica regarding climate change, their perspective on the effects of climate change on their health, the main environmental issues in town, discuss the importance of promoting accurate, accessible, and

engaging reporting on climate change issues, fostering a more informed public discourse, and finally, will provide recommendations on bridging the gap between scientific evidence and citizens' understanding of climate change issues in Kosovo. The report will outline potential strategies for enhancing public awareness, building trust in scientific evidence, and promoting collective action toward climate change mitigation and adaptation.

2.0 METHODOLOGY

This research was conducted by using a mixed-methods approach to collect and analyze data on the environmental situation in the city of Mitrovica, Kosovo. The study utilized primary and secondary data sources to understand the environmental situation and existing data comprehensively.

2.1. Primary Data Collection

To collect primary data, a survey was conducted with citizens to gather information on their perception of the environment and its impact on their daily lives. The survey was designed to elicit detailed responses from participants, and it included questions on various aspects of the environment, such as air and water quality, waste management, and environmental hazards.

2.2. Secondary Data Collection

To gather secondary data, the study reviewed Mitrovica South and North's local environmental action plans to understand the current status of environmental protection and conservation efforts in the region. The action plans were analyzed to identify gaps in environmental protection and to identify potential areas for improvement. Published reports and documents on the environment from the UN, GIZ, World Bank, Government of Kosovo, and Government of Serbia were also reviewed to gather insights into the broader regional and international context of environmental issues. These sources provided information on the region's latest environmental policies and regulations, as well as the main challenges and opportunities in the field of environmental protection.

The study also examined the strategy for climate change and the strategy for environmental protection to understand the goals and objectives of the government in these areas. This involved analyzing official documents, such as government reports and policy papers, to understand the government's approach to environmental protection and its actions to address environmental issues in the region. Additionally, published research papers from environmental experts were analyzed to gather insights and information on environmental issues in the region.

2.3. Data Analysis

The data collected through the survey and secondary sources were analyzed using both qualitative and quantitative methods. The qualitative data was analyzed thematically to identify key themes and patterns in the responses of citizens. The analysis involved identifying common themes and patterns in the responses and categorizing them accordingly. The quantitative data were analyzed using descriptive statistics to provide an overview of the responses. This involved calculating summary statistics, such as mean, median, and standard deviation, to provide an overall picture of the responses. The secondary data were analyzed

using content analysis to identify key themes and patterns across the various reports and documents. This involved reviewing the data to identify common themes and patterns and categorizing them accordingly. The findings from the data analysis were synthesized to develop a comprehensive understanding of the environmental perception and action plans in Mitrovica, Kosovo. This involved drawing conclusions from the data analysis and making recommendations for future action based on the findings.

3.0 NATIONAL LEGISLATION, DIRECTIVES, PROGRAMMES

The **National Development Strategy (NDS)**[1] outlines Kosovo's development policies for 2016-2021, addressing priorities that directly impact the environment. This ensures that investments in infrastructure, energy, roads, agriculture, and more are aligned with Kosovo's dedication to environmental protection and combating climate change. The strategy includes specific measures to support investments that promote the sustainable use of natural resources while maintaining a balance between development needs and environmental stewardship. These measures include investments in energy efficiency measures to reduce greenhouse gas emissions directly, optimizing water usage, and enhancing production and distribution capacities, taking into consideration the impact of climate events such as floods.

The **Climate Change Strategy 2019 – 2028**[2] aligns with the key priorities set forth by the latest **National Development Strategy 2030**[3] **(NDS)**, where the latter prioritizes environmental protection with the goals of enhancing environmental conditions by increasing the production and consumption of energy from renewable sources, investing in measures for saving and rational use of energy, and improvements in waste recycling methods and sustainable management of forests. The Climate Change Strategy encompasses a wide range of initiatives, including ambitious targets for reducing greenhouse gas emissions, enhancing energy efficiency, promoting renewable energy sources, and collectively advancing towards the goals set forth in the Paris Agreement, contributing to the global transition towards a greener, more sustainable future.

Integral to these efforts is implementing mitigation and adaptation measures in various sectors, including water management. To ensure a comprehensive approach, the Climate Change Strategy closely aligns with the principles outlined in the **Water Strategy 2017-2036**[4]. These principles include preparing regulations on wastewater treatment, water reclamation and reuse, groundwater management, and risk management programs addressing flood protection and drought management. Furthermore, the Water Strategy encourages the adoption of rainwater harvesting through incentive programs, which will contribute to climate change resilience by promoting water conservation and reducing the pressure on water resources.

The **Law on Energy Efficiency**[5] **(2018)** aims to promote energy efficiency and the use of renewable energy sources in various sectors. Key elements include the National Energy Efficiency Plan and Action Plan (NEEAP), Energy Efficiency Obligation Scheme, and minimum energy performance requirements for buildings. The law encourages energy

[1] *Kosovo National Development Strategy 2016 – 2021, link*
[2] *Kosovo Climate Change Strategy 2019 – 2028, link*
[3] *Kosovo National Development Strategy 2030, link*
[4] *Kosovo Water Strategy 2017 – 2036, link*
[5] *Kosovo Law on Energy Efficiency, link*

management systems, energy-efficient procurement, and retrofitting of public buildings. It also provides financing mechanisms like subsidies and grants while establishing monitoring and reporting mechanisms, which contribute to sustainable development and combat climate change by reducing energy consumption and greenhouse gas emissions.

The **National Emission Reduction Plan[6] (2018)** is a strategic document that serves as an essential roadmap for reducing emissions, complying with the EUs Energy Community Treaty environmental standards, and contributing to better air quality and public health in the country. The NERP 2018 offers a comprehensive analysis of the present state of emission reductions, establishing targets, deadlines, and key challenges while suggesting specific strategies to tackle them, such as retrofitting existing power plants with modern pollution control technologies, promoting the development of new, environmentally friendly power generation facilities like renewable energy sources and high-efficiency cogeneration plants, emphasizing the significance of energy efficiency and demand-side management in various sectors such as industry, buildings, and transport through awareness campaigns and regulatory measures, and advocating for a robust monitoring and enforcement system that encompasses a comprehensive emissions inventory, regular compliance assessments, and penalties for non-compliance.

The **Kosovo Integrated Waste Management (KIWM) 2021-2030** is a draft strategic plan approved by the Ministry of Environment in 2021, aimed at improving waste management practices, protecting the environment, and promoting sustainable development in Kosovo. Key aspects include updating the legal and institutional framework, promoting waste prevention and minimization, enhancing separate collection and recycling, developing integrated waste treatment and disposal facilities, strengthening hazardous waste management, building capacity and raising awareness, and establishing a comprehensive monitoring and evaluation system. The plan seeks to align Kosovo's waste management practices with European Union standards and best practices.

4.0 INTERNATIONAL LEGISLATION, DIRECTIVES, PROGRAMMES

4.1. EU Green Agenda for the Western Balkans[7] (GAWB)

Kosovo's efforts to combat climate change are closely linked to the **Green Agenda for the Western Balkans (GAWB)**, as the vital policy document that sets priorities and goals for the Western Balkans countries, with regional collaboration being a key policy focus. Kosovo has embraced the ambitious goals set forth in this transformative regional strategy, aimed at fostering a greener, low-carbon, and more circular economy oriented. By working closely with its neighbors and the European Union, Kosovo has embarked on a mission to reduce greenhouse gas emissions, increase energy efficiency, and promote renewable energy sources. The implementation of GAWB will allow Kosovo to address its unique environmental challenges while simultaneously reaping the benefits of regional cooperation and setting a commendable example for other countries in the Western Balkans. These efforts are further supported by the **EU4 Environment project**[8]as **an Instrument for pre-Accession**

[6] *Kosovo National Emission Reduction Plan (2018), link*
[7] *Green Agenda for the Western Balkans, link*
[8] *Home - EU4ENVIRONMENT*

Assistance (**IPA II**[9]) which aided in the transition towards a greener, more resilient economy that is in line with European Union (EU) standards. As a result, it made sense to incorporate EU best practices and goals into local and national environmental strategies and action plans.

4.2. Paris Agreement[10]

The **Paris Agreement** is a global initiative within the United Nations Framework Convention on Climate Change (UNFCCC) aimed at combating climate change. Adopted in 2015, it provides a framework for countries to set and achieve Nationally Determined Contributions (NDCs) for reducing greenhouse gas emissions, adapting to climate change impacts, and mobilizing financial resources to support these efforts.

Due to its specific political situation, Kosovo is not a member of the UNFCCC or the Paris Agreement, and thus, it is not obligated to submit Nationally Determined Contributions (NDCs) or Climate Action Plans. In 2021, Kosovo proactively addressed climate change by initiating discussions with global stakeholders to develop a voluntary NDC with the assistance of Japan's government, reestablishing the Climate Change Council to begin the process of crafting voluntary NDC. Kosovo's voluntary NDC reports will be centered on the goal of decreasing greenhouse gas emissions by 8.95 million metric tons of CO2 equivalent by 2030. This represents a reduction of approximately 16.3% compared to 2016 levels, illustrating Kosovo's dedication to participating in the worldwide effort to combat climate change, even in the absence of formal obligations under the Paris Agreement. In addition to greenhouse mitigation efforts, the voluntary NDC will include adaptation measures in other sectors, including agriculture, forestry, land use, water, biodiversity, and health.

4.3. Aarhus convention[11]

The Aarhus Convention, formally known as the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, is an international treaty signed in 1998 in Aarhus, Denmark. The convention aims to promote transparency, accountability, and public engagement in environmental decision-making processes. Although Kosovo is not a party to the Aarhus Convention, it has expressed commitment to combating climate change and protecting the environment, in line with the convention's principles. Kosovo is taking steps to enhance environmental governance, which has implications for climate change mitigation and adaptation efforts.

Kosovo has initiated various programs and policies to combat climate change and promote sustainable development, including developing a National Strategy on Climate Change and aligning with the European Union's environmental regulations. By adopting and implementing these policies, Kosovo is indirectly embracing the principles of the Aarhus Convention, such as access to information, public participation in decision-making, and access to justice in environmental matters.

UN Sustainable Development Goals[12]

[9] link
[10] *The Paris Agreement, link*
[11] *Aarhus convention, link*
[12] *UN Sustainable Development Goals, link*

The United Nations Sustainable Development Goals (SDGs) are a set of 17 global goals aimed at ending poverty, protecting the planet and ensuring prosperity for all. These goals, adopted in 2015, have a target achievement year of 2030. They provide a blueprint for countries to develop policies and initiatives that promote social, economic, and environmental sustainability.

One of the SDGs is focused on Climate Action, which recognizes the urgent need to take action to combat climate change and its impacts. Like many other countries, Kosovo is facing the challenge of climate change and is working towards achieving the Climate Action goal and other SDGs.

Kosovo has been actively working to address climate change and contribute to the UN's SDGs. Some key initiatives linking Kosovo's efforts to the UN SDGs include:

SDG 7: Affordable and Clean Energy – Kosovo has been working to reduce its dependency on fossil fuels and promote renewable energy sources. The country is investing in solar, wind, and hydroelectric power projects to increase its share of clean energy and improve energy efficiency.

SDG 11: Sustainable Cities and Communities – The government has been implementing urban planning strategies to reduce greenhouse gas emissions, improve waste management, and enhance public transportation systems. These efforts support sustainable urban development and contribute to a greener environment.

SDG 13: Climate Action – Kosovo is actively involved in global climate agreements and has submitted its Nationally Determined Contributions (NDCs) to the Paris Agreement. The country is working on enhancing its climate resilience, mitigation, and adaptation strategies to combat the impacts of climate change.

SDG 15: Life on Land – Kosovo has been undertaking reforestation and afforestation projects to increase its forest cover, combat deforestation, and promote sustainable land management practices. These actions support biodiversity conservation and enhance the country's capacity to sequester carbon dioxide.

4.4. Approximation with the EU legislation

As a 'potential candidate for accession,' Kosovo is required by the European Commission to approximate EU environmental norms with national legislation. Kosovo has made some progress in specific areas, such as transposing the EU air quality standards and nature conservation into national legislation. However, much is left to be done regarding other areas of environmental protection. Administrative capacity at both central and local levels needs to be strengthened, and considerable efforts must be invested in awareness-raising, setting a more strategic approach, and aligning with and implanting the EU environmental acquis.

5.0 CLIMATE CHANGE CONCEPT AND REALITIES IN KOSOVO

5.1. What is climate?

Climate refers to the long-term patterns of temperature, humidity, wind, precipitation, and other atmospheric conditions in a particular area. Unlike the weather, which describes the short-term atmospheric conditions, climate represents the average weather patterns over an extended period, typically 30 years or more. The climate is influenced by factors such as altitude, latitude, vicinity to large bodies of water, and ocean currents. It varies around the globe and helps shape the ecosystems, natural resources, and human activities in a region.

5.2. Climate change vs. Global warming

Even though one identifies the terms "climate change" and "global warming" in a manner that suggests those are synonymous in their causes and effects, it is important to understand that these expressions denote two separate and unique phenomena related to the Earth's evolving climate system. As explained in continuation, global warming is a single specific aspect of climate change, focusing on the increase in Earth's average surface temperature, while climate change encompasses a wider range of climate-related phenomena and their impacts on the planet.

Global warming is the long-term increase in Earth's average surface temperature, primarily due to the release of methane and carbon dioxide, i.e., greenhouse gases, or human activities such as deforestation or burning fossil fuels. These gases trap heat within the Earth's atmosphere, leading to a rise in global temperatures.

On the other hand, climate change refers to a broader range of changes in the Earth's climate system, including global warming and other impacts such as changes in precipitation patterns, more frequent and severe weather events, and shifts in ecosystems. Climate change encompasses the warming trend and the resulting impacts on the Earth's environment, including rising sea levels, ocean acidification, shrinking ice sheets and glaciers, and disruptions to ecosystems and their inhabitants.

5.3. Climate change causes

Climate change is a complex global issue, and its causes are multi-faceted. It is primarily driven by human activities, with the leading cause being the release of carbon dioxide, methane, and nitrous oxide, also known as greenhouse gases, into the atmosphere. These emissions result mainly from burning fossil fuels as well as deforestation, which reduces the planet's ability to absorb carbon dioxide. Agricultural practices, such as livestock farming and rice cultivation, contribute significantly to methane and nitrous oxide emissions. Industrial processes and waste management also play a role in exacerbating climate change. The accumulation of these greenhouse gases traps heat within the Earth's atmosphere, leading to a rise in global temperatures and subsequent alterations to weather patterns, ecosystems, and sea levels.

Fossil fuel combustion relies heavily on fossil fuels, particularly coal, for energy production. Potent greenhouse gases (GHG) like methane, carbon dioxide, and nitrous oxide are released

during fossil fuel burning. The energy sector is the largest source of GHG emissions, with electricity generation, heating, and transportation.

In Kosovo's case, one must keep in mind that the primary source of electricity comes from two lignite-powered thermal power plants. Kosovo's reliance on these thermal power plants, Kosovo A and Kosovo B, which date back to the Yugoslav period, has significant implications for climate change. Lignite combustion, a low-grade and highly polluting form of coal, releases substantial amounts of greenhouse gases, particularly carbon dioxide, intensifying global warming. These aging power plants lack modern pollution control technologies, resulting in the emission of harmful air pollutants like nitrogen oxides, sulfur dioxide, and particulate matter. These pollutants contribute to local air quality issues, posing health risks to the population, and have a broader impact on climate change by contributing to the formation of acid rain and tropospheric ozone, both of which can cause damage to ecosystems and reduce agricultural productivity.

6.0 ENVIRONMENTAL SITUATION IN MITROVICA

Kosovo is facing several environmental challenges, including air pollution, deforestation, water pollution, and improper waste management. The use of coal as the primary source of energy production in Kosovo is a major contributor to air pollution, with the capital city of Prishtina experiencing particularly high levels of pollution.

In Mitrovica, a comparable situation exists where there is a lack of up-to-date information that could aid in identifying and addressing challenges. Despite the publication of Local Environmental Action Plans (LEAN) by municipalities between 2012-2017, there are no transparent statistics made available by the local authorities. Nonetheless, data from the draft of the LEAN document reveal that a substantial portion of both sides of the town was previously covered by forests, which play a crucial role in preserving biodiversity. However, many of the deforested areas have not been reforested, making it essential to engage in active and long-term reforestation with local trees for a sustainable forest economy. Studies indicate that Mitrovica suffers from significant pollution, including lead and heavy metals, due to industrial waste deposits from the past and dust deposition on the soil surface. This pollution takes the form of dust and contaminates the soil, air, water, and, ultimately, the food chain, posing a substantial risk to the population's health, particularly children and pregnant women.

Multiple studies, including those conducted by the World Health Organization, the University of Siena's geochemical research, the Ministry of Environment and Spatial Planning, and the Environmental Directorate in the Municipality of Mitrovica South, indicate that extensive areas in the Mitrovica South region, such as the Ibar and Sitnica river valleys, have high levels of lead and heavy metal pollution. In the south, soil pollution extends up to 35 cm in depth across three analyzed locations, while in the north, four locations have similarly high pollution levels. The concentration of heavy metals in these areas exceeds the permissible levels for soil pollution, such as the allowed value of 450[mg/kg] for Pb. Such pollution is particularly high in areas near the Kelmend landfill, Kërshi i Dudës, Lisicë, near the rivers, and Shupkovc near the battery factory. Industrial waste from the past, deposition of Pb dust on the soil surface, transport activities of Trepça's products (Pb and Zn concentrate), pollution of soil, air, water, colors, food, and agricultural products from the past, as well as a large number of old vehicles, are the primary sources of lead and heavy metal pollution.

6.1 Physical environment

- Climatic conditions

The geographic identity of Mitrovica is determined by its location, morphology, and spatial extent. The local factors influence the climate are relief, slopes, hydrographic conditions, vegetation cover, and human activity. The climate of Mitrovica is mostly continental, with hot summers and cold winters, but there are variations in temperature and rainfall due to the uneven terrain. The months of December and January are the coldest, while July and August are the warmest (average temperatures within the country range from +30°C (summer) to -10°C (winter). The heaviest rainfall occurs between October and December, and snow can fall between November and March in the mountainous regions.

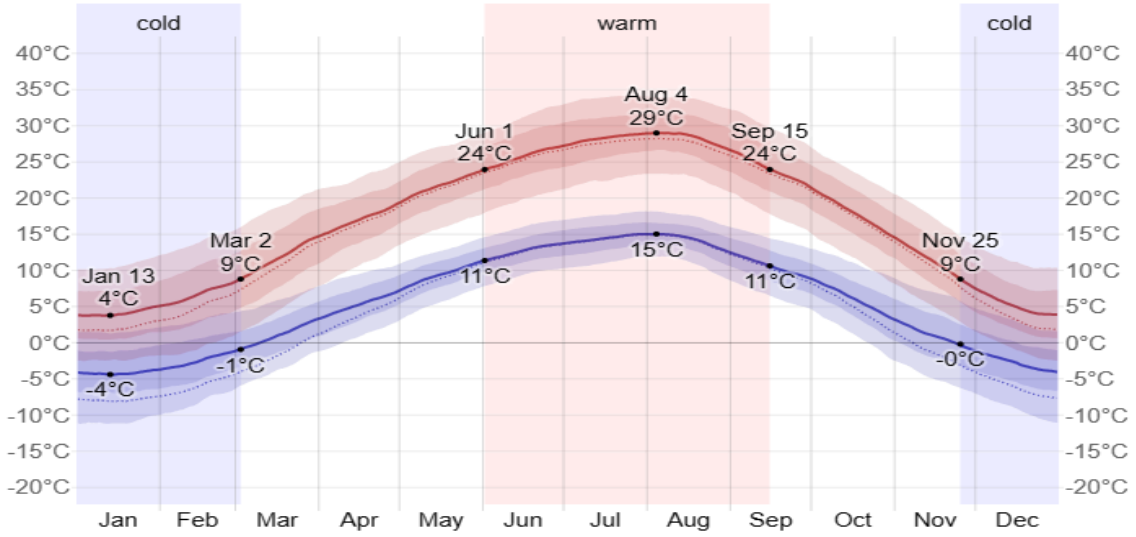


Figure 1. Average High and Low Temperature in Kosovo (2015 - 2022)

- Topography

North/South Mitrovica municipalities are positioned on open wide alluvial plains at the confluence of the Ibar and Sitnica rivers and the surrounding slopes. Geographically both municipalities are located in the northernmost part of Kosovo, at the foot of the Zvecan volcanic mound. They are surrounded by the steep slopes of Kopaonik, Rogozna and Mokra Gora from the east, north, and west. In the south, the mountain ranges open towards the plain of Fushe Kosova. The Ibar canyon begins to the north of the municipalities[13].

- Precipitation

The influence of mountain massifs is evident when analyzing the temperature regime. Air temperatures in the highest regions drop to -30C during the winter. As a result, the average temperature in the research area ranges from 3.7 to 11.4C. The coldest month is January with average temperatures ranging from -4C to 1C. August is the warmest with average mean temperatures from 13C to 22.1C. Based on the processed data, there are relatively small oscillations of precipitation during the year, meaning that precipitation is evenly distributed over the months. This is very favorable from a hydrogeological point of view because a stable regime of precipitation enables a stable regime of groundwater. The average precipitation

[13] URL: https://en.wikipedia.org/wiki/Demographics_of_Kosovo

height for the observed terrain amounts to 600-855 mm of water column, except in the mountainous terrain, with an average of 1100 mm of precipitation. The surrounding mountains have, during severe winters, a number of days with snow cover that goes up to 180, which has a significant effect on the groundwaters. The most precipitation occurs in May, June, and July, with an average of over 100 mm.

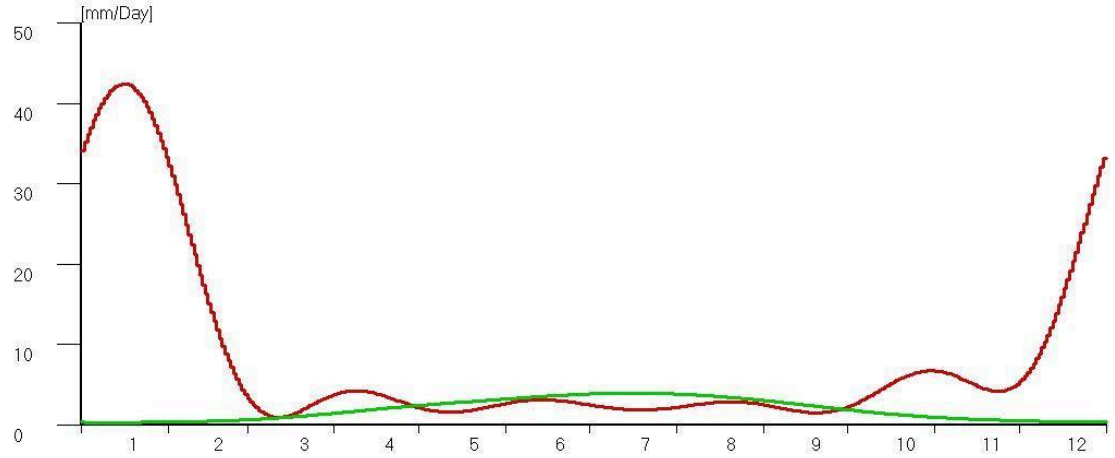


Figure 2. Average daily precipitation (red) and evapotranspiration (green) in Mitrovica region

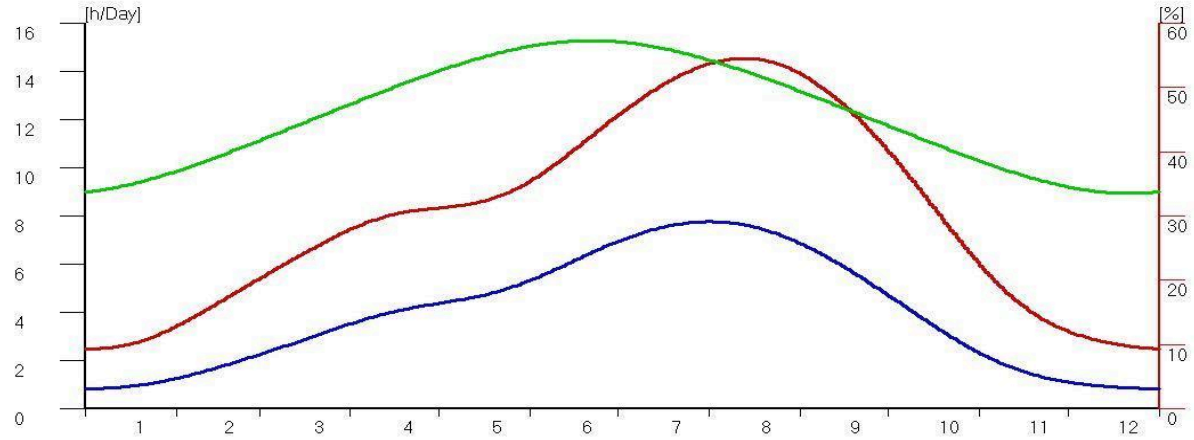


Figure 3. Annual solar cycle, Mitrovica region

- Water quality and pollution

Mitrovica has no wastewater treatment plant, resulting in all untreated wastewater being discharged into the rivers and streams of the area. The four rivers in South Mitrovica are highly polluted, with the Sitnica River being the most polluted due to the presence of phenols from the Kosovo Energy Corporation. The Trepça River is also polluted due to mining activities in the First Tunnel. The Lushta and Ibar Rivers are mainly polluted by urban wastewater. Heavy metal concentrations are not high in the lower reaches of the rivers due to the lack of reactivity between the lead and water and the dilution effect from Kelmend Lake and the Ibar River.

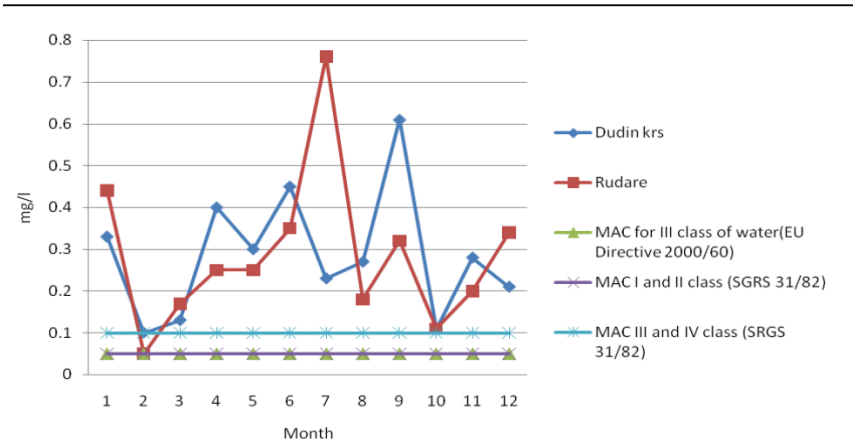


Figure 4.The concentration of lead in Ibar river samples[14]

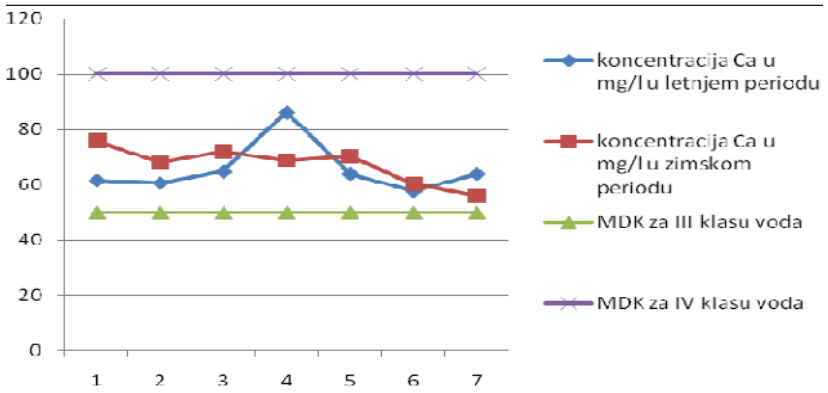


Figure 5. The concentration of Calcium in Ibar river samples

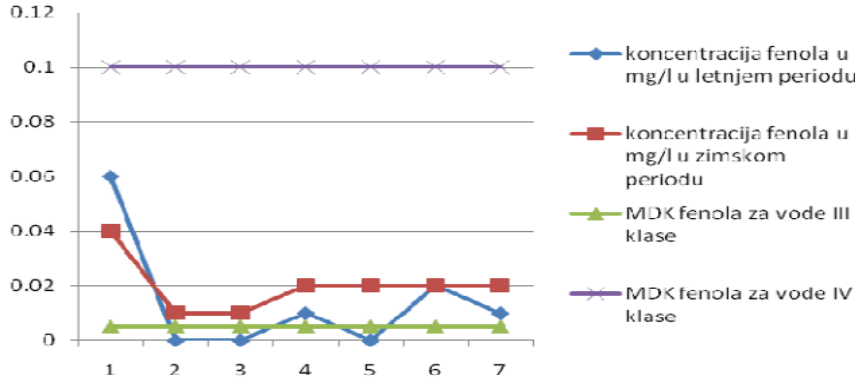


Figure 6. The concentration of phenol in Ibar river samples

- Risk of floods

The Ibar River, running through both parts of Mitrovica, presents a flood risk for some areas in both municipalities. The intitial area of the Ibar River's flow through Mitrovica, runds downstream from the inflow point of the Sitnica River in a length of about 5.0 km. Ibar River in this area is in the middle of two important transportation infrastructures: the Mitrovica-Prishtina motorway and the regional railroad. These two create a boundary to the river, preventing the water from overflowing. However, flooding can occur on the surface

[14] *Source: Public Health Institute, North Mitrovica*

areas between the two mentioned transportation infrastructures. Floods usually occur because the river Sitnica pushes large amounts of sediment, increasing the water level, along with the garbage from the Trepca river, increasing the water level. Areas considered under risk are the downstream areas from the point of inflow of the river Sitnica in a length of 5.0 km.

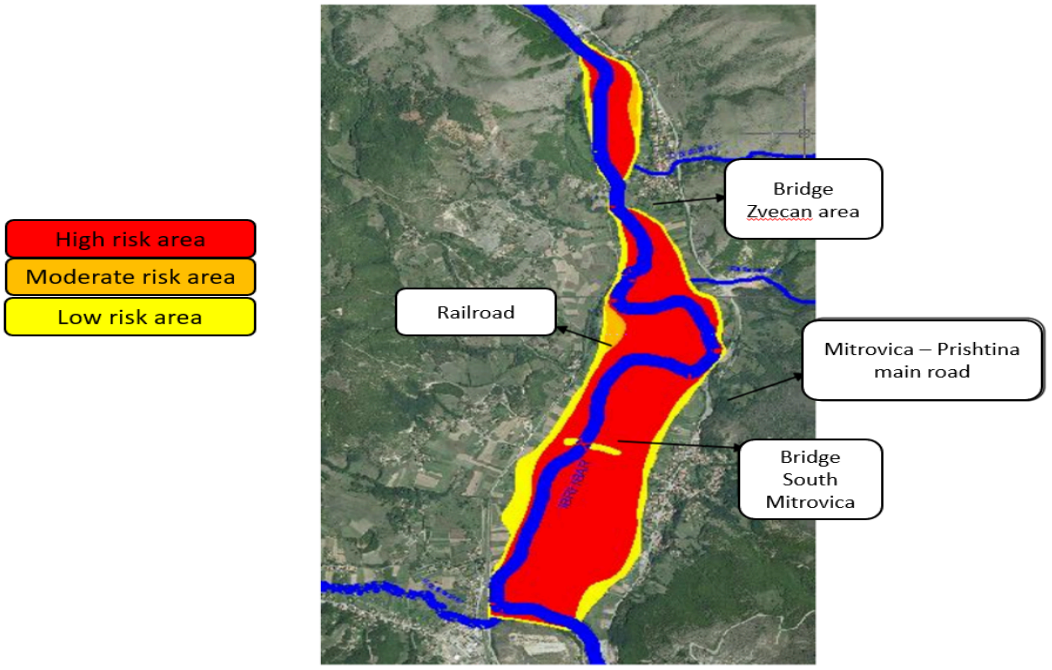
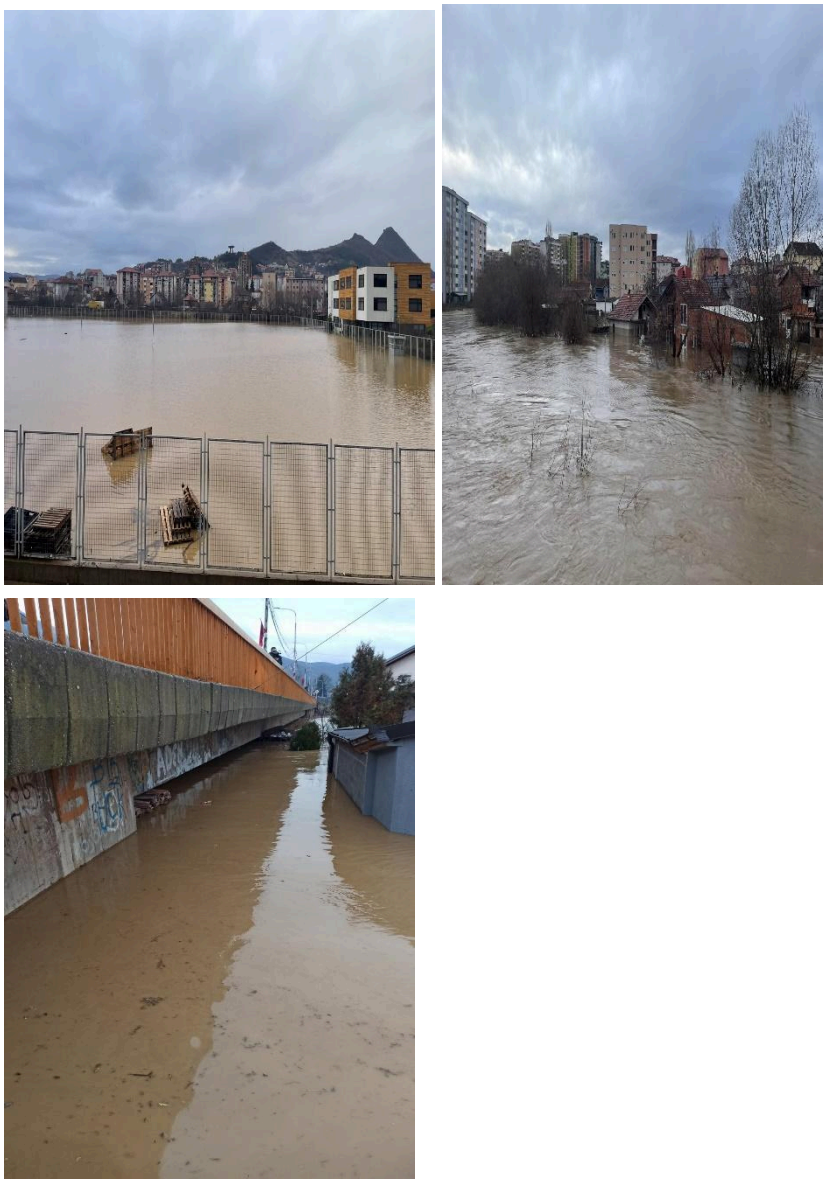


Figure 7. Map of Ibar river areas at risk of flooding

The sewage manholes in both parts of town are clogged with dirt, making it almost impossible to carry out adequate operations when the sewage system is blocked. Due to the sewer pipes' age and the penetration of dirt and tree roots, a plug gets formed, obstructing the ducts. Due to heavy rainfalls, a large amount of water is usually retained at the lowest points in town, preventing the traffic flow, obstructing the everyday life of citizens.

Picture 1: Flooding incident in the Three towers area, February 2019, North Mitrovica



Picture 2: Flooding incident in the area by the East bridge, January 2023, South Mitrovica

- Air quality and pollution

Air quality is a serious challenge in Mitrovica. Despite the closure of the lead and metallurgical industry in Mitrovica, lead and other metals continue to be a major pollutant and environmental problem with serious health implications for the population. The city is positioned near the Trepça industrial complex, which has contributed to the pollution of the environment in Mitrovica and its surroundings. The industrial plants that have contributed to the pollution are the Smelter, Refinery, Flotation, Chemical Production Plant, Steel Plant, Thermal Power Plant, Zinc Electrowinning Plant, and Battery Plant.

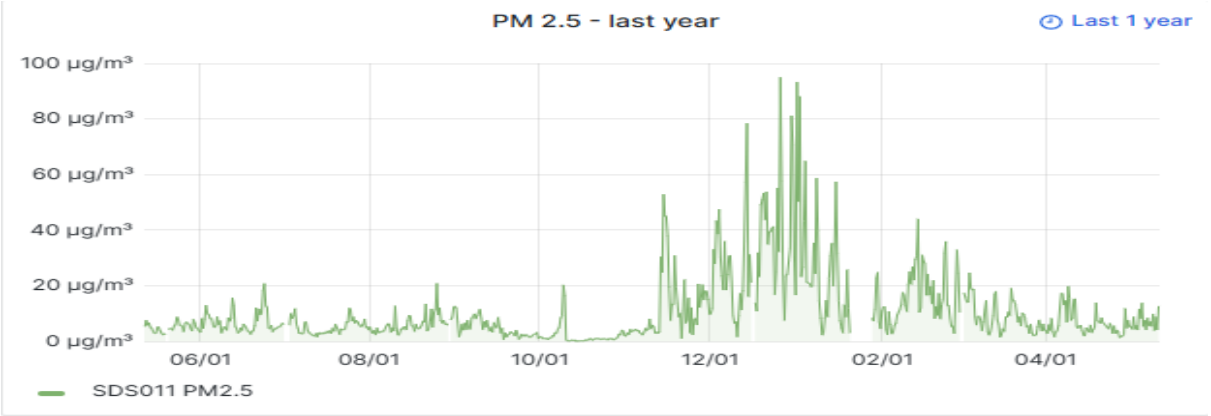


Figure 8. PM 2.5 concentration in Mitrovica North - May 2022 - May 2023

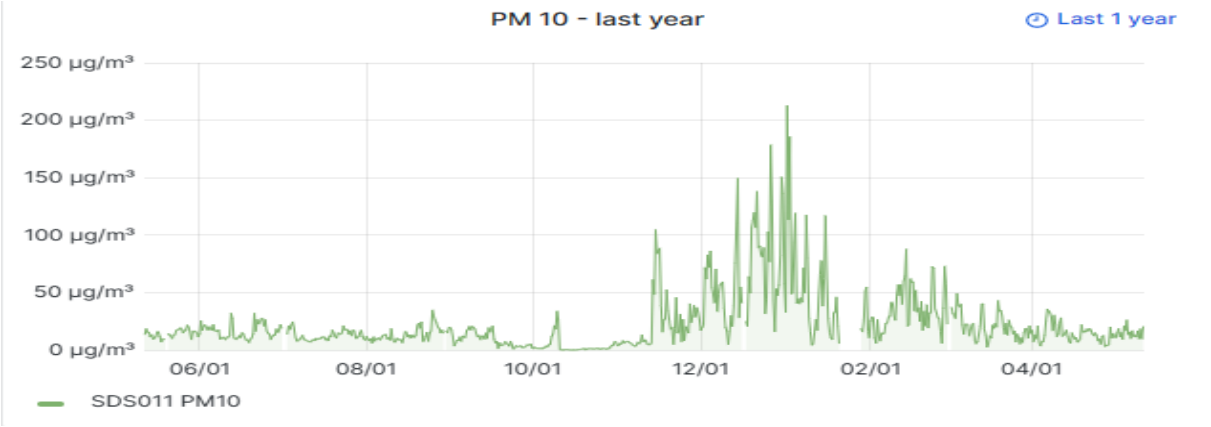


Figure 9. PM 10 concentration in Mitrovica North - May 2022 - May 2023

- Wind

The Mitrovica region experiences around 50-60 windy days per year, mostly from the north and blowing towards the south. Despite being protected by mountains from the north, the valley of Ibar draws large air masses from the north rather than the south, which has an open path for air movements. Although the highest wind speed was recorded from the southwest, most of the winds were second-class winds.

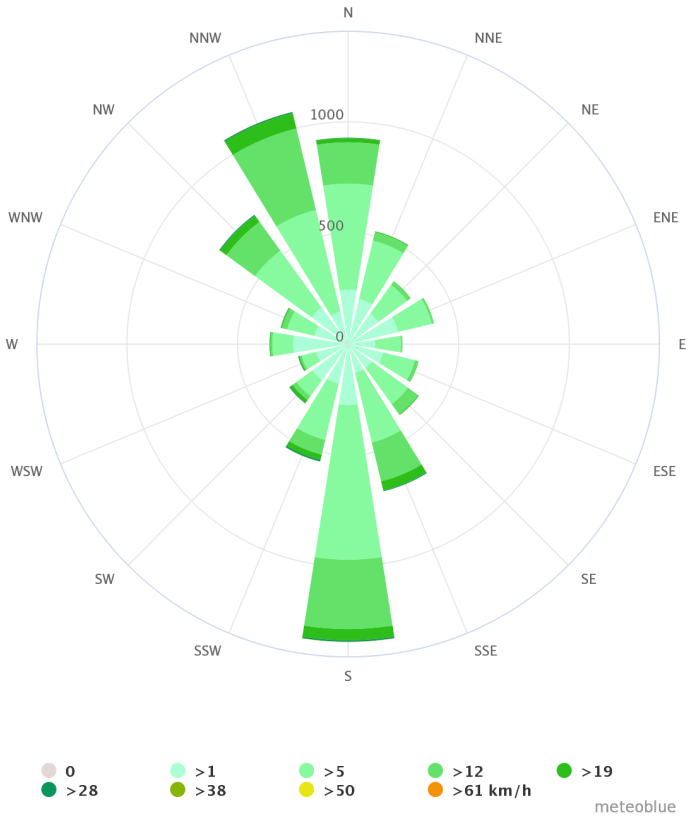


Figure 10. Mitrovica wind rose.

- Soils

The majority of soil types in Kosovo belong to categories such as Stagnosols, Vertisols, Lithosols, Rendzina, Ranker, Gleysoils, Fluvisols, Histosols, Solonetz, and Bare rocks. In the Mitrovica region, the soil is typical rendzina on serpentinite, which is characterized by thick layers and a lack of forest cover.

Both municipalities of Mitrovica cover territories that include three different types of land:

Diluvial soil extends along the valley of the Ibar river, on its right bank, and belongs to the group of genetically undeveloped soils, occurring at the transition of the hilly-mountainous relief to the plain and is under the constant influence of the process. This type of soil is without the presence of carbonates and with a neutral to the slightly acidic reaction of the soil solution, it is well-drained and rich in autochthonous humus, and in its natural state, it is overgrown with grassy and bushy forest vegetation.

Alluvial soil extends along the valley of the river Ibar. This soil also belongs to the group of genetically undeveloped soils with, sandy-clay mechanical composition, and according to the chemical composition, it is carbonate-free soil with a neutral to weakly acidic reaction with a lower content of humus. This soil type is suitable for irrigating and producing fruits and vegetables.

Reddish-brown soil is represented in the southern part of the city region and towards Zvecan. According to its mechanical composition, it belongs to loamy soils, it is poor in humus, and has a medium to highly acidic reaction. It is suitable for arable - fruit growing - viticultural crops.

Soil quality

In the urban areas of Mitrovica, the highest lead content was found near the tailing's flotation and Zn smelting plant. The average lead value of 1700 mg/kg exceeds the average EU value by a factor of 74, and the soils can be classified as heavily contaminated with lead[15]. As seen at Figure 11, the content of arsenic in the surface layer of the soil in the areas near the lead and zinc smelting plant (North Mitrovica and Zvecan) is high, but it is also high on the surface layer of the soil of the northern side of the smelter, as well as in in the area of mining activities in the northeastern part. The researched area was divided into three zones: zone I (the most polluted area), zone II (medium polluted area), and zone III (unpolluted area). As can be seen, the most polluted area (zone I) had an average As content of 100 mg/kg, in zone II, the average value was almost three times lower (34 mg/kg), and in zone III, the content of As in the soil was significantly lower (14 mg/kg). In the samples from N. Mitrovica, the average value was significantly lower (55 mg/kg), and it was evident that the soil samples from Vushtrri were not heavily contaminated with As (22 mg/kg), although they still exceeded the European average of the upper soil layer by more than three times[16].

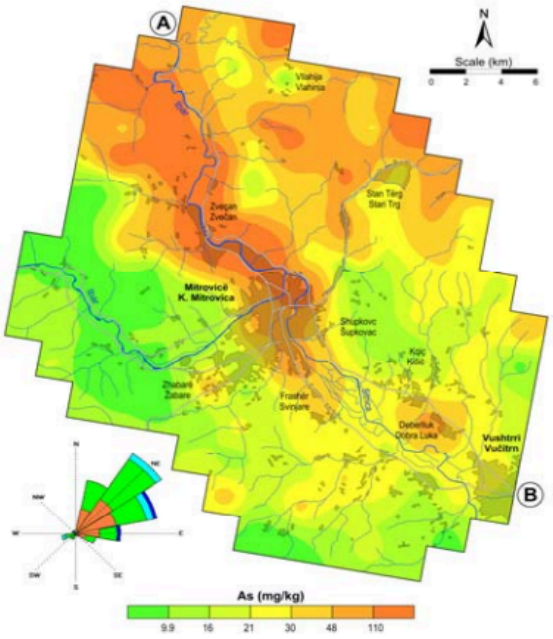


Figure 11. Distribution of concentration of arsenic in Mitrovica region

- Noise

[15] *Jasminka Alijagić, Trajče Stafilov, Robert Šajn, Heavy metal contamination of topsoil around a lead and zinc smelter in Kosovska Mitrovica/Mitrovicë, Kosovo/Kosovë, Journal of Geochemical Exploration, 2013*

[16] *Arsenic in Surface Soils Affected by Mining and Metallurgical Processing in K. Mitrovica Region, Kosovo, Trajce Stafilov, Milihate Aliu, Robert Sajn Int J Environ Res Public Health. 2010 Nov; 7(11): 4050–4061*

The main source of noise comes from traffic, while the industry with construction activities is in second place. The municipality has the equipment to measure noise levels, with allowable limits ranging from 0-15 dB(A) during the day and 0-23 dB(A) at night, depending on the zone. Protected zones should be planned in the Municipality Development Plan to restrict construction and business activities causing noise levels exceeding legal limits. Development needs include completing and harmonizing legal frameworks with international norms, supporting the use of higher quality fuel, rehabilitating existing noisy areas, reducing noise in urban areas, decreasing noise from vehicles and generators, and developing effective and environmentally acceptable noise monitoring systems and standards.

6.2 Overview of biodiversity

Kosovo's current legislation lays a strong foundation for protecting nature and biodiversity. The country's unique climatic characteristics enable the development of rich and specific flora and vegetation, which creates a diverse array of plant communities. These communities vary based on environmental factors, such as altitude, temperature, and precipitation, and as a result, there is a specific vertical zone of plant communities in Kosovo. One area that stands out for its rich biodiversity is the mountainous region of Mokra Gora. This area is abundant in medicinal plants and is home to a range of wildlife, including wild boars, rabbits, wolves, foxes, martens, wild cats, partridges, eagles, and falcons. In addition, the Gazivode water reservoir is teeming with various fish species such as carp, barbel, amur, bream, chub, and gudgeon, while mountain streams offer mountain trout and eels in some areas.

Despite the favorable conditions for various types of life in Kosovo, human activities have taken a toll on the region's biodiversity. Industrialization, tourism, transport, forestry, and other human activities have led to a reduction in the number of plant and animal species and have also disrupted the delicate balance of the ecosystem. As a result, it is important for the current legislation to be enforced effectively to protect the region's biodiversity and ensure a sustainable future for all.

6.3 Economy

The **northern municipalities** of Kosovo are home to diverse natural resources, such as various ores, water sources, and wood, which have traditionally supported various industries and sectors. These resources have traditionally been closely tied to the local industries and sectors that operate within the municipalities. The region once boasted a thriving business environment, with thousands of people employed in the mining, production, and processing industries. The area even attracted highly skilled employees from across Europe and beyond. However, over time, the mining and associated industries began to slow down, and today, large-scale operations are no longer the norm. Instead, small-scale mining operations, as well as associated laboratory and processing sectors, still provide some employment opportunities for locals. Unfortunately, since 1999, the northern Kosovo business community has struggled to attract large-scale private sector investment. In response, international aid agencies, both government and non-governmental, have attempted to fill this void to varying degrees of success. Despite these challenges, the municipalities of Kosovo continue to be rich in natural resources, and there is potential for economic growth and development in the region.

In the **southern part of the municipality**, agriculture and small trade businesses are the main sources of the economy. The Trepça mining complex is still functioning but with limited

capacity. Around 2,880 private businesses are registered, but there is no reliable data on the number of people employed in the private sector. Meanwhile, in the northern part of the city, the economy relies on support from the Serbian government. The health and education sectors are the main employers, followed by the local administration and publicly owned enterprises. There are also a few hundred small businesses providing goods and services and lately the number of non-governmental organizations has increased as well.

7.0 POTENTIAL ENVIRONMENTAL THREATS IN KOSOVO/MITROVICA

Land use change and deforestation

Land use change, such as converting forests to agricultural land, and deforestation contribute to climate change by reducing the number of trees that can absorb CO2. In the Western Balkans, land use change is driven by agricultural expansion, urbanization, and illegal logging.

Urban structures, agricultural areas, vegetation, forests, and semi-natural areas characterize northern Kosovo. According to the "Spatial Plan of Kosova 2010-2020+" and the spatial structure of development and future organization in Kosovo, the area falls under the Treasury of Kosova (the Green Area) and includes the municipalities of Mitrovica (South and North), Vushtrri, Skenderaj, Zveçan, Leposaviq, and Zubin Potok. The city of Mitrovica, known for its underground resources, has the potential to be a leader in heavy industry at the Kosovo level, especially in lead and zinc mining. The vision for the area's development includes maintaining traditional practices, promoting agricultural business, trade, and service industries while respecting the environment and achieving social equality through effective local governance.

Deforestation has been driven mainly by illegal logging, urbanization, and expansion of agricultural land. These activities have decreased forests' capacity to act as carbon sinks, exacerbating the effects of climate change. A specific example of this can be seen in Leposavić/Leposaviq, Zubin Potok in northern Kosovo, and Sharr/Šar mountains in the southern part of Kosovo. The Sharr Mountains National Park, which covers an area of approximately 390 square kilometers, has experienced significant deforestation due to illegal logging and increased demand for firewood. This has reduced the forests' ability to store carbon and has contributed to increased CO2 emissions.

In 2010, Kosovo possessed 323,000 hectares of forested land, covering 30% of its total landmass. By 2021, the nation experienced a loss of 520 hectares in tree cover[17].

[17] Source: Global Forest Watch, link

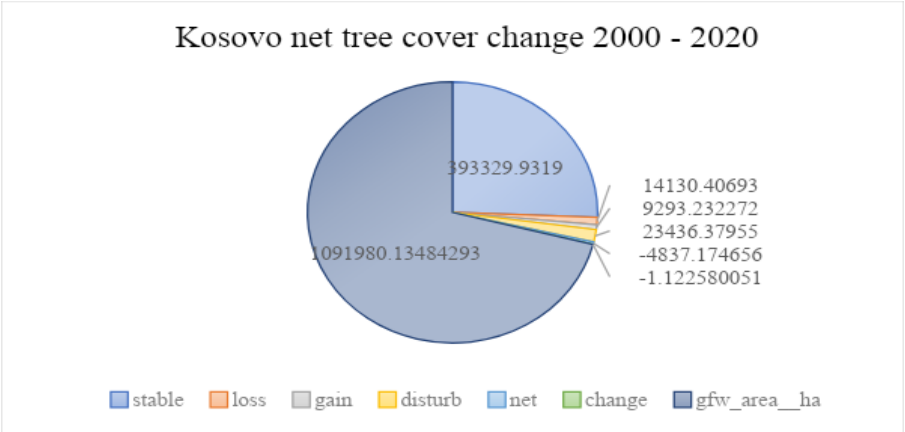


Figure 12. Kosovo net tree cover change 2000 - 2020

The graph above refers to a period between 2000 – 2020, and one can observe that during this time, Kosovo experienced a net change of -4.84kHa of cover, meaning that it has lost 1.1% in tree cover.

- Stable forest – 393kha
- Gain – 9.29kha
- Loss – 14.1kha
- Disturbed – 23.4kha

7.1 The consequences of deforestation

The loss of forests in Kosovo can have implications for the hydrological cycle. Deforestation can reduce the ability of forests to regulate water flow and maintain water quality, leading to an increased risk of flooding, erosion, and sedimentation of water bodies. These impacts can exacerbate the effects of climate change, as increased flooding and erosion contribute to the release of more CO2 and other greenhouse gases from the soil.

Agriculture is a significant contributor to climate change through the release of methane from livestock, nitrous oxide from fertilizers, and carbon dioxide from soil disturbance. The Western Balkans generally have a substantial agricultural sector, contributing to its greenhouse gas emissions.

According to the Kosovo Agency of Statistics[18], agricultural land in use in Kosovo amounts to 420,141.05 hectares. Most of this land is occupied by meadows and pastures (including common land) at 51.9%, followed by arable land at 44.8%, perennial crops (such as fruits, vineyards, and seedlings) at 3.0%, and gardens at 0.3%. Out of the 188,364.69 hectares of arable land, the largest portion is dedicated to cereals at 124,198.96 ha (65.9%). Forage plants account for 37,496.72 ha (19.9%), while vegetables grown in open fields, greenhouses, and gardens total 9,958.80 ha. Vegetables specifically cultivated in open fields and greenhouses comprise 8,836.68 ha (4.7%). Additionally, 3,688.19 ha (2.0%) are allocated to potatoes, 2,997.00 ha (1.6%) to legumes, 401.92 ha (0.2%) to industrial plants, and 2,580.42 ha (1.4%) to other crops. Wasteland makes up 8,164.80 ha (4.3%) of the total arable land.

[18] Agricultural Holdings Survey 2019, Kosovo Agency of Statistics, KAS, link

Both Mitrovica municipalities' landscape is characteristic of its hilly and mountainous regions, suitable for developing agriculture, tourism, and forestry. Around half of Mitrovica's 336 square kilometers of land is designated for agriculture, with 40% of these areas being forests. Flat terrains, on the other hand, are used in traditional agricultural activities and the building of residential areas.

Table 1. Mitrovica (North/South) land use categories[19]

Category	Surface (ha)	%
Forests	10170	50.29
Agriculture/Meadows	16894	42.73
Rocky and water surfaces	1219	3.63
Road infrastructure	715	2.13
Settlements	396	1.18
Infrastructure	13	0.04
Factories/Mining plants	3	0.01
Total	33594	100

7.2 The consequences of agriculturally-related pollution

Expanding agricultural activities, especially in areas with fertile soils, leads to removing trees and other vegetation, resulting in reduced carbon sequestration. This further contributes to increased greenhouse gas emissions, as these agricultural lands release more CO2 and other greenhouse gases (like methane and nitrous oxide) compared to the forests they replaced. The widespread use of traditional farming methods led to increased greenhouse gas emissions. The overuse of synthetic fertilizers and the lack of proper manure management contribute to elevated levels of nitrous oxide emissions. Additionally, the practice of extensive tillage in Kosovo exacerbates soil erosion and releases carbon dioxide into the atmosphere as soil organic matter is disturbed.

Industry

Mitrovica has a rich mining history dating back to ancient Roman times. The region has always been known for the extraction of various metals like lead, copper, nickel, zinc, and iron, as well as precious metals like gold and silver. Environmental threats in Mitrovica are specific and encompass mining waste produced by the Trepça/Trepča industrial complex, with numerous industrial pollutants like municipal and mining wastewater systems, tailing dumps, and communal landfills, affecting the air quality, producing different negative impacts on soil and biodiversity, and polluting waters/groundwaters. The primary channels for pollutant exposure are contaminated soil and rivers, which present a crucial transboundary pollution hazard for neighboring towns and even countries.

Trepça's past operations had left a dangerous legacy of hazardous waste, endangering tens of thousands of people, including children. Acidic discharges, airborne particles, and poorly managed, unstable mining waste sites pose a constant risk to nearby residents. In the most polluted zones, local water sources are contaminated, agricultural land contains heavy-metal toxins, and the air is filled with harmful dust particles. The towns of Mitrovicë/Mitrovica and

[19] Local Environmental Action Plan, Mitrovica 2012 - 2017, link

Zveçan/Zvečan are the most severely impacted being located in the inhabited areas. During the 1980s, while fully operational, the Trepça Enterprise released metals into the air as emissions and into the water through effluent discharges. Air emissions included 1,215 tons of lead, 60 tons of zinc (from the main stack alone), 2 tons of cadmium, and 6 tons of mercury per year. Water pollutant discharges were estimated at 150 tons of lead, 300-900 tons of zinc, and 900 tons of fluoride per year. It was observed that Trepça's pollution, in terms of emissions, significantly exceeded that of both Kosovo A and B power plants together.

Table 2 Historical and active tailings in Mitrovica region[20]

Tailing	**Location**	**Tailing status**	**Area covered (ha)**	**Amount of waste (t)**
Gornji Krnjin	Leposaviq/Leposavić	Abandoned	6.5	2 600 000
Bostaniste	Leposaviq/Leposavić	Active	8 – 10	3 600 000
Zitkovac	Zveçan/Zvečan	Abandoned	26	8 500 000
Gornje Polje	Zveçan/Zvečan	Abandoned	50	12 000 000
Gornje Polje	Zveçan/Zvečan	Abandoned	4-6	2 500 000
Zveçan/Zvečan	Zveçan\/Zvečan	Abandoned	10-15	10 000 000
Kelmend	Kelmend village	Active	8-10	3 600 000
Mitrovicë/Mitrovica Industrial Park	Mitrovicë/Mitrovica	Abandoned	35	4 200 000

7.3 The consequences of industrial pollution

Abandoned and active tailings in Mitrovica contribute to environmental pollution and eventually climate change through various mechanisms. Mining waste materials are left after the extraction process of valuable minerals from the ground, and those have significant environmental impacts when not managed properly. Mitrovica region has 6 abandoned and 2 active tailing sites (See above, Table #). Another major concern is the contamination of underground water resources, as tailings often contain heavy metals, toxic chemicals, and other pollutants that can leach into groundwater, rivers, and lakes. Mitrovica with its 3 rivers, Ibar, Sitnica, and Trepqa, is a perfect example of this type of contamination, which threatens human health, and aquatic ecosystems, and leads to the loss of biodiversity, disruption of food chains, and deterioration of water quality. Tailings also contain sulfide minerals that generate sulfuric acid when they come into contact with water and oxygen, resulting in acid mine drainage that further contaminates water resources, damages aquatic life, and corrodes infrastructure. Soil degradation is another issue caused by tailings, as they contaminate soils by depositing heavy metals and other toxic substances, reducing soil fertility and leading to the loss of productive land. This hinders vegetation growth, affects local ecosystems, and contributes to soil erosion and sedimentation in waterways. Air pollution is also a concern, as dust from tailings can be carried by the wind, spreading harmful substances that can negatively impact human health, particularly for those with respiratory issues.

- **Waste management**

[20] Source: UNDP report on Industrial Waste Management for Trepça Enterprise, link

The European Commission, in their Kosovo* Report 2022, Chapter 27: Environment and Climate Change[21], notes that there is a problem with the waste management system and its lack of sustainability, with only partial alignment to the EU acquis. The legal framework needs to incorporate extended producer responsibility and the polluter pays principle. Kosovo's Assembly passed the Law on Waste in August 2022, aligning it with the waste framework directive, but the implementation of hazardous waste management legislation is still behind. Improperly managed landfills and illegal dumpsites still receive most of the waste. However, progress is evident in organic waste management, with some municipalities piloting separate collection and waste reduction measures. Fifteen out of 38 municipalities have started home-composting systems. The Municipal Performance Grant has helped remove illegal landfills, decreasing their number significantly since 2019. Further, the EU Commission urges Kosovo to establish realistic targets and timeframes, effectively implement integrated waste management, and start implementing a circular economy. Developing, approving, and adopting inter-municipal waste management plans could facilitate the creation of a modern waste management system. The waste management system in Kosovo is inadequate as it only involves the collection and disposal of waste without any organized recovery of recyclables or treatment of organic materials. Waste is mainly collected door to door or using large collection bins on a weekly basis, but even this is not up to minimum standards. There is no separate collection of recyclable materials, and such materials are collected by waste pickers and transferred to recycling companies. However, there are no facilities for the treatment of biodegradable waste, which is directly disposed of in landfills. The Mitrovica region has one sanitary landfill, but hazardous waste remains a significant problem with no proper disposal facilities.

- **Industrial waste**

Table 3. bellow compares waste management practices over five years, from 2016 to 2020, in Kosovo. A noticeable trend can be observed in the data presented, highlighting the growing emphasis on recycling and more sustainable waste management strategies.

The data also reveals a significant decline in the amount of waste sent elsewhere from 2016 to 2020. This reduction indicates a shift in waste management practices, moving away from traditional waste disposal methods, such as landfilling and incineration, towards more environmentally friendly alternatives. The downward trend in waste sent elsewhere is likely the result of multiple factors, including stricter regulations, technological advancements in waste treatment, and a heightened focus on the circular economy. Inefficient waste management practices, such as open burning and uncontrolled landfills, are very harmful for the environment, releasing methane and other GHGs. This is important when discussing both household waste and industrial waste.

Table 3. The total quantity of industrial waste generated and processed in Kosovo, 2016 - 2020[22]

Year	Waste generated	Burnt waste	Recycled waste	Deposited waste	Waste sent elsewhere	Total processed waste
2016	2329539	1160	21672	593078	1074406	1690315

[21] European Commission Kosovo* report 2022, pg. 113, link
[22] *Source: Kosovo Agency of Statistics, link*

2017	2606203	232	3193	1674327	967552	2605128
2018	2554308	1030	40585	1567872	945318	2554804
2019	2096118	299	9223	1519488	567088	2096098
2020	2137015	453	180022	1918457	38163	2137095

- **Household waste**

Local waste collection companies in northern Kosovo municipalities include "Standard Mitrovica" PUC, "Zvecan" PUC, "Ibar Zubin Potok" PUC, and "November Leposavic" PUC. In Mitrovica South, a regional company named "Uniteti" provides similar services within the area and its surrounding region. The above companies offer waste collection, transportation, and landfilling services.

The waste generation statistics for Mitrovica South and Mitrovica North show that Mitrovica South generates significantly more waste than Mitrovica North. This is primarily due to its larger population (71,909 in Mitrovica South compared to 29,700 in Mitrovica North) and a higher waste generation rate per capita (1.2 kg/day in Mitrovica South vs. 1.0 kg/day in Mitrovica North). The total combined municipal solid waste (MSW) generation for Mitrovica South is 91.47 tons/day, while for Mitrovica North, it is 29.74 tons/day[23].

Table 4: Household waste quantification and characterization in Mitrovica municipalities South and North[24]

	City name	Population	Waste generation rate per capita (kg/day)	Total MSW generation (t/day)		
				Households	Non-Households	Total
	Mitrovica South	71909	1.2	64.03	27.44	91.47
	Mitrovica North	29700	1.00	20.37	9.37	29.74
TOTALS		**101609**	**2.2**	**315.93**	**36.81**	**121.21**

7.4 The consequences of poor waste management

Poor waste management practices of both industrial and household sources can significantly contribute to environmental pollution and contribute to climate change. The improper disposal and handling of waste materials can release harmful substances into the environment, contaminating air, soil, and water resources. Open dumping sites and waste burning can emit hazardous air pollutants, such as particulate matter, dioxins, and volatile organic compounds, which degrade air quality and threaten human health. The decomposition of organic waste in landfills generates methane, a potent greenhouse gas contributing to global warming. In addition to air pollution, leachate from improperly managed waste sites can infiltrate groundwater, impairing water quality and adversely affecting aquatic ecosystems. This pollution of water resources harms human health through the consumption of contaminated drinking water or exposure to polluted recreational water bodies. The

[23] *GIZ CirculaMare waste management, Baseline Assessment report Kosovo*
[24] *GIZ CirculaMare waste management, Baseline Assessment report Kosovo*

accumulation of non-biodegradable waste, such as plastics, in the environment disrupts natural habitats and poses a severe threat to wildlife, as plastics can suffocate or be ingested by animals. The consequences of inadequate waste management practices extend far beyond unsightly litter and encompass a range of detrimental effects on the environment, ecosystems, human health, and the global climate, highlighting the urgent need for more sustainable and responsible waste management solutions.

8.0 SURVEY ANALYSIS ON MITROVICA CITIZENS' PERCEPTION OF CLIMATE CHANGE

The primary objective of this survey report was to gain insight into the level of awareness of climate change, its causes, and the actions individuals can take to mitigate its effects. The survey sample size was 59 respondents, which, while modest, still offers valuable insights into the perceptions of the citizens of Mitrovica toward climate change. The report presents the survey's key findings and analyze the implications of the results for climate change policies and strategies in the region. To achieve the research objectives, the survey was designed to encompass three core areas: awareness of climate change and its causes, personal actions to mitigate climate change, and perceptions of climate change policies and strategies. We aimed to evaluate the respondents' understanding of the concept of climate change, their awareness of the human activities contributing to climate change, and their knowledge of the associated environmental consequences. Lastly, the survey investigated the respondents' opinions on the effectiveness of local and national policies in place to address climate change, aiming to identify any perceived barriers to implementing effective climate change strategies in Mitrovica.

8.1. Gender

The total sample of 59 respondents consists of 19 male respondents and 40 female respondents. The majority of female respondents fall into the age range of 25-40 (23 out of 40), followed by 18-25 (13 out of 40) and 40-65 (4 out of 40). On the other hand, male respondents are evenly distributed between the age ranges of 18-25 and 25-40 (9 each).

In terms of percentages, 32.2% of the respondents are male and 67.8% are female. Among female respondents, 32.5% are in the age range of 25-40, 21.6% are in the age range of 18-25, and 10.8% are in the age range of 40-65. Among male respondents, 47.4% are in the age range of 18-25 and 47.4% are in the age range of 25-40.

The unemployment rate is relatively low at 6.78% overall, with a slightly higher rate for males (9.09%) compared to females (5.41%). The percentage of students is higher among females (16.22%) compared to males (13.64%). There is only one retired respondent, who is male.

8.2. Environmental issues

Air pollution was a top concern for participants, with 74.6% of respondents mentioning it, showing that Mitrovica residents possess high awareness of the importance of air quality. This is likely because Mitrovica has always been notorious for its poor air quality, especially during times when Trepça was still operational. Water pollution, including rivers, lakes, and underground sources, also consistently appeared throughout the responses, with 71.2% of

respondents expressing concern about the quality of their water and water sources. Another frequently mentioned issue was the chemicals used in everyday products, which affect our health, appearing in 61% of responses. This concern reflects the impact of chemicals on personal and public health. Urban issues, such as traffic, pollution, and lack of green spaces, were also mentioned in 61% of responses. Lastly, agricultural pollution, including the use of pesticides and fertilizers, as well as a growing amount of waste, appeared in 37.3% of responses. Although as important as the above-mentioned issues, these were mentioned less frequently in responses, still representing significant concerns for some participants.

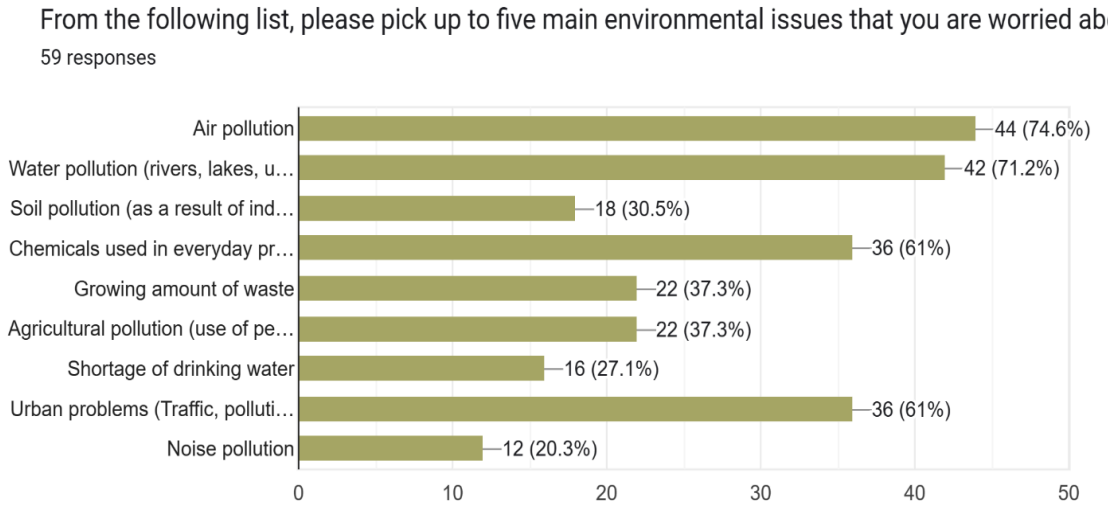


Figure 13. Main environmental concern among respondents

8.3. Climate Change as a threat to personal health and safety

To a question posed, "On a scale from 1 to 10, how much do you think climate change threatens your personal health and safety?" the respondents' results indicate a wide range of perceptions regarding the threat of climate change to personal health and safety. On a scale of 1 to 10, the majority of respondents expressed a moderate to high level of concern, with many responses clustering around the higher end of the scale, particularly at 8, 9, and 10. However, there are also respondents who displayed a lower level of concern, with a few answers falling between 1 and 4. The overall sentiment seems to lean towards a heightened awareness of the potential risks associated with climate change, but there remains a notable subset of individuals who do not perceive it as a significant threat to their well-being.

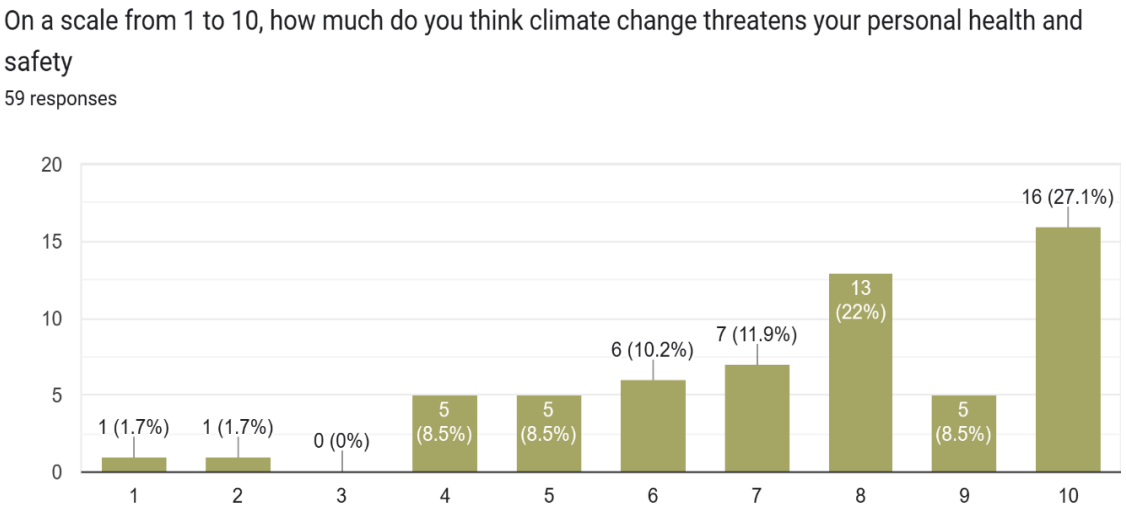


Figure 14. Climate change as a threat (Scale 1 – 10)

8.4. Likelihood of recommending to a friend the activity that will help reduce global warming.

The survey question asked respondents to rate on a scale from 1 to 5 how likely they are to recommend a friend to promote activities that will help reduce global warming. A total of 59 respondents participated in the survey, and their responses were distributed as follows:

26 respondents (44.1% of the total) selected a rating of 5, showing a strong commitment to the cause. Meanwhile, 8 respondents (13.6% of the total) selected a rating of 4, demonstrating a positive inclination towards supporting climate change mitigation efforts but potentially having some reservations or requiring more information to fully commit. Additionally, 16 respondents (27.1% of the total) selected a rating of 3, indicating neutrality or uncertainty about recommending such activities, possibly due to being undecided on the issue, lacking knowledge about climate change, or believing that other issues should be prioritized. On the other hand, 4 respondents (6.8% of the total) selected a rating of 2, suggesting that they are unlikely to recommend these activities, possibly due to skepticism about their efficacy, the belief that individual actions have limited impact, or not prioritizing climate change as a major concern. Lastly, 5 respondents (8.5% of the total) selected a rating of 1, indicating a high unlikelihood to recommend these activities, potentially because they doubt the existence or severity of climate change, oppose efforts to address it, or prioritize other concerns over environmental issues.

One can observe a positive approach to this topic, with a majority (57.7%) of respondents having a likely (rating of 4 or 5) to recommend a friend to promote activities to reduce global warming, while a smaller portion (15.3%) being unlikely (rating of 1 or 2) to do so. The remaining 27.1% of respondents are neutral or unsure about their stance on this issue.

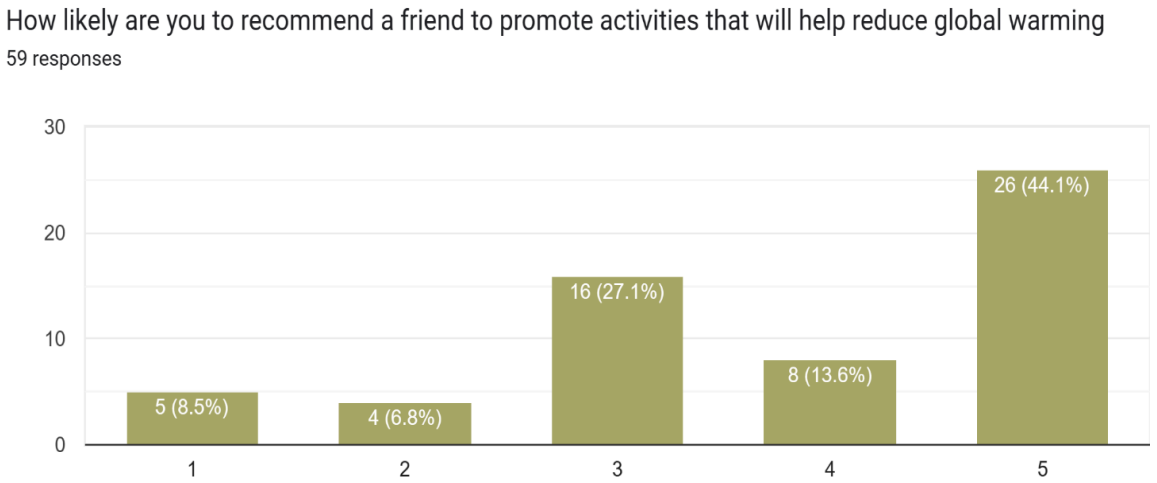


Figure 15. Likelihood of recommending to a friend the activity that will help reduce global warming

8.5. Awareness on the existence of global and local policies to reduce climate change.

Based on the survey responses, it is evident that a majority of the participants are aware of the global and local policies or initiatives taken by various organizations to reduce climate change or global warming. Out of 59 replies, 44 respondents (about 74.6%) answered "Yes," indicating that they have knowledge of these policies and initiatives, while 15 respondents (about 25.4%) answered "No," suggesting that they are unaware of such actions. This outcome may be attributed to the increasing awareness of climate change and global warming issues, along with the growing media coverage and public discourse on these topics. It is also possible that the respondents represent a more informed and environmentally conscious demographic.

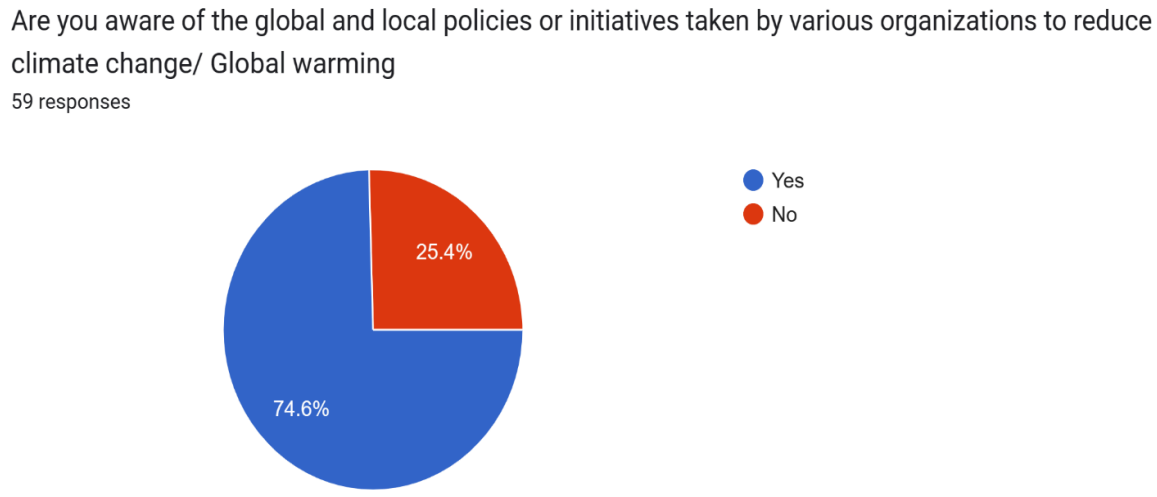


Figure 16: Percentage of awareness of global and local climate change policies

8.6. Environmental policies in the country

Based on the survey question "Are you aware of environmental policies in your country?" posed to 59 participants, 61% of respondents indicated that they were aware of the environmental policies in their country, while 39% were not aware of these policies. The

majority of participants are informed about their country's environmental policies, but there is still a significant portion of individuals who are not. It may be beneficial for governments and environmental organizations to increase public outreach and education efforts to ensure that more citizens are aware of and engaged in the policies designed to protect the environment. This data suggests that although a majority of respondents are informed about their country's environmental policies, there is still a significant portion of individuals who are not. It may be beneficial for governments and environmental organizations to increase public outreach and education efforts to ensure that more citizens are aware of and engaged in the policies designed to protect the environment.

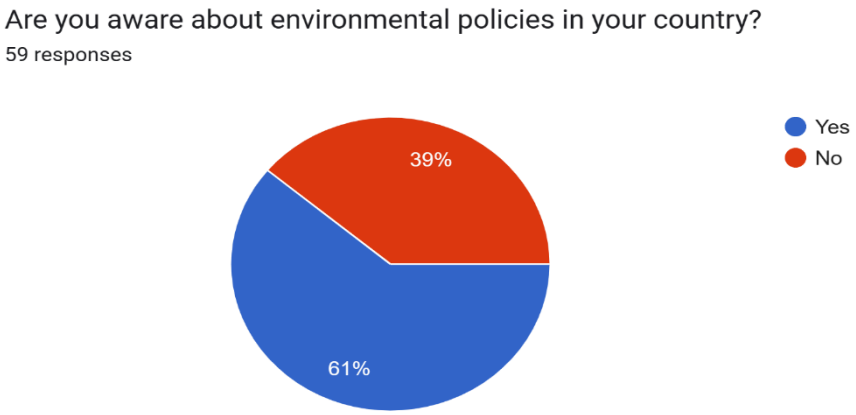


Figure 17: Percentage of awareness of local environmental policies

8.7. Sufficiency of environmental policies in place

The survey question, "Do you think that current policies on preventing climate change/global warming in your country are enough?" has received 59 responses, with 55 respondents answering "No" and 4 respondents answering "Yes."

Based on these results, it is evident that a significant majority of the participants (93.22%) believe that the current policies in place in their country are insufficient to address climate change and global warming. This indicates a general dissatisfaction with the actions taken by their governments in tackling this critical issue. Only a small minority of the participants (6.78%) believe their country's policies are enough to prevent climate change and global warming.

This overwhelming response in favor of "No" suggests a strong demand for more aggressive action and policy changes to address climate change and global warming effectively. It is important to keep in mind that this is a small sample size and may not necessarily represent the overall sentiment of the population. Additionally, further investigation could explore the specific policies participants deem insufficient and what improvements they would like to see.

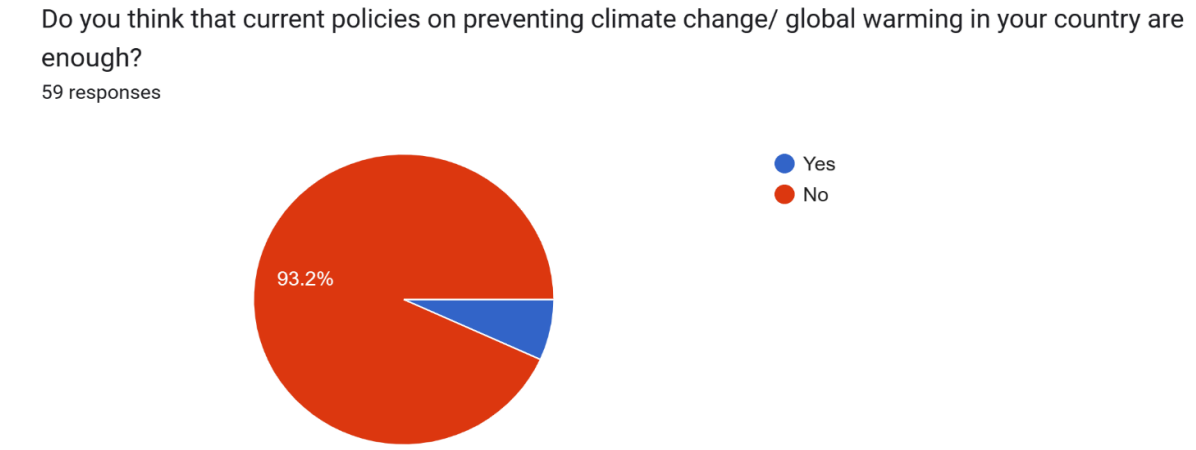


Figure 18: Percentage of respondents who believe that policies in place are sufficient in combatting climate change.

8.8. Platforms informing on climate change.

The survey question asked participants to indicate the platforms where they have heard about climate change, and the replies include a variety of responses, ranging from single to multiple platforms. The platforms listed in the survey question include television, the internet, social media, government bodies/municipality, and environmental groups. Some replies included additional platforms or indicated "other." The most commonly mentioned platforms are social media (83.1%) and the internet (66.1%), which appear in 36 and 40 replies, respectively. Television is the third most commonly mentioned platform, appearing in 27 replies, followed by environmental groups (20) and government bodies/municipalities (6). Newspapers are mentioned in 4 replies, while "other" appears in 4 replies as well.

The results suggest that the internet and social media are the primary platforms where participants have heard about climate change. This may reflect the increasing use of digital media for news consumption and information sharing. The relatively low mention of government bodies/municipalities suggests that these institutions may not be effective in communicating about climate change, or that participants are less likely to seek information from these sources. The relatively low mention of newspapers may reflect the decline of print media and the shift toward digital media.

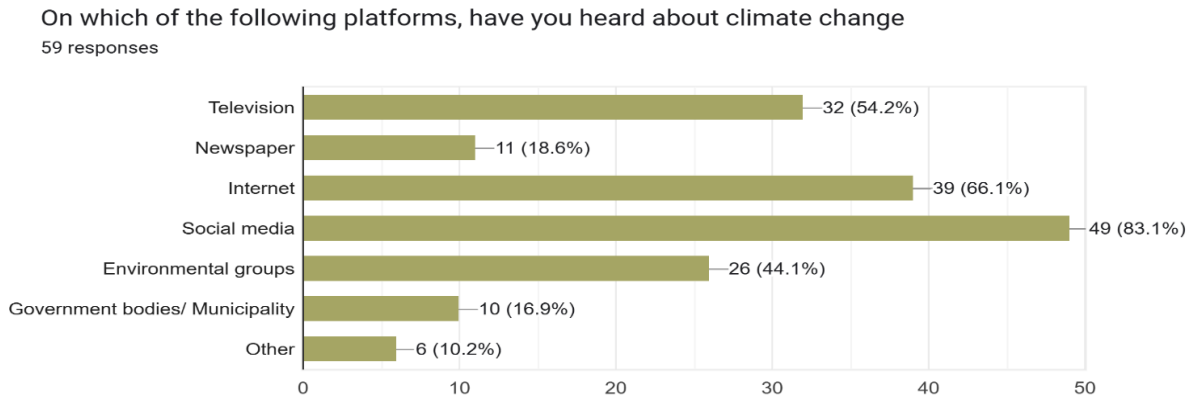


Figure 19: Percentage of most influential media platforms communicating climate change issues.

8.9. Environmental issues importance

The responses to the survey question indicate that participants perceive air pollution and river and sea pollution to be the most important issues on a global scale, with 47 and 46 respondents selecting "Very important" for these issues, respectively. The majority of respondents selected "Very important" for these two issues. In contrast, noise pollution and flooding were rated as less important, with fewer respondents selecting "Very important."

The responses were more evenly distributed across the rating options for litter, poor waste management, and deforestation. While a significant number of participants considered these issues to be important or very important, a notable percentage of respondents selected "Fairly important" or "Slightly important," indicating that they do not view these issues as urgent or high priority.

The results indicate that participants place high importance on environmental issues related to pollution (air pollution, rivers, and sea pollution, and noise pollution) and the proper management of waste (poor waste management). Deforestation was also considered to be an important issue by many respondents, indicating that they are concerned about the impact of human activities on the world's forests.

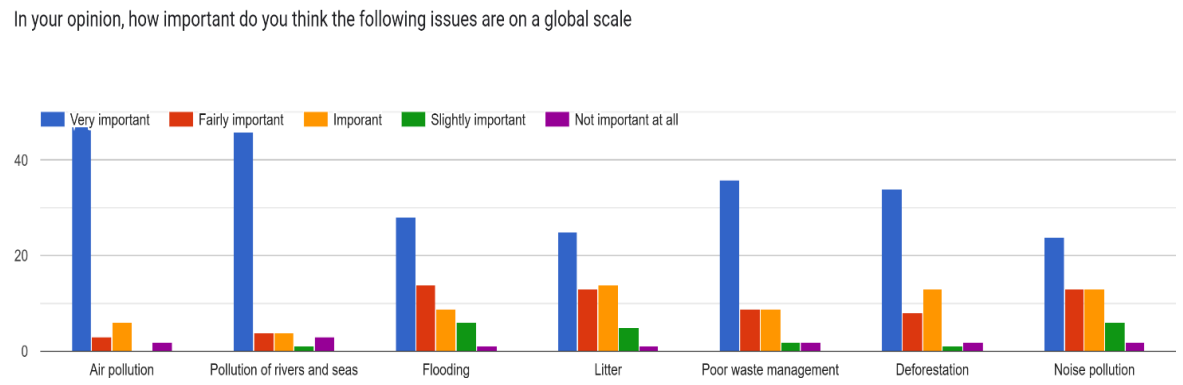


Figure 20: Environmental priorities among respondents

8.10. Level of agreement with the statements on climate change

The survey question aims to measure participants' level of agreement with various statements related to global warming/climate change. The response options are "Completely agree," "Somewhat agree," "Neutral," and "Completely disagree." The analysis of the survey question and the 59 replies reveals that:

- The majority of respondents believe that climate change is a threat to people around the world (45 completely agree, 9 somewhat agree), a serious threat to themselves and their families (26 completely agree, 18 somewhat agree), and caused by human activities (31 completely agree, 14 somewhat agree).
- A significant portion of respondents (12) remain neutral regarding the statement that climate change is happening as we speak.

- The majority of respondents (37 completely agree) feel they understand what climate change means.
- A slight majority of respondents (45 completely or somewhat agree) are ready to take action to reduce climate change.

The responses indicate a general awareness of and concern about climate change. However, it is worth noting that a significant minority of respondents remain neutral or disagree with some of the statements. This suggests that there may still be room for education and persuasion regarding the causes and effects of climate change and the need for individual and collective action to address it.

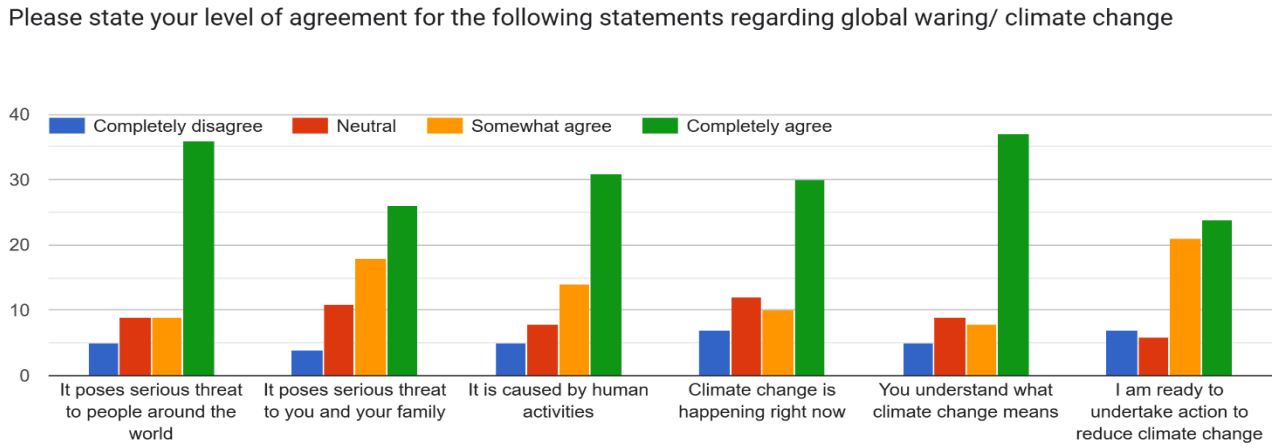


Figure 21: Level of agreement with the specific climate change statements

8.11. Issues of concern

The survey question asks participants to rate their level of concern for various issues on a scale of 1 to 5. The issues presented in the question are poverty, climate change, unemployment, violence/war, and lack of education.

Looking at the responses, one can observe that the highest level of concern was expressed for "Lack of education," with 32 respondents giving it a rating of 5, followed by "Unemployment" and "Poverty," with 27 and 26 respondents, respectively rating them as 5. The "Climate change" issue received a relatively high level of concern as well, with 20 respondents rating it as 5. However, it received a slightly lower level of concern than the aforementioned issues. "Violence/War" received mixed responses, with 23 respondents rating it as 5 and 15 respondents rating it as 3, indicating that while some participants were highly concerned about it, others were less so. It appears that the participants' highest level of concern was in regard to the issues related to basic human needs such as education, employment, and poverty. Climate change was also an important issue for many respondents, but to a slightly lesser extent than the issues mentioned above. Meanwhile, the issue of violence and war received mixed responses from the participants.

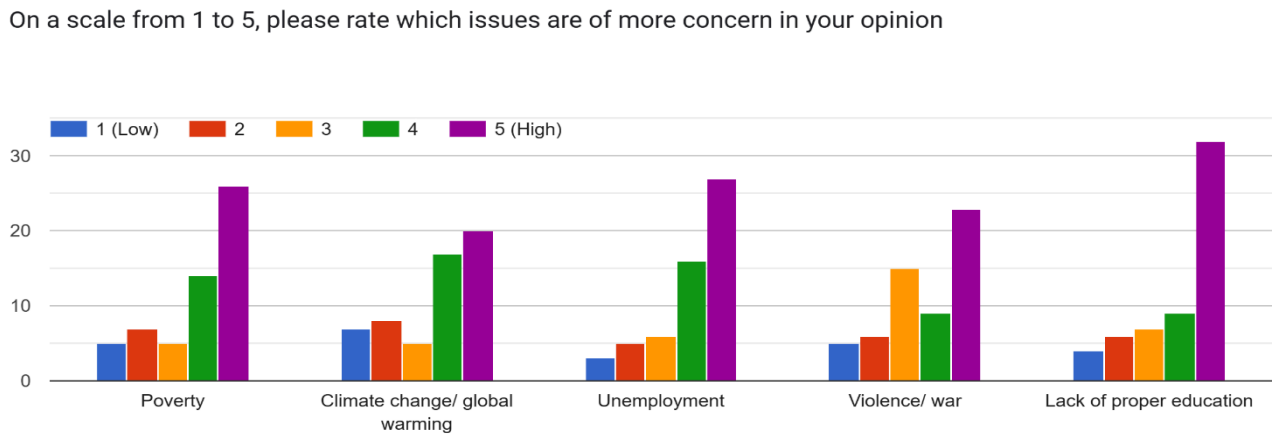


Figure 22: Global priorities to deal with among respondents (scale 1 – 10)

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 The importance of societal aspects of climate change and citizens' perspective change

The role of societal involvement and shifts in viewpoints have become integral to the evolution of climate policy in numerous advanced nations. As the global community accelerates its efforts to tackle climate change, these elements have begun to hold greater prominence and importance within academic discussions. These factors are increasingly regarded as critical instruments for decision-makers seeking to devise efficient methods to counteract the harmful consequences of climate change. In the case of Mitrovica, a region grappling with severe environmental issues, this approach has particular relevance. Fostering an ethos of sustainability among individuals and communities could be a viable pathway to significantly decrease greenhouse gas emissions without the exclusive dependence on costly technological innovations.

The transition of society to a green/circular economy or moving toward carbon-neutral societies are just some factors that could have numerous benefits, improving the overall well-being of individuals and communities. These benefits include increased energy security through the utilization of renewable energy sources, cost savings as a result of energy efficiency measures, improved overall citizens' health as a result of reduced air pollution, job creation in the growing green economy, and enhanced social cohesion as communities work together to address a common challenge. The thing is that encouraging people to adopt sustainable practices requires an almost inclusive understanding of the factors that influence individual and collective decision-making processes. Effective approaches to behavior change must consider the long-term impacts of different interventions and involve systems first of all, then individuals, and best social practices.

A key component of traditional approaches to societal engagement and perspective change in the context of climate change and the development of policies is the reliance on the information deficit model. This model assumes that simply providing individuals with information about the impacts of climate change and the benefits of adopting sustainable practices will lead to the desired changes in behavior. However, knowledge alone cannot guarantee changes in citizens' perspectives and behavior. Citizens' actions are influenced by a

complex interaction of factors, including their personal values and beliefs, social norms, and institutional services and structures.

9.2. Bridging the Mitrovica climate gap

The once heavily industrialized town of Mitrovica has been grappling with severe pollution problems for decades, mainly stemming from the Trepça mining and smelting complex. The impact on public health and the environment has been devastating, and yet, despite the mounting scientific evidence, there seems to be a persistent gap between the awareness of the problem and the citizens' understanding of climate change issues. To bridge this gap and foster a collective effort to mitigate the crisis, Mitrovica's' citizens, policymakers, and political leaders must adopt a multi-faceted approach promoting education, communication, and community engagement. Educational institutions should prioritize the inclusion of environmental science and climate change in their curricula by fostering an early understanding of the causes and consequences of climate change. This is how students will grow up equipped with the knowledge necessary to make informed decisions about their individual and collective actions.

Pollution certainly knows no borders, as the contaminated air and water from industrial sites and waste disposal continue to affect both the Serbian-dominated north and the Albanian-majority south of Mitrovica. The politicians in Mitrovica South and North should shift their focus on climate issues that are directly or indirectly affecting the citizens rather than their usual hate speech rhetoric, as by addressing environmental challenges, they can demonstrate their commitment to the well-being of their communities and help bridge the divide that has long plagued the town and the region. By working together on common climate change mitigation and adaptation goals, politicians from both sides can set a positive example and inspire their constituents to engage in collective action for a more sustainable future. Despite ongoing political tensions, the pressing environmental concerns call for a collaborative approach between the two communities to preserve the health of the town's residents and the surrounding ecosystem.

Also, another challenge that has hindered public understanding of the issue is the use of complex, technical jargon that is difficult for non-experts to comprehend. To address this, researchers and academia need to collaborate with communication specialists to simplify and present information in an accessible manner, using infographics, videos, and other visual aids. It is crucial to emphasize the local context in these communications, as people are more likely to respond to information that is relevant to their immediate environment.

Community engagement is vital in bridging the gap between scientific evidence and citizens' understanding of climate change. In the divided town of Mitrovica, the importance of community engagement cannot be overstated when it comes to bridging the gap between scientific evidence and citizens' understanding of climate change. In a context where divisions and mistrust are deeply rooted, the key to enhancing comprehension and acceptance of scientific findings lies in the involvement of local community leaders. Religious leaders, professors, and social workers are instrumental in this process, as they hold considerable influence and are often trusted by the community. These individuals can function as effective communication channels, transmitting accurate and accessible information about climate change to the public. By involving them in the dialogue, the credibility of the scientific

evidence is strengthened, and the likelihood of the community embracing the necessary changes to combat climate change increases. Building trust is essential in such a divided town, and this can be achieved by collaborating with local leaders who deeply understand the cultural, social, and political context. They can help tailor the messaging and approach to respect local sensitivities, ensuring that the climate change discourse does not inadvertently aggravate existing divisions. Instead, this collaboration can foster a sense of unity and shared purpose among the citizens of Mitrovica. Integrating these leaders into the process can also facilitate the creation of locally relevant solutions to climate change, which are more likely to be accepted and implemented by the community. When local leaders are actively engaged in developing and promoting sustainable practices and policies, citizens feel a greater sense of ownership and commitment to the cause, fostering collective action. Also, establishing community-based initiatives, such as clean-up activities, tree-planting campaigns, and recycling programs, can help foster a sense of ownership and responsibility for the environment. By engaging citizens in tangible actions, they will be more likely to internalize the importance of combating climate change and gain first-hand experience of the positive impact of their actions.

Bridging the climate gap between scientific evidence and citizens' understanding of climate change in Mitrovica requires a comprehensive approach founded on education, communication, and community engagement. By fostering an informed and engaged citizenry, people can collectively work towards a cleaner and healthier environment for the residents of Mitrovica and future generations.

9.3. How is this relatable to our focus group, the youth of Mitrovica?

The deficit information model can significantly impact societal opinion about climate change issues, suggesting that a lack of proper information or the nonexistence of such information can lead to misunderstandings and misconceptions and ultimately shape public opinion.

Mitrovica youth may have limited access to accurate information about climate change due to factors such as lack of education literacy, language barriers, or even political polarization and ideological differences in the Mitrovica case. As a result, they might not be aware of the scientific consensus on climate change, its causes, and its impacts. In the absence of proper information, residents may be more susceptible to misinformation or disinformation about climate change. These false claims could be spread through various channels, such as word of mouth, social media, or local media outlets that may not prioritize accurate reporting on the issue. Mitrovica's notorious political polarization and ideological differences between North and South also contribute to limited access to accurate information on climate change. The Mitrovica socio-political division often results in selective acceptance of scientific evidence, with individuals tending to favor only the information that aligns with their political beliefs, coming from "their part of town". Consequently, the politicization of climate change can lead to the dismissal of scientific consensus, creating barriers to understanding the issue exclusively and objectively. There is also the proliferation of social media platforms, enabling the spread of misinformation and disinformation, often fueled by actors with vested interests. These actors may intentionally distort or suppress accurate information from either South or North Mitrovica to protect their interests or promote alternative and biased views, especially in view of conspiracy theories. This results in individuals being only exposed to information

confirming their pre-existing beliefs, further limiting their access to accurate information on climate change or any other topic.

With two separate educational systems operating in Mitrovica, there could be inconsistencies in the quality and content of climate change education. A lack of knowledge can influence students' perspectives and make them more susceptible to inaccurate information. Despite their nationality, people from both sides of town may struggle to comprehend climate change data and might easily fall prey to misleading narratives. Inadequate funding for climate change research and limited access to high-quality educational resources can only aggravate this issue. The deficit of accurate information on climate change could foster skepticism and mistrust among the communities, leaving them without a solid understanding of the issue and making them more likely to doubt its existence or severity. The societal opinion on climate change, shaped by the deficit information model, may have broader consequences on Mitrovica's socio-economic development. For example, a lack of awareness about the risks and impacts of climate change can hinder efforts to build resilience and develop sustainable practices, ultimately affecting the well-being and prosperity of the community.

As a result of the misconceptions mentioned above and the lack of proper information, residents of Mitrovica may not feel the urgency to take action against climate change, eventually leading to a delayed response in implementing adaptation and mitigation measures, such as reducing greenhouse gas emissions, conserving energy, and protecting natural resources. Also, high-quality and inclusive education, training, and lifelong learning might be the solution to providing opportunities for everyone to develop the necessary skills. Competence learning, training, and lifelong learning refer to a teaching and learning approach that aims at developing key competencies, including relevant knowledge and attitudes. It is best explained if compared to knowledge-based teaching and learning, which focuses solely on the knowledge aspect. Seen from the point of view of this report, the competence-oriented courses, workshops, and seminars in environmental science and sustainability could be used to address the challenge of balancing short-term human needs with the long-term health of environmental systems in such areas as conservation, environmental policy, sustainability and climate change through an interdisciplinary effort. Cross-regional knowledge, intergenerational dialogues and exchanges between schools, universities, training institutions, municipalities, public authorities in cooperation with the private sector, parents and citizens are needed for climate action and environmental protection, demonstrating the citizen's access to them and active participation. By engaging society in a meaningful and sustained manner and focusing on the multiple benefits that would adequately address burning environmental issues, it would be possible to create the necessary momentum for widespread behavior change and support for climate policies that can help mitigate the negative impacts of climate change, but that is up to the policymakers, social workers, individuals, governments, and organizations to collaborate, innovate, and invest in the development and implementation of sustainable solutions on both sides of Mitrovica while fostering a sense of shared responsibility and urgency in addressing the challenges of a rapidly changing climate.

These recommendations will be further elaborated and used to develop a toolkit as a practical tool aiming to foster a proactive and informed approach to addressing climate change, ultimately contributing to the development of resilient and sustainable communities in Mitrovica and the region.

10.0 References

- Climate Change, Division of Community and Regional Affairs. https://www.commerce.alaska.gov/web/dcra/climatechange.aspx
- Kastrati, Bashkim. (2013). RESHJET ATMOSFERIKE NË KOSOVËN VL. KËRKIME GJEOGRAFIKE Nr. 15.
- Meteo Kosova. (2022). Meteo Kosova. *Meteo Kosova*. https://www.meteokosova.com/
- Climatic Conditions – KPMM. (n.d.). Kpmm. https://www.kosovo-mining.org/kosovo/climatic-conditions/?lang=en
- Kosovo • Country Environmental Analysis. (2013). In World Bank (No. 75029-XK). World Bank. Retrieved April 30, 2023, from https://documents1.worldbank.org/curated/en/282361468047686579/pdf/750290ESW0P1310LIC00Kosovo0CEA0Rprt.pdf
- Regional Environmental Centre, REC – Office in Kosovo. (n.d.). Local Environmental Action Plan. https://unhabitat-kosovo.org/wp-content/uploads/2019/07/Mitrovica-LEAP.pdf
- Mardiatmoko, G., & Wilem Hatulesila, J. (2020). Effects of Climate Change on City Life: Case Study in the City of Ambon, Indonesia East Region. IntechOpen. doi: 10.5772/intechopen.89812
- Background Report Lead contamination in Mitrovicë/Mitrovica affecting the Roma community. (2009). OSCE Mission in Kosovo. https://www.osce.org/files/f/documents/f/8/36234.pdf
- WWF. (2022, October 6). Coalition 27: Kosovo institutions to take immediate steps to improve environmental conditions. Retrieved May 2, 2023, from https://www.wwfmmi.org/?7734416/Kosovo-institutions-to-take-immediate-steps-to-improve-environmental-conditions
- Bekteshi, H. (2020). Environmental laws in Kosovo: Implementation of the SAA. Environmental Laws in Kosovo: Implementation of the SAA. https://commons.lib.jmu.edu/cgi/viewcontent.cgi?article=1048&context=ese
- UNDP. (2016). Baseline Assessment for Mitrovica Region. In UNDP. UNDP. https://www.undp.org/kosovo/publications/baseline-assessment-mitrovica-region
- Idrizi, B., Maliqi, E., & Pashova, L. (2021). Spatial Database Designing for Environmental Monitoring and Decision Making in Mitrovica Region, The Republic of Kosovo. Geosfera Indonesia, 6(2), 189. https://doi.org/10.19184/geosi.v6i2.23934

Project supported by UNMIK.