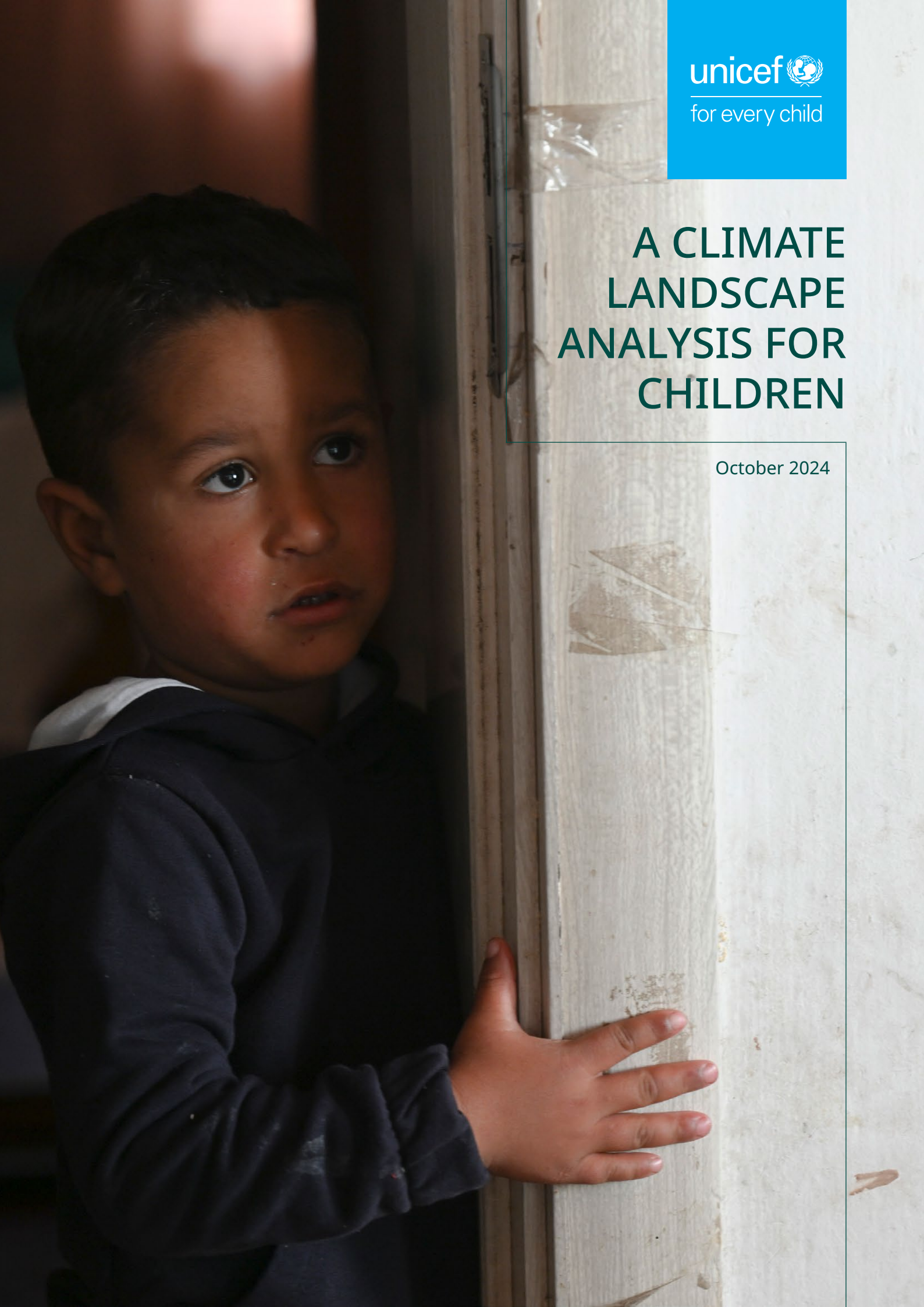

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A CLIMATE LANDSCAPE ANALYSIS FOR CHILDREN

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Contents

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ACRONYMS

ARIs	Acute Respiratory Infections
CLAC	Climate Landscape Analysis for Children
CO_2	Carbon dioxide
FAO	Food and Agricultural Organisation
GCF	Green Climate Fund
GHG	Greenhouse Gas
NAP	National Adaptation Plan
NDCs	Nationally Determined Contributions
PM	Particulate Matter
UNICEF	United Nations Children's Fund
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organisation

KEY DEFINITIONS

Adaptation	The process of adjusting infrastructure, systems, services and behaviours to become more resilient to climate hazards and seasonal variabilities.
Air pollution	The contamination of air due to the presence of substances in the atmosphere that are harmful to the health of humans and other living beings. Includes greenhouse gases and particulate matter.
Child vulnerability	Susceptibility to climate change and other environmental degradation as a result of multi-dimensional poverty and other indicators, including a lack of access to safe housing, WASH, healthcare, adequate nutrition and education.
Climate change	Long-term, average shifts in temperatures and weather patterns. Since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (such as coal, oil, and natural gas).
Climate hazard	A climate-related event or trend that may cause loss of life, injury, or other health impacts, including drought, flooding, cyclones, thunderstorms and temperature extremes.
Climate resilience	Infrastructure, systems, services and behaviours that can survive, adapt, and function in the face of climate-related hazards and seasonal variabilities.
Drought	A drought is broadly defined as drier than normal conditions; that is, moisture deficit relative to the average water availability at a given location and season.
Ecosystem	A functional unit consisting of living organisms, their nonliving environment and the interactions within and between them.
Microplastics	Fragments of any type of plastic less than 5 mm in length.
Mitigation	Efforts to reduce or prevent the emission of greenhouse gases, for example by incorporating renewable technologies into infrastructure, systems and services.
National Adaptation Plan (NAP)	This plan helps identify country-specific climate adaptation needs and develops and implements strategies to address them.
Nationally Determined Contributions (NDC)	This is a national climate action plan to cut emissions and adapt to climatic impacts in alignment with the goals of the Paris Agreement. Each party to the Paris Agreement is required to establish an NDC and update it every five years.
Particulate matter	Solid particles or liquid droplets found in the air. They are often hazardous to human health.

Renewable energy	Any form of energy from solar, geophysical, or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use (e.g. solar and wind energy).
Water scarcity	Water scarcity is the lack of fresh water resources to meet the standard water demand. There are two types of water scarcity: physical water scarcity and economic water scarcity.

FOREWORD

The Climate Landscape Analysis for Children (CLAC) report discloses an urgent truth: the climate crisis is a children's rights crisis in Kosovo. Kosovo is experiencing record temperatures, water scarcity, and extreme air pollution that are transforming the environment for children. For the most vulnerable children, the stakes are even higher—those already struggling to access essentials like clean water, safe housing, and quality education are disproportionately impacted by the climate shocks of heatwaves, drought, and flooding. These environmental threats not only jeopardise their current well-being but also undermine the foundations of their development and prospects for a stable future.

Kosovo's children have the right to breathe clean air, access safe water, and live in a world free from the harms of climate change. Yet these rights can only be realised if we—UNICEF, the institutions civil society, and the international community—act decisively and collaboratively. This report is more than an assessment; it is a resounding call for immediate and united action to foster a secure, sustainable, and resilient future for every child in Kosovo.

These are the urgent demands of young people, and UNICEF stands with them. Their requests call on the government and other partners to take concrete actions to confront the climate crisis and safeguard children. More specifically, this includes:

1. **Accelerating Kosovo's transition to renewable energy:** Expand the use of solar and wind energy to harness Kosovo's geographic potential. Prioritise scaling up renewable installations, aiming for clean energy sources to power more homes and communities.
2. **Ensuring clean, accessible water for all:** Safeguard water sources and improve water treatment systems to provide safe water for drinking and daily use. Urgently address current issues such as the undrinkable water from Badovc to ensure reliable and safe water for all households.
3. **Investing in our climate change and environmental education** so that we are equipped with the knowledge and skills to protect and contribute to a safe environment and a sustainable future.
4. **Eliminating the reliance on coal for household heating:** Provide incentives and support for rural households to transition from coal to cleaner energy solutions, such as electric heating, to mitigate greenhouse gas emissions and improve indoor air quality for children.
5. **Implementing stricter regulations on industrial emissions:** Advocate for clean technology requirements and filtration systems in power plants and factories to minimise pollutants that disproportionately impact children's health.

6. **Promoting waste reduction and recycling:** Launch national campaigns and local programmes that encourage recycling and waste minimisation. Invest in infrastructure and education to build a culture of sustainable waste management across communities.
7. **Increasing urban greenery:** Integrate more green spaces in cities and towns to improve air quality, provide natural cooling, and offer safe recreational areas for children. This requires strategic urban planning to balance development with green infrastructure.
8. **Expanding safe biking infrastructure:** Develop city-wide bike lanes to promote sustainable transportation and reduce vehicle emissions. Safe bike lanes will encourage eco-friendly commuting options for young people and the broader population.

Kosovo's children deserve a future where they can live, learn, and thrive without the burdens of an ailing environment. UNICEF stands with Kosovo's youth in their call for a brighter, greener, and safer tomorrow.

01 EXECUTIVE SUMMARY

For the children of Kosovo the climate crisis is a children's rights crisis. Kosovo's changing climate and rapid rates of environmental degradation, including air and water pollution, are all impacting all aspects of children's health and wellbeing. This includes undermining their right to clean water, healthy, nutritious food, basic education and the right to play in a safe, healthy environment. In the coming decades, this crisis is set to worsen, as temperatures become more extreme and water scarcity, flooding and wildfire increase.

Children in Kosovo face one of the greatest exposure to these climatic extremes, whilst also having some of the highest vulnerabilities in Europe due to poverty. Around 23% of children in Kosovo are living under the nationally poverty line, meaning they lack access to safe water, adequate housing, clean energy and other essential services. These children are even more exposed and vulnerable to climate and environment-related hazards, such as extreme heat, storms and pollution.

Children living in rural areas, or informal settlements, including those close to power plants, mines and other key sources of pollution face some of the highest risks. Children with disabilities and pre-existing conditions and those from marginalised communities, such as Roma, Ashkali and Egyptian households, also face additional layers of vulnerability, which jeopardise their health and overall wellbeing.

These challenges demand urgent and coordinated action to protect Kosovo's natural resources and ensure a safe and sustainable future for its youngest citizens.

While progress has been made by the Government to address these challenges, much more is needed to protect Kosovo's natural resources and uphold children's right to a healthy environment.

The Climate Landscape Analysis for Children (CLAC) outlines the latest evidence on key climate and environment-related hazards, and their impacts on Kosovo's children. It also outlines targeted measures to safeguard them from climate and environment-related hazards. Developed in close consultation and collaboration with the Government, local partners, and most importantly, with children and young people themselves, the CLAC incorporates their lived experiences and suggestions for future actions. It is designed to serve as a critical resource for UNICEF and its partners, providing the evidence needed to foster meaningful and united action in the fight against climate change.

UNICEF is calling on the Government, civil society, and international partners to work together to implement the recommendations of this report and ensure a safer, healthier future for all children in Kosovo.

Key findings

- **Since the 1950s, annual average temperatures in Kosovo have risen by 2-3**°C **with the most significant warming occurring during the summer months.** This has led to an increase in heat waves, heavy rainfall and flooding, water scarcity and drought and wildfires (*Table.1* and *Fig.1*). Children also face a significant exposure to air and water pollution and a medium risk of earthquakes. **Overall, children across all districts face a high or extremely high exposure to these hazards. Children living in Ferizaj and Prizren face the greatest combined exposure.**
- **Looking ahead, average annual temperatures are expected to continue rising by another 4-8°C by 2100, depending on global efforts to limit greenhouse gas emissions.** This will lead to more frequent and intense heat waves, and altered precipitation patterns, increasing the incidence of both water scarcity and flooding.
- **The leading causes of death among children in Kosovo remain closely related to climate change and the environment.** For example, the leading causes of death among infants under-one are Lower Respiratory Infections (LRIs) and diarrhoea, both of which are exacerbated by temperature extremes and a lack of safe water access. LRIs in children have also been closely linked with air pollution in Kosovo.
- **As the frequency and length of heat waves continues to increase in Kosovo, so too do hospital admissions for children.** For example, Family Medicine Centres in both Pristina and Mitrovica have reported a significant surge in child admissions, particularly when temperatures exceed 30°C.
- **High temperatures in Kosovo not only contribute to heat-related mortality but also exacerbate a range of paediatric diseases.** These include intestinal infectious diseases, respiratory conditions, endocrine, nutritional, and metabolic diseases, as well as nervous system disorders. Extreme heat has also been linked to sudden infant death syndrome (SIDS)**.**
- **A warmer climate has been linked to an increased risk of vector-borne disease in Kosovo, expanding the climatic niche of disease vectors such as mosquitoes, sandflies and ticks.** In Kosovo, Tick-Borne Encephalitis (TBE), Crimean-Congo Hemorrhagic Fever (CCHF) and Lyme Disease all pose a growing and significant risk to children. These diseases can lead to paralysis, toxicosis, allergic reactions and even death.
- **In recent years, severe flooding has caused significant damage across Kosovo, with many children losing their homes due to water damage, particularly in Mitrovica, Peja, and Skenderaj.** Around 25 percent of children in Kosovo live in inadequate housing conditions, including homes with a leaking roof, increasing their vulnerability and exposure to these events. Flooding in Kosovo has also been linked to the spread of water-borne diseases such as gastroenteritis.

- **Increased water scarcity due to climate change poses a severe threat to food security and child nutrition in Kosovo, where agriculture is a fundamental source of sustenance and income, particularly in rural areas.** Children under-five, particularly those from the Roma, Ashkali, and Egyptian communities, where up to 15 percent of children under five are stunted (low height for age), compared to four percent nationwide, are particularly vulnerable.
- **Wildfires pose a serious and growing threat to children in Kosovo, with profound implications for their health and safety.** The smoke from wildfires contains fine particulate matter (PM2.5), which is particularly harmful to young children's respiratory systems, being up to 10 times more damaging than PM2.5 from other sources. Prenatal exposure to wildfire smoke further compounds these risks, as pregnant women exposed to smoke have higher rates of low birthweight, premature birth, and stillbirth.
- **Kosovo is located in a seismically active region, positioned within the Alpine-Mediterranean seismic belt, which is one of the world's most earthquake-prone areas.** Gjakovë and Prizren both lie near tectonic fault lines, making them particularly vulnerable to earthquakes. In addition to the physical dangers, the psychological impacts on children who experience earthquakes can be severe and enduring.
- **Kosovo's air quality is among the worst in Europe, with daily PM2.5 levels, the most dangerous air pollutant, reaching up to 367 µg/m³—more than 25 times the WHO's safe limit for children.** Research indicates that every 10 µg/m³ increase in PM2.5 raises the risk of under-5 mortality by 10%, meaning Kosovo's children could face up to a 300% higher risk of mortality compared to areas meeting WHO guidelines. PM2.5 has been linked to issues such as premature birth and low birth weights among infants, stunting, respiratory and cardiovascular disease and allergies among children.
- **Furthermore, indoor air pollution, exacerbated by inadequate ventilation in homes and schools, also poses serious health risks for children in Kosovo.** The lack of access to clean energy for cooking and heating in Kosovo's rural areas also poses a significant risk of burn injuries to children, especially those under the age of five, as evidenced by the high incidence of burn injuries, exceeding rates seen in most other European countries.
- **Research from Europe demonstrates that for every increase of 5 µg/m³ in PM2.5, there is a corresponding one-point decrease in Grade Point Average (GPA).** In Kosovo, this translates to a potential decrease in children's GPA by approximately 68 points.[1]

1 Calculations based on levels that reach up to 367 µg/m³—more than 25 times the WHO's safe limit for children.

- **Kosovo currently generates approximately 580,000 tonnes of municipal solid waste (MSW) annually, but only 26% of this waste is safely managed.** Additionally, Kosovo recycles just 2.5 percent of recyclable waste - one of the lowest rates in Europe. This is leading to high levels of soil and water pollution. Microplastics, a new and emerging concern for children's health, have been found to be prevalent in test sites across Kosovo.
- **Other sources of pollution, including heavy metals from mining and industrial activity, have also been found to cause a myriad of health issues for children in Kosovo.** These include Neural Tube Defects (NTDs), cancer, liver and kidney problems in children.
- **The loss of Kosovo's native flora and fauna represents a significant cultural loss for children and young people.** Conversely, promoting a strong connection between children and their natural environment can foster a sense of belonging and cultural pride, while also supporting physical health, cognitive development, and emotional well-being.
- **Despite significant strides in policy development and legislation in recent years, there still remains a significant gap in efforts to adequately address the impacts of climate change and environmental degradation on children and youth.** Few include the voices of children and young people and fewer still incorporate specific measures to shield them from the environmental challenges outlined in this report.

Fig.1 A summary of the climate and environment-related impacts facing Kosovo's children

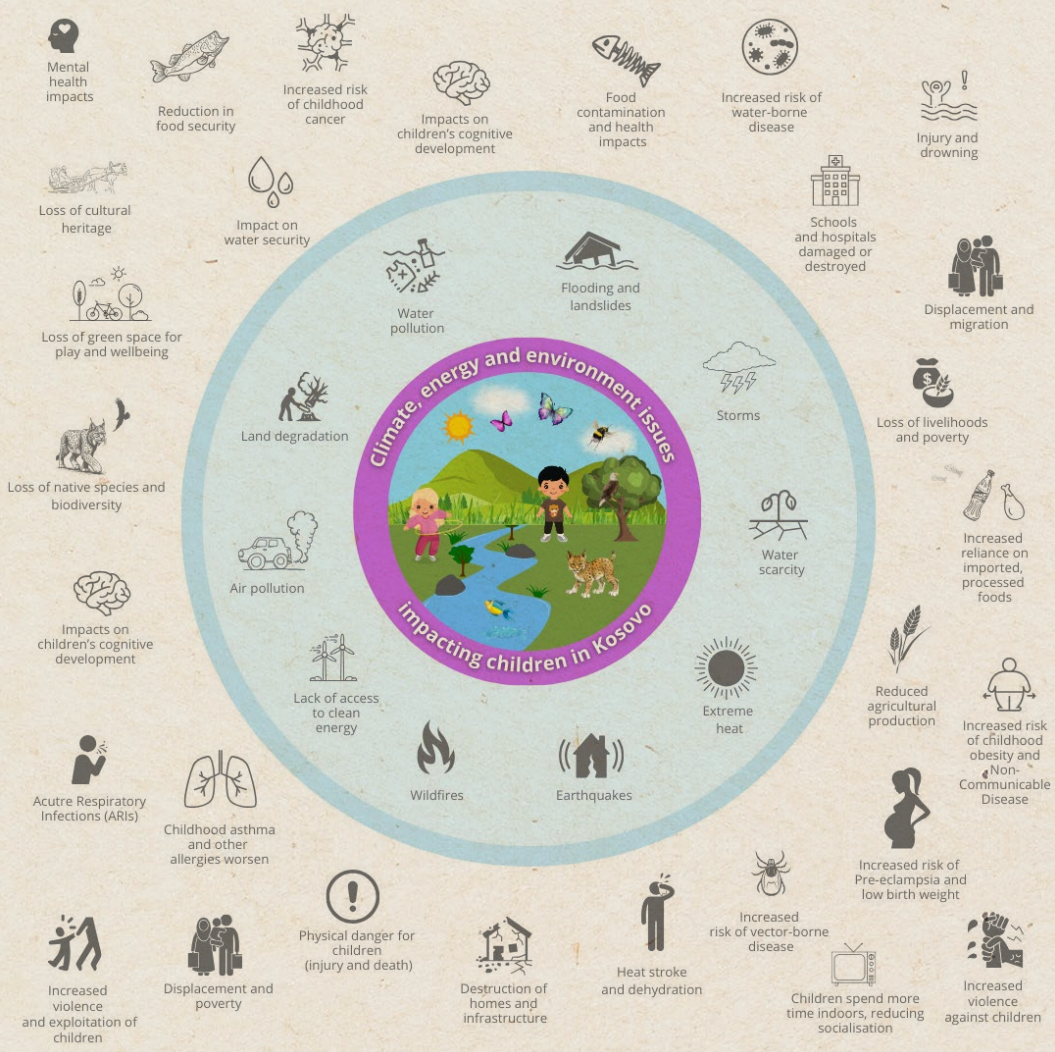


Table.1 Summary of observed and projected climate and environment-related hazards in Kosovo and their impacts on children[2345678910]

Climate impacts	Current situation	Projected changes	Overall risk	Most affected regions	Impacts on children
a. Rising temperatures and extreme heat 	Annual average temperatures have risen between 2-3°C since the 1950s, with greatest warming in the summer months. The frequency and severity of heatwaves has increased.	Average annual temperatures are expected to rise by around 0.5 - 1C each decade, and by 4-8°C by 2100, depending on future global efforts to limit greenhouse emissions. Projected warming will be higher than the world average, especially in mountainous regions.	Medium	Central and Eastern municipalities, including Gjakovë, Prizreni and Peja districts Other lowland areas	Heatstroke and dehydration Increased incidence of pre-eclampsia in pregnant women Increased risk of low birth weights in infants Reduced concentration and learning at school. Increased risk of violence and abuse Anxiety and other mental health disorders. Increase in allergies and respiratory illness Increased risk of water-borne disease

2 Due to lack of country-specific data on district-level climate hazards, data from neighbouring countries and river basins in Serbia, Montenegro, North Macedonia and Albania have been used to provide an extrapolated estimate, for each region in Kosovo, using https://thinkhazard.org/en/

3 World Bank (2024) Kosovo Trends and Significant Change against Natural Variability https://climateknowledgeportal.worldbank.org/country/kosovo/trends-variability-projections#:~:text=SSP1%2D1.9%20holds%20warming%20to,second%20half%20of%20the%20century

4 Ibid.

5 USAID (2017) Climate Change Risk Profile https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf

6 Naser K, Haq Z, Naughton BD. The Impact of Climate Change on Health Services in Low- and Middle-Income Countries: A Systematised Review and Thematic Analysis. Int J Environ Res Public Health. 2024 Apr 3;21(4):434. doi: 10.3390/ijerph21040434. PMID: 38673345; PMCID: PMC11050668

7 LFMWB (2024) Landscape fires in Kosovo https://www.lfmwb.net/knowledge-platform/country-data/kosovo/landscape-fires/#:~:text=1999)%20%C2%BB%20Landscape%20fires-,Landscape%20fires%20in%20Kosovo%20(UNSCR%201244,1999)%20(2000%2D2021)%3A&text=It%20is%20imperative%20that%20responsible,of%20forest%20fires%20is%202318.

8 IMF (2023) Republic of Kosovo: Request for Stand-By Arrangement and an Arrangement Under the Resilience and Sustainability Facility https://www.elibrary.imf.org/view/journals/002/2023/200/article-A002-en.xml#:~:text=In%20Kosovo%2C%20this%20could%20lead,or%20water%2Dscarce%20by%202050

9 DP Plus (2023) From Policy to Practice The Challenge of River Pollution and Waste Management in Kosovo https://dplus.org/wp-content/uploads/2023/09/20-09-23_The-Challenge-of-River-Pollution-and-Waste-Management-in-Kosovo.pdf

10 Earthquake Track (2024) Kosovo https://earthquaketrack.com/p/kosovo/recent?mag_filter=6

Climate impacts	Current situation	Projected changes	Overall risk	Most affected regions	Impacts on children
b. Heavy rainfall and flooding 	Overall decrease in rainfall since the 1960s, with an increased frequency and intensity of rainfall. Increases in winter precipitation, particularly in mountains, resulting in more frequent spring flooding.	Projected decrease in overall annual precipitation, with greatest decreases in summer. Winter precipitation will continue to increase in intensity, particularly in mountains, resulting in more frequent spring flooding.	High	Riverine flooding in lowland areas Flash flooding in upland areas Mitrovica and Gjakovë districts	Injury and death. Destruction of homes, infrastructure and essential services for children. Displacement and urban migration. Financial hardship and stress for families. Increased exposure to chemicals, pathogens and other toxins, which contaminate soil and water sources. Increased risk of water and vector-borne disease. Reduced access to essential services, including health and WASH services for women and children
c. Water scarcity and drought 	In Kosovo, a decline of 50 days per year of snow cover by 2050, reducing spring water flows. Decrease in overall annual precipitation, with greatest decreases in summer. Droughts in Kosovo in 1993, 2000, 2007, 2008 and 2013	Drought and scarcity is likely to increase overall, with the greatest risks being during the summer months Four of Kosovo's five water basins are likely to become water- stressed or water-scarce by 2050.	Medium	The Ibri Basin The Kosovo Plain (including Pristina, Gjilan, Ferizaj, Mitrovica and Podujevo)	Increased risk of undernutrition due to local food insecurity, loss of rural livelihoods and reliance on food imports. Increased concentration of toxins, bacteria and other contaminants in open water bodies and impacts on hygiene, increasing risk of water-borne disease
d. Wildfires 	Increase in the number of forest fires since 2007 in Kosovo. Correlates with increasing high temperatures and drought years. From 2000 to 2022, there were 2318 forest fires which burnt around 34992 ha of land.	Likely increase in the number of fires due to rising temperatures and increasing water scarcity.	**High**	Forest fires are most likely to impact the following districts: Peja Gjakova Prizren Mitrovica Ferizaj	Burn injuries and death Respiratory issues Destruction of homes, infrastructure and essential services children rely on Displacement, family separation and loss of community Trauma and anxiety

Climate impacts	Current situation	Projected changes	Overall risk	Most affected regions	Impacts on children
e. Earthquakes 	The last major earthquake hit Kosovo in 1957. Since then, the Kosovo has experienced several minor earthquakes that have led to infrastructure damage.	Relatively low probability of a high impact quake, smaller earthquakes remain likely.	Medium	All regions, but particularly Prizren, Gjakovë, Mitrovica and Gjilan	Injuries and death Destruction of homes, infrastructure and essential services children rely on, including healthcare, education and food supply Displacement, family separation and loss of community Trauma and anxiety
f. Air pollution 	High atmospheric pollutants, including particulate matter from coal-fired power plants. Pristina and other cities have some of the worst air quality in Europe, with PM2.5 levels exceeding WHO guidelines. Nearly two-thirds of the population uses solid fuels for heating, mainly wood and coal, resulting in significant economic costs related to air pollution mortality, estimated at US$160–US$310 million, or 2.5–4.7 percent of GDP.	Heavy reliance on coal for power (95 percent of electricity in 2020) and home heating means particulate emissions and other forms of air pollution are unlikely to decline under current policies.	**High**	Urban centres and regions with significant industrial activities., including: Pristina Obiliq Mitrovica: Drenas	Increased infant and child mortality Impacts on foetal development, leading to long-term health issues for the child, including growth restrictions and developmental delays Increased risk of stillbirth, miscarriage and low birth weights Respiratory Issues, including asthma, allergies, bronchitis, pneumonia, COVID-19 and other chronic respiratory conditions. Cardiovascular issues Asthma and Allergies: Exposure to pollutants like ozone and particulate matter increases the risk and severity of asthma and allergic reactions. Lung Development: Prolonged exposure to polluted air can hinder lung growth and function, leading to chronic respiratory conditions. Neurodevelopmental Disorders, leading to cognitive deficits, behavioural problems, and developmental delays. Weakened immune systems

Climate impacts	Current situation	Projected changes	Overall risk	Most affected regions	Impacts on children
g. Land and water degradation 	Forests cover 41 percent of Kosovo, but their quality and productivity have declined significantly. Illegal harvesting on both public and private forest lands is widespread. 1.4 million tonnes of municipal waste produced annually; landfills are nearing capacity and do not meet EU standards. Water pollution is a significant concern due to industrial activity, inadequate wastewater treatment and mining operations.	Unless urgent action is taken to address these issues they will continue to impact the health and wellbeing of children	**High**	All regions, but particularly those with extensive industrial activities, mining, and poor land management practices, particularly: Mitrovica Obiliq Drenas Pristina (particularly the Graçanka River) Other areas around the Kosovo Plain (i.e. Podujevo, Gjilan, Ferizaj and Vushtrri)	Increased local food Insecurity, with impacts on child nutrition (including over-reliance on processed foods and micronutrient deficiencies). Increased risk of flooding, landslides and water scarcity Gastrointestinal diseases Skin infections Reductions in food safety and quality Birth defects Developmental delays Neurological disorders and impaired cognitive development Increased risk of childhood cancer Loss of cultural heritage Loss of green space for play Psychological stress and increased anxiety and depression, particularly among youth.

Kosovo’s landscapes are characterised by a mix of rugged mountains, fertile valleys, and picturesque rivers, offering a diverse and scenic natural environment.

02 INTRODUCTION

Around 23% of children in Kosovo are considered multidimensionally poor, making them highly vulnerable to climate and environment-related hazards ©UNICEF Kosovo/2024

Kosovo is located in the central Balkan Peninsula in Southeast Europe.[11] It comprises seven regions and is home to around 1.6 million people *(Graph.1).*[12] Around 31% of the people living in Kosovo are under the age of 18.[13] Kosovo is also home to a diverse mix of ethnic groups, with the majority being ethnic Albanians.[14]

Graph.1 The regions of Kosovo

Prishtina	**Mitrovica**	**Peja**

Gjakova	**Prizreni**	**Ferizaji**	**Gjilani**

Since the end of conflict in 1999, Kosovo has been focused on rebuilding its infrastructure and legislative framework.[15] Despite economic growth since its declaration of independence in 2008, Kosovo remains one of the poorest countries in Europe, with an estimated 25 per cent of the population living in poverty.[16] Kosovo's GDP per capita is just one-quarter of the European Union average.

Kosovo is exposed to a myriad of climate-related hazards, including high temperatures, water scarcity, flooding, landslides and other forms of environmental degradation (*Table.1*).[17] As such, according to the UNICEF Children's Climate Risk Index, Kosovo's children experience a medium exposure to a multitude of climate-related hazards, including flooding, wildfires, earthquakes, water scarcity and extreme heat.[18]

11 All references to Kosovo shall be understood in the context of UNSCR 1244 (1999).
12 Radio Free Europe/Radio Liberty (2023) Kosovo's Population Census: Statistics and Graphs. https://www.evropaelire.org/a/regjistrimi-popullsise-statistika-grafika-kosove-/33033892.html
13 UNICEF Kosovo (2024) Children in Kosovo https://www.unicef.org/kosovoprogramme/children-kosovo
14 World Bank (2024) Kosovo Country Context https://www.worldbank.org/en/country/kosovo/overview
15 IMF (2023) Republic of Kosovo: Request for Stand-By Arrangement and an Arrangement Under the Resilience and Sustainability Facility https://www.elibrary.imf.org/view/journals/002/2023/200/article-A002-en.xml#:~:text=In%20Kosovo%2C%20this%20could%20lead,or%20water%2Dscarce%20by%202050
16 World Bank (2023) Kosovo Data Catalogue https://datacatalogfiles.worldbank.org
17 GFDRR (2017) Disaster Risk Profile: Kosovo https://www.google.com/url?q=https://www.gfdrr.org/en/publication/disaster-risk-profile-kosovo&sa=D&source=docs&ust=1718095133741736&usg=AOvVaw24e6JB7vtDywducAPs6EiC
18 UNICEF (2021) CCRI https://experience.arcgis.com/experience/0d9d2209bf104584a65e012b03b6d3f8/

In early 2023, Kosovo also experienced the worst floods in several decades, leading to the destruction of buildings and critical infrastructure, affecting around 22,000 people nationwide.[19] Climate change is expected to make such disasters more frequent and intense in Kosovo - with major impacts on children's health and well-being.[20]

Projections indicate that Kosovo will experience rising average annual temperatures, more frequent and intense heat waves, and altered precipitation patterns, leading to both increased water scarcity and flooding across Kosovo.[21] Children are particularly vulnerable to these climate-related hazards, facing increased risks of heat stress, respiratory issues, malnutrition and other issues *(Fig.1).*

Kosovo's high levels of air pollution, including particulate matter from coal-fired power plants, further exacerbate these impacts and create additional health risks for Kosovo's children. Kosovo has some of the worst air quality in Europe.[22] Water pollution, deforestation and other forms of land degradation are also having an impact on the ecosystem services children rely upon for their survival - including access to safe water and nutritious food.

These challenges, coupled with population growth and land-use changes driven by economic development, will further degrade natural resources and children's living conditions unless urgent action is taken.

The Climate Landscape Analysis for Children (CLAC) compiles comprehensive data and research on the impacts of climate change and environmental degradation on children in Kosovo. It identifies the most vulnerable children and their locations and outlines specific measures to protect them. Developed in collaboration with government partners, UN agencies, and civil society organisations, the CLAC includes the voices and perspectives of Kosovo's children and youth, capturing their experiences and recommendations for future actions. It is hoped that the CLAC and the Call to Action, written by youth in the Foreword, will serve as a catalyst for urgent and decisive efforts by the government and other stakeholders to reduce greenhouse gas emissions and protect children from the impacts of climate change.

19 UNICEF (2023) Kosovo Country Office Annual Report https://www.unicef.org/kosovoprogramme/reports/annual-report-2023
20 Ibid.
21 USAID (2017) Climate Risk Profile: Kosovo https://www.climatelinks.org/resources/climate-risk-profile-kosovo#:~:text=Kosovo's%20large%20service%20sector%20(67,heat%20waves%2C%20drought%20and%20flooding.
22 HEAL (2021) The health harm of air pollution in Pristina https://www.env-health.org/wp-content/uploads/2021/12/AQ_City_briefings_Pristina.pdf

03

CLIMATE AND ENVIRONMENT HAZARDS IN KOSOVO AND THEIR IMPACT ON CHILDREN

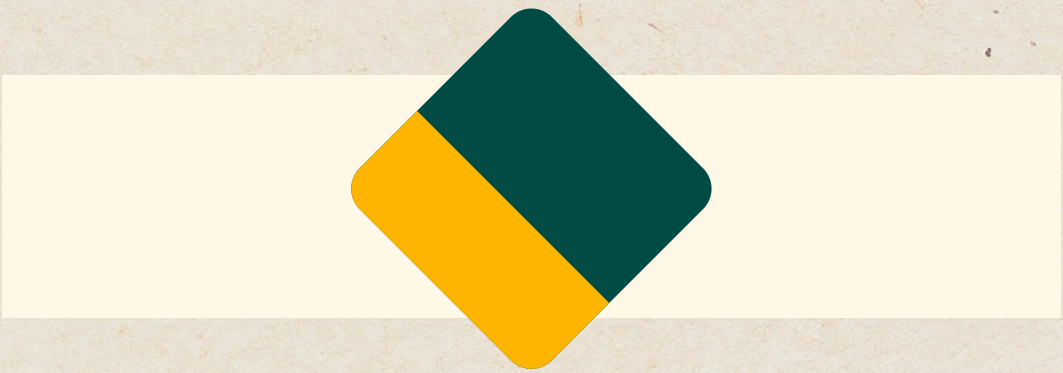
3.1 An overview

Kosovo's diverse landscapes, characterised by rugged mountains, fertile valleys, and scenic rivers, create a varied natural environment influenced by both Mediterranean and Alpine climates. Kosovo generally experiences a continental climate, with warm summers and cold winters. Mountainous regions are prone to heavy snowfall, while areas like the valley between Kaçanik and Mitrovica tend to be much drier.

Kosovo has two distinct climatic zones; the Kosovo Plain and the Dukagjini Plain *(Map.2).* The Kosovo Plain, including the Iber Valley, is characterised by a continental climate with cold winters and hot summers, reaching up to 35°C.[23] The region is relatively dry, with about 600 mm of annual precipitation. In contrast, the Dukagjini Plain, influenced by warm air masses from the Adriatic Sea, experiences milder winters and receives about 700 mm of precipitation annually, including significant snowfall in winter.

In the coming decades, Kosovo will experience rising average annual temperatures, more frequent and intense heat waves, and altered precipitation patterns, leading to both increased water scarcity and flooding across all regions *(Table.1).*[24]

Map.2 Climatic zones of Kosovo



Climate change and environmental degradation impact all aspects of children's health and well-being through multiple pathways, exacerbating child poverty (*Fig. 1*). At the same time, child poverty increases children's vulnerability to the impacts of climate change and environmental degradation. As such, both issues must be tackled together, in unison, to protect the future of Kosovo's children.

Children in Kosovo face some of the highest exposure to climate and environment-related hazards, whilst also having some of the highest vulnerabilities in Europe due to poverty.[25] Around 23% of children in Kosovo live below the national poverty line, meaning they lack access to safe water, adequate housing, and other essential services, making them highly vulnerable and more exposed to climate and environment-related hazards *(Table.2).*.[26]

23 Bureau of Education and Cultural Affairs (2024) Kosovo Guidebook https://eca.state.gov/files/bureau/kosovo-guidebook.pdf
24 USAID (2017) Climate Risk Profile: Kosovo https://www.climatelinks.org/resources/climate-risk-profile-kosovo#:~:text=Kosovo's%20large%20service%20sector%20(67,heat%20waves%2C%20drought%20and%20flooding.
25 UNICEF (2021) Children's Climate Risk Index https://experience.arcgis.com/experience/0d9d2209bf104584a65e012b03b6d3f8/#data_s=id%3AdataSource_2-17b3a7be4c5-layer-1_427%3A192
26 UNICEF Kosovo (2024) Children in Kosovo https://www.unicef.org/kosovoprogramme/children-kosovo

Table.2 Which children are the most vulnerable to climate change and environmental degradation in Kosovo?[27]

Vulnerable Group	Description
Children from the poorest families	These children face multiple deprivations including lack of access to WASH, education, healthcare, basic nutrition, clean energy and safe housing.
Children Under-5, particularly infants	Young children and infants are the most vulnerable to malnutrition, infectious diseases, and health impacts of air pollution and extreme temperatures.
Children with pre-existing medical conditions	This includes children with chronic illnesses, disabilities, mental health problems and others requiring continuous medical care and support, which may be disrupted during climate-related disasters. These conditions also leave them at increased risk of climate and environment-related illnesses such as extreme heat, ARIs and diarrhoea.
Orphans and other children not in the care of their biological parents	These children, when they don't have stable support systems and caretakers, are more susceptible to neglect, exploitation and overall poverty.
Children living in rural communities	These children are at a greater risk of climate-related hazards such as water scarcity, impacting family livelihoods and rural support services.
Girls (including adolescent girls)	Girls and adolescent girls in Kosovo face higher risks of abuse and exploitation, including early marriage, anxiety, depression, sexual and reproductive health concerns and unequal gender roles at home.
Migrants and refugees	In Kosovo, migrants and refugees often face an increased risk of poverty, a lack of legal protection and access to essential services..
Children engaged in child labour	These children are exposed to hazardous working conditions, severely impacting their health, development, and education opportunities.
Children from minority ethnic groups	Children from Roma, Ashkali, and Egyptian Communities face social exclusion and lack of access to essential services, including safe housing and water, in addition to living close to pollution hotspots.

For instance, the harsh impacts of extreme temperatures, water scarcity, and poor air quality can exacerbate existing health conditions and lead to new health challenges, further straining limited family resources and coping capacities - and increasing childrens' risk of further deprivation, in addition to abuse and neglect. At the same time, these children are also more likely to live in close proximity to major pollution hotspots, such as mines, power stations and heavy industry, due to poverty, making them more vulnerable to a myriad of health issues.

27 UNICEF (2021) Kosovo Country Office Annual Report.

The leading causes of death among children in Kosovo remain closely related to climate change and the environment. For example, the leading causes of death among infants under-1 are Lower Respiratory Infections (LRIs) and diarrhoea, both of which are exacerbated by temperature extremes.[28] LRIs in children have also been closely linked with air pollution in Kosovo.[29]

The graphs on the next page provide a snapshot of the key climate-related hazards and vulnerabilities facing Kosovo's children.

Graph 3 provides a snapshot of the overlapping climate and environment-related hazards facing Kosovo's children by district.[30]

Graph 4 provides a snapshot of the overlapping vulnerabilities children face by region, including a lack of access to water and sanitation, nutritious food, healthcare, education, social protection and clean energy access.

Graph 3 and 4 have then been combined to create an Overall Children's Climate Risk Map for Kosovo *(Graph 5)*.

Overall, the maps indicate that children across all regions face a **high exposure** to climate and environment-related hazards *(Map.3).* In terms of overall ranking, the most at-risk regions include Ferizaj and Prizren. At the same time, children in each region face a **medium-high vulnerability** to these hazards, as a result of multi-dimensional poverty *(Graph.4).* Combined, this means that all regions of Kosovo face an **overall high Children's Climate Risk.**

It is important to note that even within regions that show a slightly lower overall ranking, there are pockets of highly vulnerable children. Specific groups of these children are detailed in *Table.2*. It is critical that all vulnerable children in Kosovo receive priority support, with tailored protection measures and adaptation services to mitigate the impacts of climate change.

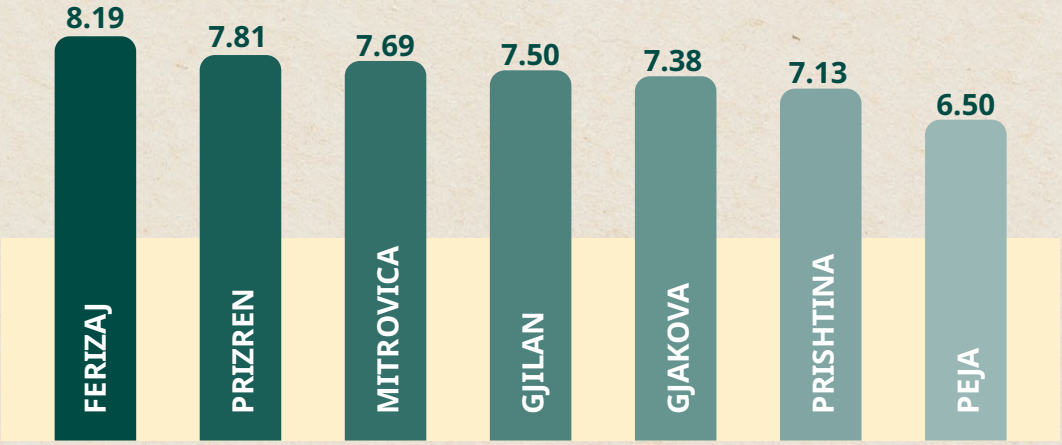
The following sections provide a more detailed analysis of each of these key climate and environment-related hazards, and the impacts they have and will continue to have on Kosovo's children. Evidence from Kosovo has been referenced wherever available. Where it is not yet available, regional and global studies have been used as supportive evidence.

28 Azemi M, Gashi S, Berisha M, Kolgeci S, Ismaili-Jaha V. Rate and time trend of perinatal, infant, maternal mortality, natality and natural population growth in kosovo. Mater Sociomed. 2012;24(4):238-41. doi: 10.5455/msm.2012.24.238-241. PMID: 23678327; PMCID: PMC3633379.

29 Shabani Isenaj Z, Berisha M, Gjorgjev D, Dimovska M, Moshammer H, Ukëhaxhaj A. Air Pollution in Kosovo: Short Term Effects on Hospital Visits of Children Due to Respiratory Health Diagnoses. Int J Environ Res Public Health. 2022 Aug 16;19(16):10141. doi: 10.3390/ijerph191610141. PMID: 36011773; PMCID: PMC9407926.

30 Due to lack of country-specific data on district-level climate hazards, data from neighbouring countries and river basins in Serbia, Montenegro, North Macedonia and Albania have been used to provide an extrapolated estimate, for each region in Kosovo, using https://thinkhazard.org/en/

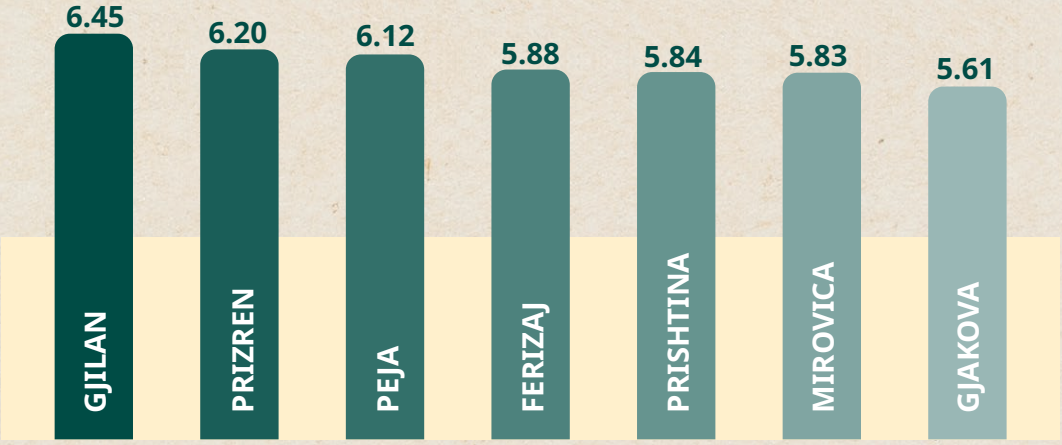
Graph.3 Children's exposure to climate and environment-related hazards[31]



The graph below provides a snap-shot of the most critical climate-related hazards facing Kosovo's children; **water scarcity, flooding, extreme heat, earthquakes, landslides, wildfires and air pollution.** These hazards have then been combined to create the total hazard exposure score for each region.

Overall, children across all districts of Kosovo face a **high or extremely high exposure** to climate and environment-related hazards.

Graph.4 Children's vulnerability to climate and environment-related hazards[32][33]



The graph below provides a snap-shot of the most critical climate-related vulnerabilities for children in Kosovo. These include **key multidimensional child poverty; including a lack of access to Water, Sanitation and Hygiene (WASH), Health, Nutrition, Education and Child Protection indicators, in addition to a lack of access to clean energy and safe housing.** These vulnerabilities have then been combined to create the total vulnerability score for each region.

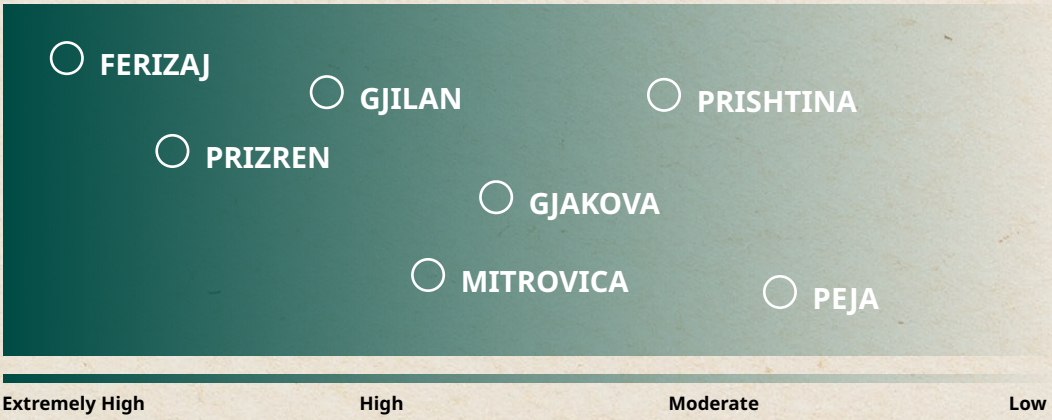
Overall, children across all districts of Kosovo face a **medium-high vulnerability** to climate and environment-related hazards.

31 Due to lack of country-specific data on district-level climate hazards, data from neighbouring countries and river basins in Serbia, Montenegro, North Macedonia and Albania have been used to provide an extrapolated estimate, for each region in Kosovo, using https://thinkhazard.org/en/

32 Kosovo Agency of Statistics (2020) Multiple Indicator Cluster Survey (MICS) https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey

33 Republic of Kosovo Water Services Regulatory Authority (2022) KRU-Raporti Vjetor i Performancës 2022 https://www.arru-rks.org/assets/cms/uploads/files/Publikimet/raportet%20vjetore%20te%20performances/KRU-Raporti%20Vjetor%20i%20Peformances%202022%20v02.pdf

Graph.5 Children's Climate Risk Map



In Kosovo, the children facing the greatest climate change risks are the ones who are most exposed to climate hazards (Graph.3) and are highly vulnerable due to multidimensional child poverty (Graph.4).

An overall Children's Climate Risk Score (out of 10) has been developed by combining the Climate Hazard (Graph.3) and Child Vulnerability scores (Graph.4) for each region.

The results of this show that children across all districts face an **overall high overall climate risk**

3.2 Climate Hazards

3.2.1 Rising temperatures and extreme heat

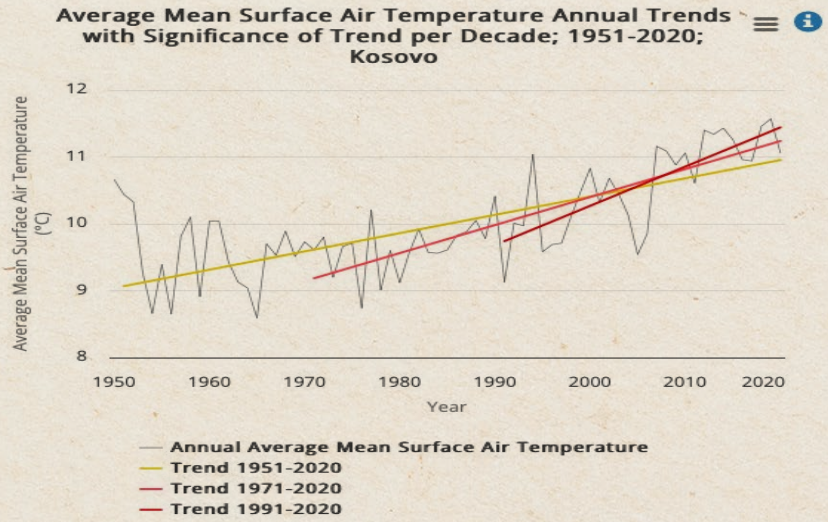
a. Observed trends and future projections

Since the 1950s, annual average temperatures in Kosovo have risen by 2-3°C, with the most significant warming occurring during the summer months.[34] Additionally, heatwaves across Kosovo have become more frequent. In 2021, Kosovo experienced the hottest year on record, with 2023 being the second hottest.[35]

34 World Bank (2024) Kosovo Trends and Significant Change against Natural Variability https://climateknowledgeportal.worldbank.org/country/kosovo/trends-variability-projections#:~:text=SSP1%2D1.9%20holds%20warming%20to,second%20half%20of%20the%20century

35 UNICEF (2022) The Cold Year of the Rest of Their Lives https://www.unicef.org/media/129506/file/UNICEF-coldest-year-heatwaves-and-children-EN.pdf

Fig.2 Average mean surface air temperature trends in Kosovo (1951-2020)[36]



Looking ahead, average annual temperatures are expected to continue rising by approximately 0.5-1°C each decade, depending on global efforts to limit greenhouse gas emissions.[37][38] This means that, overall, average temperatures are likely to rise by another 4-8°C by 2100.[39][40] This change in average temperatures will lead to more heat waves and increased summer and winter temperatures, particularly in mountainous regions, exposing more than 50% of Kosovo's children to high heatwave frequency.[41]

b. The impacts on children

Heat-related illnesses

Around half of the children living in Europe and Central Asia are currently exposed to frequent heat waves. This is double the global average of 1 in 4 children.[42] By 2080, these rising temperatures are expected to lead to the tripling of heat-related mortality - with many of the victims likely to be children.[43]

In recent years, as the number of heatwaves has increased, so too have hospital admissions for children. Family Medicine Centres in both Pristina and Mitrovica have reported a significant surge in patient visits on hot days in recent years, with many of the patients being children.[44][45]

36 World Bank (2024) Kosovo Trends and Significant Change against Natural Variability https://climateknowledgeportal.worldbank.org/country/kosovo/trends-variability-projections#:~:text=SSP1%2D1.9%20 holds%20 warming%20 to,second%20half%20of%20the%20century

37 World Bank (2024) Kosovo Trends and Significant Change against Natural Variability https://climateknowledgeportal.worldbank.org/country/kosovo/trends-variability-projections#:~:text=SSP1%2D1.9%20holds%20warming%20to,second%20half%20of%20the%20century

38 EEA (2014) Projected changes in annual, summer and winter temperature https://www.eea.europa.eu/data-and-maps/figures/projected-changes-in-annual-summer

39 NATO (2024) NATO Climate Change and Security Impact Assessment Report 2024, Third Edition

40 World Bank (2024) Kosovo Trends and Significant Change against Natural Variability https://climateknowledgeportal.worldbank.org/country/kosovo/trends-variability-projections#:~:text=SSP1%2D1.9%20holds%20warming%20to,second%20half%20of%20the%20century

41 UNICEF (2022) The coldest year of the rest of their lives: Protecting children from the escalating impacts of heat-waves https://www.unicef.org/media/129506/file/UNICEF-coldest-year-heatwaves-and-children-EN.pdf

42 UNICEF (2024) Beat the Heat 2024. https://www.unicef.org/eca/reports/beat-heat-2024

43 UNICEF (2022) The coldest year of the rest of their lives https://www.unicef.org/media/129506/file/UNICEF-coldest-year-heatwaves-and-children-EN.pdf

44 KosovaPress (2023) The flow of patients increases as a result of high temperatureshttps://kosovapress.com/eng/the-flow-of-patients-increases-as-a-result-of-high-temperatures

45 Koha Ditore (2023). High temperatures - over 24 children in Mitrovica sought treatment in 100 hours. https://www.koha.net/en/KOSOVO/28877/high-temperatures-for-24-hours-required-treatment-for-over-100-children-in-Mitrovica

High temperatures in Kosovo not only contribute to heat-related mortality but also exacerbate a range of paediatric diseases ©UNICEF Kosovo/2024

Kosovo's youngest children are the most susceptible to heat-related illnesses such as heatstroke.[46] They are particularly vulnerable due to their smaller body size, higher ratio of body surface area to mass, and immature temperature-regulating mechanisms. This makes it difficult for them to cool down when ambient temperatures are high. The lack of cooling facilities in homes (e.g. air conditioning), in schools and hospitals further increases children's exposure to higher temperatures.

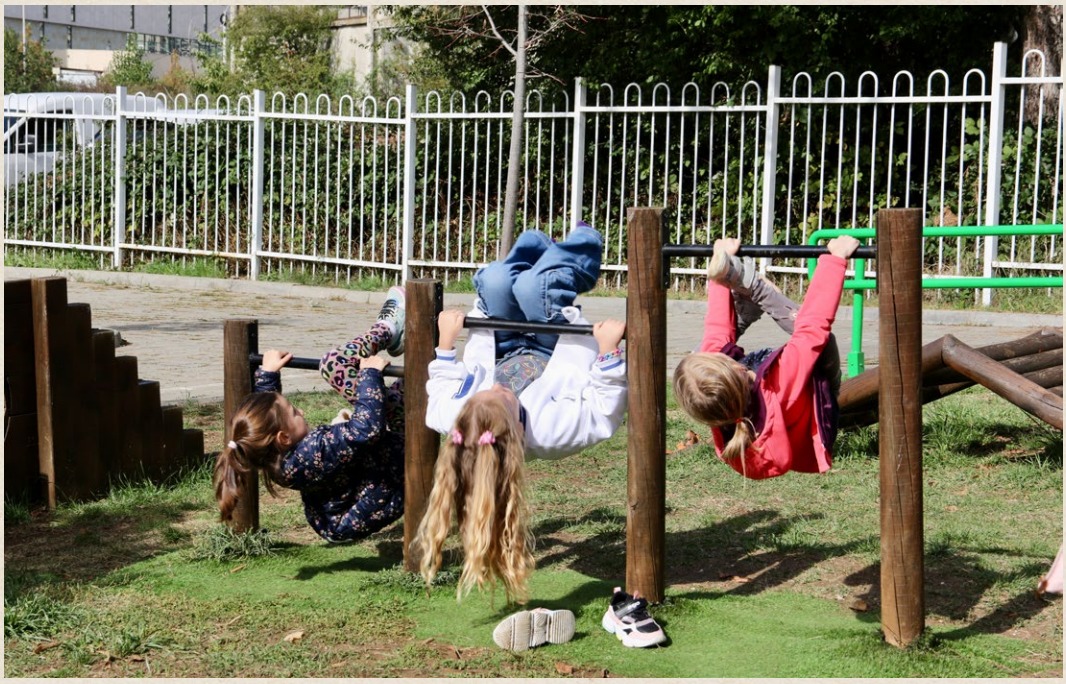
Heat exposure has been found to have acute effects on children, even before birth, potentially leading to preterm births, low birth weight, stillbirth, and congenital anomalies.[47][48] Complications from premature birth are particularly concerning, as they represent one of the greatest contributors to neonatal deaths in Kosovo. Around 10% of births are classed as preterm in Kosovo, meaning that the baby is born before 37 weeks of pregnancy.[49]

In pregnant mothers, the risk of stillbirth has been found to be higher among those who experience extreme high temperatures during the week before giving birth.[50] Premature birth risk has been found to be 15% higher for mothers who experienced extreme heat.[51]

Additionally, increased heat exposure during pregnancy has been associated with lower educational attainment and decreased earnings later in life.[52]

Extreme heat can increase the risk of hypertensive disorders of pregnancy.[53] This is a leading cause of maternal mortality which can also put both mother and baby at risk for problems during pregnancy and delivery.

46 Ibid.
47 UNICEF (2024) Beat the Heat 2024. https://www.unicef.org/eca/reports/beat-heat-2024
48 Brink, N., Lakhoo, D.P., Solarin, I. et al. Impacts of heat exposure in utero on long-term health and social outcomes: a systematic review. BMC Pregnancy Childbirth 24, 344 (2024).
49 Kallxo (2023) 147 foshnje vdiqën sivjet në Neonatologji https://kallxo.com/lajm/147-foshnje-vdiqen-sivjet-ne-neonatologji/
50 Cushing L, Morello-Frosch R, Hubbard A. Extreme heat and its association with social disparities in the risk of spontaneous preterm birth. Paediatr Perinat Epidemiol. 2022 Jan;36(1):13-22. doi: 10.1111/ppe.12834
51 McElroy S, Ilango S, Dimitrova A, Gershunov A, Benmarhnia T. Extreme heat, preterm birth, and stillbirth: A global analysis across 14 lower-middle income countries. Environ Int. 2022 Jan;158:106902. doi: 10.1016/j.envint.2021.106902. Epub 2021 Oct 6. PMID: 34627013
52 Brink, N., Lakhoo, D.P., Solarin, I. et al. Impacts of heat exposure in utero on long-term health and social outcomes: a systematic review. BMC Pregnancy Childbirth 24, 344 (2024). https://doi.org/10.1186/s12884-024-06512-0
53 CDC (2024) Clinical Overview of Heat and Pregnant Women https://www.cdc.gov/heat-health/hcp/clinical-overview/heat-and-pregnant-women.html



In March 2024, a mother plays football outside of her house with two of her children in Plemetin (Obiliq), © UNICEF/UNI552857/Karahoda

In neonatal intensive care units (NICUs) across Kosovo that lack air conditioning, excessive ambient temperatures can cause neonatal hyperthermia, where the inability to maintain proper body temperature control can have fatal consequences. Extreme heat is directly linked to higher mortality rates in infants, particularly newborns, with the most severe effects often resulting from cardiovascular, respiratory, digestive system, and blood disorders.

Across Eastern Europe, heat stress and hyperthermia have been associated with sudden infant death syndrome (SIDS), particularly in those cases where the syndrome peaks before 4 months of age.[54] SIDS often occurs in unusually warm environments or in situations where infants are excessively clothed or overwrapped, highlighting the critical role that environmental temperature plays in these tragic events.

For older children in Kosovo, heat stress is more often linked to physical activity, such as sports, when temperatures are high. Hospital admissions for dehydration are notably higher in children aged 5–18 years, particularly during heatwaves.

Other health-related impacts

High temperatures in Kosovo not only contribute to heat-related mortality but also exacerbate a range of paediatric diseases.[55] These include infectious diseases, respiratory conditions, endocrine, nutritional, and metabolic diseases, as well as nervous system disorders.[56] Heat stress has been found to increase the likelihood of children being taken to emergency departments with pneumonia and can lead to higher rates of pneumonia-related hospital admis-

54 UNICEF (2024) Beat the Heat: Child health amid heat waves in Eastern Europe and Central Asia https://www.unicef.org/eca/media/35706/file/Beat%20the%20Heat%202024.pdf
55 UNICEF (2024) Beat the Heat: Child health amid heat waves in Eastern Europe and Central Asia https://www.unicef.org/eca/media/35706/file/Beat%20the%20Heat%202024.pdf
56 UNICEF (2024) Beat the Heat 2024. https://www.unicef.org/eca/reports/beat-heat-2024

In the coming decades, ticks in Kosovo are likely to spread to higher altitudes and previously cooler regions in the central and eastern parts of the country, as a result of climate change

sions.[57] The combination of high temperatures and poor air quality further compounds these adverse health outcomes, particularly in young children.

A warmer climate has been linked to an increased risk of vector-borne disease globally, expanding the climatic niche of disease vectors such as mosquitoes, sandflies and ticks.[58][59] In Kosovo, tick-borne disease poses the most significant vector-borne threat to children, as a result of diseases such as Tick-Borne Encephalitis (TBE), Crimean-Congo Hemorrhagic Fever (CCHF) and Lyme Disease. These diseases can lead to paralysis, toxicosis, allergic reactions and even death among children.[60][61][62] In Kosovo, the risk of infection remains highest in areas with dense vegetation and livestock farming, with most bites occurring in May and June.[63] In the coming decades, ticks in Kosovo are likely to spread to higher altitudes and previously cooler regions in the central and eastern parts of Kosovo, as a result of climate change.[64] Such changes will enable more ticks to survive the winter, increasing the probability of tick bites.[65]

57 Makrufardi F, Triasih R, Nurnaningsih N, Chung KF, Lin SC, Chuang HC. Extreme temperatures increase the risk of pediatric pneumonia: a systematic review and meta-analysis. Front Pediatr. 2024 Feb 2;12:1329918. doi: 10.3389/fped.2024.1329918. PMID: 38370139; PMCID: PMC10869493

58 D. Porretta, V. Mastrantonio, S.Amendolia, S. Gaiarsa, S. Epis, C. Genchi, C. Bandi, D. Otranto, S. Urbanelli Effects of global changes on the climatic niche of the tick Ixodes ricinus inferred by species distribution modelling Parasites Vectors, 6 (2013), p. 271

59 Bouchard C, Dibernardo A, Koffi J, Wood H, Leighton PA, Lindsay LR. N Increased risk of tick-borne diseases with climate and environmental changes. Can Commun Dis Rep. 2019 Apr 4;45(4):83-89. doi: 10.14745/ccdr.v45i04a02. PMID: 31285697; PMCID: PMC6587693 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6587693/

60 Ibid.

61 Ibid.

62 Deka, Mark. (2017). Crimean-Congo Hemorrhagic Fever (CCHF) Geographic and Environmental Risk Assessment in the Balkan and Anatolian Peninsulas. Papers in Applied Geography. 4. 10.1080/23754931.2017.1378122.

63 Ponosheci-Biçaku, A., Ahmeti, S., Trkulja, V., Biçaku, A., & Tešović, G. (2021). First data on human Lyme borreliosis in Kosovo: Prospective evaluation of the disease from a tick bite perspective. *Vector-Borne and Zoonotic Diseases, 21*(6), 450-456. https://doi.org/10.1089/vbz.2020.2717

64 HW Williams, DE Cross, HL Crump, CJDrost, CJ. Thomas Climate suitability for European ticks: Assessing species distribution models against null models and projection under AR5 climate Parasites Vector, 8 (1) (2015), p. 440

65 Jan C. Semenza, Shlomit Paz, (2021) Climate change and infectious disease in Europe: Impact, projection and adaptation, The Lancet Regional Health - Europe, Volume 9, 2021, 100230, ISSN 2666-7762, https://doi.org/10.1016/j.lanepe.2021.100230

Extreme heat reduces both the quality and quantity of local food being available to children, whilst simultaneously impacting livelihoods and exacerbating poverty. ©UNICEF Kosovo/2024

Mosquitoes, which cause diseases such as malaria, dengue and the West Nile Virus, may also expand their range across the Western Balkans, as a result of warmer temperatures and increased humidity.[66] For example, in 2020, Kosovo reported its first incidence of the Asian tiger mosquito, a potential vector of about 22 viruses, including dengue, chikungunya and Zika, all of which have the potential to cause severe illness, and even death, among children.[67]

Sandflies, the vectors of Leishmaniasis, also have the potential to expand their range in Kosovo as a result of climate change.[68][69] Leishmaniasis in children can cause severe health issues, including life-threatening organ damage, disfiguring skin lesions, malnutrition, and significant psychological and educational impacts. As with ticks and mosquitoes, the range of sandflies is expected to move from the western region to the central and eastern parts of Kosovo.[70]

The spread of foodborne diseases as a result of rising temperatures has also been observed in neighbouring countries, although data on this, for Kosovo, remains limited.[71] **This is because pathogens, including** Campylobacter, salmonella and e.coli bacteria proliferation and transmission are closely linked to warmer temperatures. This increases the risk of bacterial contamination across the food chain.[72] The transmission of food-borne disease from these pathogens is expected to increase in Europe as the climate continues to warm.[73]

66 Ibid.
67 Muja-Bajraktari N, Kadriaj P, Zhushi-Etemi F, Sherifi K, Alten B, Petrić D, Velo E, Schaffner F. The Asian tiger mosquito Aedes albopictus (Skuse) in Kosovo: First record. PLoS One. 2022 Mar 15;17(3):e0264300. doi: 10.1371/journal.pone.0264300. PMID: 35290988; PMCID: PMC8923454
68 Ibid.
69 Attila J. Trájer, Ina Hoxha, Betim Xhekaj, Katharina Platzgummer, Vit Dvořák, Adelheid G. Obwaller, Jovana Stefanovska, Aleksandar Cvetkovikj, Julia Walochnik, Kurtesh Sherifi, Edwin Kniha, Ecological setting of phlebotomine sand flies in the Republic of Kosovo, Heliyon, Volume 10, Issue 12, 2024, e33029, ISSN 2405-8440, https://doi.org/10.1016/j.heliyon.2024.e33029
70 Ibid.
71 USAID (2017) Climate Change Risk Profile https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf
72 Ibid.
73 Ibid.

Vapa ekstreme gjithashtu ndikon në arritjen e arsimimit të fëmijëve në shkollë, përmes mekanizmave të shumtë, duke përfshirë lodhjen e shkaktuar nga nxehtësia dhe rritjen e sëmundjeve infektive
©UNICEF Kosovë/2024

Water-borne diseases are also expected to flourish for the same reasons, compounded by the lack of safely managed water systems, particularly in rural areas.[74][75]

Impacts on child nutrition

The effects of extreme heat further compound this burden by reducing both the quality and quantity of local food being available to children, whilst simultaneously impacting livelihoods and exacerbating poverty, with significant implications for children's nutrition. In Kosovo, childhood malnutrition continues to be a concern and striking inequalities exist for the poorest children, including those in Roma, Ashkali and Egyptian communities. Only one in three children between 6 and 36 months of age in Kosovo currently receives the minimum acceptable diet.[76] Around 9 percent of children under-five, from the poorest households, are stunted (low height for age).[77] This figure is even higher among Roma, Ashkali, and Egyptian children, where 15 percent under-five are stunted.[78]

Extreme heat diminishes agricultural productivity by stressing crops and livestock, while also increasing the risk of heat-related illnesses in animals. Rising temperatures have also been associated with increased absorp-

74 Kosovo Agency of Statistics (2020) Multiple Indicator Cluster Survey (MICS) https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey

75 Levy K, Smith SM, Carlton EJ. Climate Change Impacts on Waterborne Diseases: Moving Toward Designing Interventions. Curr Environ Health Rep. 2018 Jun;5(2):272-282. doi: 10.1007/s40572-018-0199-7. PMID: 29721700; PMCID: PMC6119235

76 UNICEF (2024) Children in Kosovo https://www.unicef.org/kosovoprogramme/children-kosovo#:~:text=Child%20malnutrition%20continues%20to%20be,receives%20the%20minimum%20acceptable%20diet.

77 World Bank. A situational analysis of early childhood development (ECD) services in Kosovo. Published October 2021. Accessed September 5, 2024. https://documents1.worldbank.org/curated/en/281831632126362189/pdf/A-Situational-Analysis-of-Early-Childhood-Development-ECD-Services-in-Kosovo.pdf

78 Ibid.

tion of heavy metals by crops and livestock, rendering them less safe for human consumption. Additionally, higher temperatures may lead to increased use of fertilisers and pesticides to maintain crop yields. Children in Kosovo, with their smaller and more vulnerable bodies, are particularly susceptible to these toxins, which can have serious health consequences.

At the same time, the impacts of extreme heat and climate change are putting immense pressure on local food production systems, leading to a growing dependence on packaged and processed foods, which has been linked to rising micronutrient deficiencies, obesity, and non-communicable diseases like diabetes among children. Around 20% of children in Kosovo are considered to be overweight or obese, a proportion that has grown in recent decades.[79] Extreme heat has also been found to lead to an increase in sedentary and isolated lifestyles among children, with many choosing to stay indoors rather than play outside.

Impacts on education

Extreme heat also affects children's education attainment at school, through multiple mechanisms. Many schools, particularly in rural communities, also lack cooling systems, making classroom temperatures unbearable for both children and teachers. Hotter temperatures have been found to reduce cerebral blood flow and increase heat-related fatigue, limiting children's ability to concentrate in class.[80] Finally, as temperatures warm, diarrhoea and other infectious diseases are also likely to rise, particularly in schools that still lack access to safe water, sanitation and hygiene services for children.

Child protection impacts

In other countries, extreme heat has been found to put women and children at a greater risk of violence and abuse in the home.[81] This has been linked to environmental stresses and the exacerbation of poverty, leading to an increase in economic and physiological stress for parents, which can in turn, lead to an increased risk of violence for children.[82][83]

Other research has also shown that extreme heat and rising temperatures increase stress and anxiety amongst children also, triggering various mood and behavioural disorders, in both children and adults.[84][85][86] These risks, likely to increase with further warming, are thought to be triggered

79 Tarp J, Jarani J, Muca F, Spahi A, Grøntved A. Prevalence of overweight and obesity and anthropometric reference centiles for Albanian children and adolescents living in four Balkan nation-states. J Pediatr Endocrinol Metab. 2018 Nov 27;31(11):1199-1206. doi: 10.1515/jpem-2018-0253. PMID: 30307896

80 Wayne C. Drevets & Marcus E. Raichle (1998) Suppression of Regional Cerebral Blood during Emotional versus Higher Cognitive Implications for Interactions between Emotion and Cognition, Cognition and Emotion, 12:3, 353-385, DOI: 10.1080/026999398379646

81 Sanz-Barbero B, Linares C, Vives-Cases C, González JL, López-Ossorio JJ, Díaz J. Heat wave and the risk of intimate partner violence. Sci Total Environ. 2018 Dec 10;644:413-419. doi: 10.1016/j.scitotenv.2018.06.368. Epub 2018 Jul 6. PMID: 29981991

82 End Violence (2022) How the climate crisis is driving violence against children and what w can do about it https://www.end-violence.org/articles/how-climate-crisis-driving-violence-against-children-and-what-we-can-do-about-it

83 Mahendran R, Xu R, Li S, Guo Y. Interpersonal violence associated with hot weather. Lancet Planet Health. 2021 Sep;5(9):e571-e572. doi: 10.1016/S2542-5196(21)00210-2. PMID: 34508676

84 Chan EYY, Lam HCY, So SHW, Goggins WB III, Ho JY, et al. 2018. Association between ambient temperatures and mental disorder hospitalizations in a subtropical city: a time-series study of Hong Kong Special Administrative Region. Int. J. Environ. Res. Public Health 15(4):754

85 Wang X, Lavigne E, Ouellette-Kuntz H, Chen BE. 2014. Acute impacts of extreme temperature exposure on emergency room admissions related to mental and behaviour disorders in Toronto, Canada. J. Affect. Disord 155(1):154–61

86 Kim Y, Kim H, Gasparrini A, Armstrong B, Honda Y, et al. 2019. Suicide and ambient temperature: a multi-country multi-city study. Environ. Health Perspect 127(11):117007

by thermoregulation stress and a subsequent negative neurological response to heat.[87]

Finally, according to the children and young people interviewed, extreme heat can also prevent them from socialising and playing outdoors. This limits their ability to exercise, socialise, and connect with nature and their cultural heritage. Studies from other countries have shown that this can increase the risk of social isolation, anxiety and depression.[88]

3.2.2 Heavy rainfall and flooding

a. Observed trends and future projections

Kosovo has experienced an overall decrease in rainfall since the 1950s, accompanied by increased frequency and intensity of rainfall events.[89] Average annual precipitation for the period of 1930-1990 was 820 mm, while for the period 2001-2019, it was 674 mm.[90] This trend is particularly evident in winter precipitation, especially in mountainous regions, leading to more frequent spring flooding.

In addition to spring flooding, Kosovo is also at risk from flooding in lowland areas, flash flooding in upland regions, and potential dam breaks.[91]

87 Burke M, González F, Baylis P, Heft-Neal S, Baysan C, et al. 2018. Higher temperatures increase suicide rates in the United States and Mexico. Nat. Clim. Change 8(8):723–29

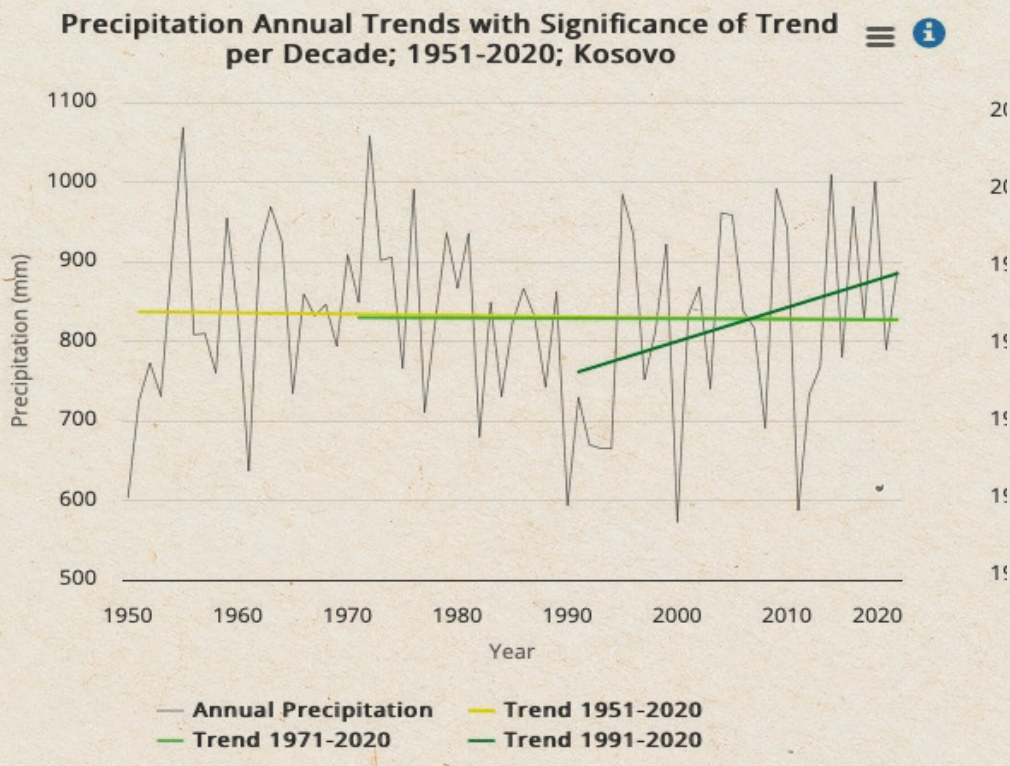
88 Vergunst F, Berry HL. Climate Change and Children's Mental Health: A Developmental Perspective. Clin Psychol Sci. 2022 Jul;10(4):767-785. doi: 10.1177/21677026211040787. Epub 2021 Sep 14. PMID: 35846172; PMCID: PMC9280699.

89 World Bank (2024) Kosovo Trends and Significant Change against Natural Variability https://climateknowledgeportal.worldbank.org/country/kosovo/trends-variability-projections#:~:text=SSP1%2D1.9%20holds%20warming%20to,second%20half%20of%20the%20century

90 Kosovo Environmental Protection Agency https://www.ammk-rks.net/assets/cms/uploads/files/Publikime-raporte//2._Treguesit_e_ndryshimeve_klimatike.pdf

91 Ibid.

Fig.3 Annual precipitation trends in Kosovo (1951-2020)[92]



In Kosovo, the risk and potential cost of flood damages are exacerbated by poorly maintained river channels, gravel extraction from flood embankments, and construction in flood-prone areas. In urban areas, the inadequate design of drainage and sewage systems also makes Kosovo's towns and cities vulnerable to flooding, putting drinking water services at risk of contamination.[93]

Fig.4 Annual average affected GDP as a result of flooding[94]

92 World Bank (2024) Kosovo Trends and Significant Change against Natural Variability https://climateknowledgeportal.worldbank.org/country/kosovo/trends-variability-projections#:~:text=SSP1%2D1.9%20holds%20warming%20to,second%20half%20of%20the%20century

93 USAID (2017) Climate Change Risk Profile https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf

94 GFDRR (2017) Kosovo Disaster Risk Profile https://www.gfdrr.org/en/publication/disaster-risk-profile-kosovo

The town of Fushe Kosove flooded in January 2023 following heavy rains ©Prishtina Insight/2024

As such, the annual average population affected by flooding in Kosovo is approximately 10,000, with an annual average GDP impact of about $50 million, a number that has grown in recent years.[95] Mitrovica is particularly prone to flooding due to its proximity to the Ibar and Sitnica rivers, deforestation and historical mining activities that have altered the region's landscape and watercourses.[96]

Future projections indicate a decrease in overall annual precipitation in Kosovo by around 15%, with the most significant reductions occurring during the summer months.[97] Conversely, winter precipitation is expected to increase, particularly in mountainous regions. This seasonal shift is likely to result in more frequent spring flooding, as the increased winter rainfall and snowmelt contribute to higher water levels during the spring.[98]

b. The impacts on children

Physical impacts

In recent years, severe flooding has caused significant damage across Kosovo, with many children losing their homes due to water damage, particularly in vulnerable areas such as Mitrovica, Peja, and Skenderaj. For example, in January 2023, Skenderaj and Mitrovica faced severe flooding, impacting 3,580 households (around 21,500 people).[99] Reports indicated that 850 households had their homes flooded, and over 3,000 children under 18 years old were affected, including one child who was fatally injured.[100][101] Other impacts included drinking water shortages and power outages across the affected regions, in addition to the destruction of homes, schools and businesses.[102] The

95 GFDRR (2017) Kosovo Disaster Risk Profile https://www.gfdrr.org/en/publication/disaster-risk-profile-kosovo
96 Ibid.
97 Government of Kosovo (2023) National Water Management Strategy https://mjedisi.info/wp-content/uploads/2023/03/National-water-management-strategy-2036-Kosovo.pdf
98 USAID (2017) Climate Change Risk Profile https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf
99 Ibid.
100 Ibid.
101 RTD (2023) https://www.dukagjini.com/vershimet-ne-peje-shkaktuan-viktima-dhe-deme-materiale/
102 NATO (2024) NATO Climate Change and Security Impact Assessment Report 2024, Third Edition

Around 25 percent of children in Kosovo live in inadequate housing conditions, including homes with a leaking roof. ©UNICEF/2024

disruption of these essential services for children had significant implications for their health, education and overall wellbeing.

Around 25 percent of children in Kosovo live in inadequate housing conditions, including homes with a leaking roof.[103] This leaves children more vulnerable to floods and storms, increasing their risk of injury and displacement. Children are particularly vulnerable during floods; they are less capable of protecting themselves physically from immediate dangers, such as fast-moving water and collapsing structures, leading to a higher risk of drowning, injury, and psychological trauma. In Kosovo, drowning and injuries are significant causes of child mortality, but the exact number of deaths and injuries directly attributable to floods remains unknown.

Health impacts

Floods in Kosovo often disrupt water and sanitation services, damaging latrines and wastewater systems, which can contaminate water supplies and surrounding environments, leading to the spread of water-borne diseases.[104] For example, the 2023 floods led to water supply disruptions in Mitrovica and Skënderaj, which subsequently led to a surge in water-borne disease.[105]

At least ten percent of households still lack access to safe (improved) sanitation facilities, leaving children particularly vulnerable to waterborne diseases such as gastroenteritis.[106] Additionally, around 16% of households are consuming water contaminated with e-coli bacteria, suggesting that even those facilities deemed "safe" are still contaminating the surrounding environ-

103 Kosovo Agency of Statistics (2020) Multiple Indicator Cluster Survey (MICS) https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey
104 Kallxo (2023). Pasojat nga vërshimet në Kosovë. https://kallxo.com/lajm/pasojat-nga-vershimet-ne-kosove/
105 Ibid.
106 Kosovo Agency of Statistics (2020) Multiple Indicator Cluster Survey (MICS) https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey

ment.[107] Schools also often lack safe and flood-resilient sanitation facilities, increasing the risk for children.

3.2.3 Drought and water scarcity

a. Observed trends and future projections

Water scarcity remains an ongoing challenge for Kosovo. Currently, per capita renewable water resources are only 16 percent of the regional average, with precipitation and water storage capacity being less than half of regional averages.[108] While water reservoirs (Ujmani/Gazivoda, Badovc, Batlava, Radoniqi) provide water to major towns, only 61 percent of rural households are connected to public water supply systems, often relying on wells or springs.[109]

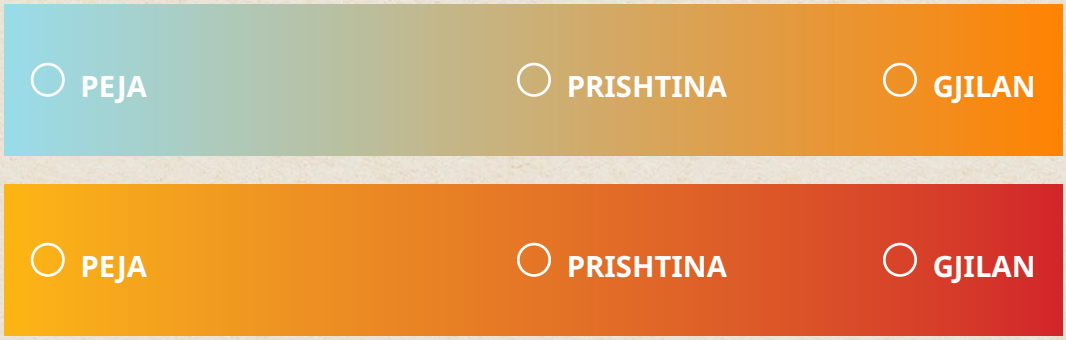
In Kosovo, the Dukagjini Plain benefits from more abundant surface and groundwater, whereas the Kosovo Plain is more susceptible to water shortages due to lower annual rainfall, reduced groundwater access, and higher population density *(Fig.5).* Contributing factors to water scarcity include rising consumption, inefficiencies, and leaks in pipelines, and greater irrigation demands. Water quality is further compromised by insufficient wastewater treatment and poor riverbed maintenance.

Between 2004 and 2008, about 80 percent of Kosovo municipalities suffered from water shortages due to hydrological drought and the misuse of water resources.[110] In the winter of 2014, following depletion of reservoirs from low snow and rain levels, the state water supply company instituted water rationing in Pristina, the capital.

Projections indicate that due to rising temperatures, decreased rainfall, and population growth, four out of Kosovo's five water basins could face water stress or scarcity by 2050.[111][112]

107 Ibid.
108 World Bank (2018) Water Security Outlook https://documents1.worldbank.org/curated/en/496071548849630510/Water-Security-Outlook-for-Kosovo.pdf
109 Ibid.
110 Ibid.
111 USAID (2017) Climate Change Risk Profile https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf
112 World Bank (2018) Kosovo Water Security Outlook https://documents1.worldbank.org/curated/en/496071548849630510/Water-Security-Outlook-for-Kosovo.pdf

Fig.5 Current and projected water stress in Kosovo by 2040



b. The impacts on children

Food security and nutrition impacts

Increased water scarcity due to climate change poses a severe threat to food security and child nutrition in Kosovo, where agriculture remains a critical source of sustenance and income, particularly in rural areas. With only 17 percent of agricultural land benefiting from irrigation, the majority of small-scale farms, covering 97 percent of agricultural landholdings, remain highly vulnerable to erratic rainfall patterns, droughts, and floods.[113] These climate-induced water shortages limit crop yields and livestock productivity, leading to reduced food availability and increased reliance on food imports. This reliance on external food sources further threatens local food security, making Kosovo's population, especially children, susceptible to the risks of undernutrition. The impact of water scarcity on agriculture also compounds existing challenges, such as land fragmentation, outdated farming techniques, and restricted market access, further undermining the resilience of Kosovo's agriculture sector.[114]

As rural livelihoods and local food production declines, food prices and poverty are likely to increase, increasing the risk of malnutrition for children. Children under-five, particularly those from the Roma, Ashkali, and Egyptian communities, where up to 15 percent of children under five are stunted (low height for age), compared to 4 percent nationwide, are particularly vulnerable.[115] Stunting has been found to impact long-term cognitive development among children, undermining their education and future earning potential.[116] Additionally, just 38 percent of children in Kosovo (6-23 months) meet the criteria for minimum dietary diversity, meaning they are not consuming enough macro and micronutrients to adequately sustain their growth and development.[117] This can also lead to weakened immune systems, cognitive delays, and increased susceptibility to infections, which in turn makes them more vulnerable to climate-related illnesses.

113 USAID (2017) Climate Change Risk Profile https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf
114 World Bank (2021) Raising Agricultural Productivity in Kosovo https://documents1.worldbank.org/curated/en/099135101212221216/pdf/P171951090fe880070be900ab47bbdb5fbe.pdf
115 Kosovo Agency of Statistics (2020) Multiple Indicator Cluster Survey (MICS) https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey
116 UNICEF (2024) Nutrition: Malnutrition https://data.unicef.org/topic/nutrition/malnutrition/#:~:text=Indicators,-Indicator%20name&text=Stunting%20refers%20to%20a%20child,even%20affect%20the%20next%20generation
117 Kosovo Agency of Statistics (2020) Multiple Indicator Cluster Survey (MICS) https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey

Around 15 percent of children under five are stunted in Kosovo, an issue that is likely to be exacerbated by climate change ©UNICEF/2024

Health impacts

Climate change is additionally set to alter Kosovo's epidemiological landscape, favouring the proliferation of certain pathogens in warmer climates (e.g E.Coli and malaria) while hindering others (e.g. rotavirus). A decrease in water volume, combined with an increase in temperatures can also lead to a relative increase in the concentration of biological and chemical contaminants found in the water that children consume (see *3.4.2 Land and water degradation*).[118] These rising temperatures cause water-borne pathogens to bloom, including E.coli and giardiasis, increasing disease and mortality rates amongst children.[119][120][121]

Hotter, more intense dry seasons have also been linked to increased pneumonia and COVID-19 risks, including through a reduction of key hygiene practices such as handwashing.[122] Understanding this dynamic relationship between climate and pathogen composition will be crucial in anticipating and mitigating the evolving risks posed by infectious diseases, as Kosovo continues to warm.

118 Ibid.
119 Philipsborn R, Ahmed SM, Brosi BJ, Levy K. Climatic Drivers of Diarrheagenic Escherichia coli Incidence: A Systematic Review and Meta-analysis. J Infect Dis. 2016 Jul 1;214(1):6-15. doi: 10.1093/infdis/jiw081. Epub 2016 Feb 29. PMID: 26931446; PMCID: PMC4907410
120 Britton E, Hales S, Venugopal K, Baker MG. The impact of climate variability and change on cryptosporidiosis and giardiasis rates in New Zealand. J Water Health. 2010 Sep;8(3):561-71. doi: 10.2166/wh.2010.049. Epub 2010 Mar 9. PMID: 20375485
121 Azage M, Kumie A, Worku A, C Bagtzoglou A, Anagnostou E. Effect of climatic variability on childhood diarrhoea and its high risk periods in northwestern parts of Ethiopia. PLoS One. 2017 Oct 26;12(10):e0186933. doi: 10.1371/journal.pone.0186933. PMID: 29073259; PMCID: PMC5658103
122 Global Handwashing Partnership (2022) Health https://globalhandwashing.org/about-handwashing/why-handwashing/health/

Eighteen-month-old Kenan who lives with his mother Sabina 24 in Plemetin © UNICEF/UNI552862/Karahoda

Child protection impacts

Finally, evidence from other countries shows a clear link between climate change, drought, and poverty, which together heighten protection risks for children. For example, a loss of rural livelihoods due to hotter, dryer climates has been linked to both early marriage and child labour, in the hope that it will provide improved financial security for the family.[123][124] Around 9% of girls are married before the age of 18 in Kosovo and around 9% of children are engaged in the worst forms of child labour.[125] Additionally, around 72% of children in Kosovo face violent discipline at home - a phenomena that has been closely linked to climate change, drought and an associated increase in parental emotional distress and household poverty.[126][127][128]

123 UNFPA (2021) Child Marriage and Environmental Crises: An Evidence Brief https://esaro.unfpa.org/sites/default/files/pub-pdf/child_marriage_and_environmental_crises_an_evidence_brief_final.pdf

124 ILO (2023) Climate change profoundly affects child labour, ILO research findshttps://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_905673/lang--en/index.htm#:~:text=The%20damage%20caused%20by%20climate,child%20labour%2C%20the%20paper%20says.

125 Kosovo Agency of Statistics (2020) Multiple Indicator Cluster Survey (MICS) https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey

126 UN (2022) The climate crisis and violence against children https://violenceagainstchildren.un.org/sites/violenceagainstchildren.un.org/files/the-climate-crisis-and-violence-against-children.pdf

127 Sanz-Barbero B, Linares C, Vives-Cases C, González JL, López-Ossorio JJ, Díaz J. Heat wave and the risk of intimate partner violence. Sci Total Environ. 2018 Dec 10;644:413-419. doi: 10.1016/j.scitotenv.2018.06.368. Epub 2018 Jul 6. PMID: 29981991

128

3.3 Other natural disasters

3.3.1 Wildfires

a. Observed trends and future projections

Wildfires outbreaks remain a growing concern for Kosovo, particularly affecting regions like Mitrovica and Prizren, where high temperatures, prolonged droughts, and human activities have made forests more vulnerable to fire *(Table.3).*[129] The majority of wildfires are caused by human activities, such as negligence during agricultural land clearing, while abiotic causes like lightning are rare.[130] These fires have however led to the loss of 13% of Kosovo's tree cover between 2001 and 2023, further exacerbating forest loss and land degradation in Kosovo (see *3.4.2 Land and water degradation*)[131]

The frequency of landscape fires in Kosovo has increased since 2007.[132] Between 2000 and 2022, a total of 2,318 forest fires were recorded, burning an area of 34,992 hectares. In 2022, 476 cases of forest fires were reported across Kosovo, affecting 1,597 hectares of public and private forests, with human activity causing 99% of these fires.[133]

Table.3 Number of forest fires by region (2021)[134]

Regions	Num.of cases	Area (ha)		Total (ha)
		Public	Private	
[illegible]	20	12	39	131
Mitrovica	9	1,777	367	2,183
Peja	2	5	0	5
Prizren	37	91	116	208
Ferizaj	9	83	2	84
Gjilan	10	61	24	85
Total	87	2,080	573	2,653

Looking ahead, the frequency and intensity of wildfires in Kosovo are expected to increase due to ongoing climate change, which will lead to rising temperatures and more frequent droughts. The pattern of forest damage caused by fires, storms, and insect outbreaks may continue to shift, exacerbating ecological, social, and economic challenges. Human-induced factors, such as agricultural practices and the expansion of settlements, will however likely remain primary causes of wildfires unless more effective fire management and public awareness strategies are implemented.

129 Ministry of Agriculture, Forestry and Rural Development (2022) Green Report 2022 https://www.mbpzhr-ks.net/repository/docs/Kosovo__Green_Report_2022.pdf
130 Ministry of Agriculture, Forestry and Rural Development (2023) Landscape Fire Management Report for Kosovo https://www.lfmwb.net/wp-content/uploads/2024/05/Kosovo.pdf
131 Global Forest Watch (2024) Kosovo: Fire https://www.globalforestwatch.org/dashboards/country/XKO/?category=-fires
132 Ibid.
133 Ibid.
134 Ministry of Agriculture, Forestry and Rural Development (2022) Green Report 2022 https://www.mbpzhr-ks.net/repository/docs/Kosovo__Green_Report_2022.pdf

b. The impacts on children

Health impacts

Wildfires pose a serious and growing threat to children in Kosovo, with profound implications for their health and safety. The smoke from wildfires contains fine particulate matter (PM2.5), which is particularly harmful to young children's respiratory systems, being up to 10 times more damaging than PM2.5 from other sources.[135] Children under the age of five are especially vulnerable, as their developing lungs are more susceptible to the toxins present in the smoke. Exposure to wildfire smoke has been extensively linked to a range of health issues, including an increase in asthma, poor lung function, and even mental health disorders.[136] Prenatal exposure to wildfire smoke further compounds these risks, as pregnant women exposed to smoke have higher rates of low birthweight, premature birth, and stillbirth.[137]

Moreover, wildfires increase the risk of burns, injuries, and even fatalities among children, particularly in rural areas where access to emergency services, particularly post-disaster, may be limited. Children's natural curiosity and limited ability to recognize danger make them more prone to accidents during such events.

Mental health impacts

The consequences of wildfires extend beyond immediate health risks, as they also cause significant disruption to children's daily lives. Wildfires can destroy homes and personal belongings, leading to displacement and trauma.

This displacement can then often result in overcrowded living conditions, which further increase the risk of disease transmission and psychological stress. Children are particularly affected by the loss of learning and recreational opportunities; the destruction of schools, educational materials, and green spaces reduces their access to safe environments for play, exercise, and social interaction, all of which are vital for their physical and mental well-being. The trauma of losing one's home or community can also lead to enduring emotional and psychological challenges, compounding the damage caused by physical health impacts.[138]

3.3.2 Earthquakes

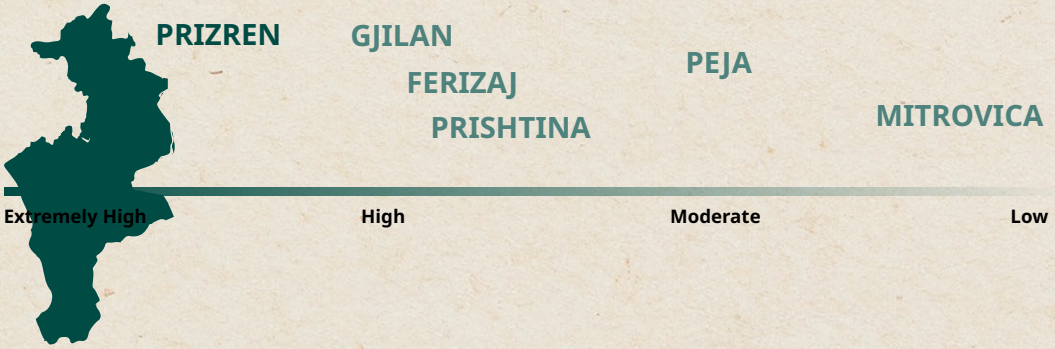
a. Observed trends and future projections

Kosovo is located in a seismically active region, positioned within the Alpine-Mediterranean seismic belt, which is one of the world's most earthquake-prone areas. This belt extends from the Azores through the Mediterranean basin to the eastern edges of Eurasia, marking the complex and dynamic contact zone between the African and Eurasian lithospheric plates. Kosovo's seismic activity is part of this broader tectonic context, which has historically been associated with significant earthquakes.[139]

135 UNICEF (2024) Safe from Wildfire Smoke. https://www.unicef.org/media/156676/file/safe-from-wildfire-smoke.pdf
136 Ibid.
137 UNICEF (2024) Safe from Wildfire Smoke https://www.unicef.org/documents/safe-from-wildfire-smoke
138 UNICEF (2024) Safe from Wildfire Smoke https://www.unicef.org/documents/safe-from-wildfire-smoke
139 Earthquake Track (2024) Kosovo https://earthquaketrack.com/p/kosovo/recent?mag_filter=6

Gjakovë and Prizren both lie near tectonic fault lines, making them particularly vulnerable to earthquakes *(Fig.6).* Additionally, Mitrovica, in the northern part of Kosovo, also has a history of seismic events, especially in the North-East region. Gjilan, located in the eastern part of Kosovo, is susceptible to earthquakes due to its complex tectonic structure.

Fig.6 Annual average affected GDP risk of earthquakes in Kosovo140



One of the most devastating earthquakes since 1900 occurred in 1911, with its epicentre in Ohrid, a region now within North Macedonia. This same region was struck again in 1963 by an earthquake that resulted in over 1,000 fatalities. While Kosovo itself has not experienced an earthquake of that magnitude since, it has seen several minor earthquakes, particularly in its southwestern regions, which are closest to active fault lines. These minor earthquakes have caused varying degrees of infrastructure damage, underscoring the ongoing seismic risk in the area.

The last significant earthquake in Kosovo struck the Gjilani region on April 24, 2002, with a magnitude of 5.1 on the Richter scale. This earthquake caused significant infrastructure damage, resulted in one fatality, and left numerous people injured, highlighting the serious risks that even moderate seismic events pose to Kosovo.[141]

Future projections indicate that these regions will continue to face significant seismic risks due to their geological settings and proximity to active fault lines. As such, enhancing preparedness and bolstering infrastructure resilience in these areas are crucial steps in mitigating the potential impact of future earthquakes on Kosovo's children.

140 GFDRR (2017) Kosovo Disaster Risk Profile https://www.gfdrr.org/en/publication/disaster-risk-profile-kosovo
141 Zeri (2019) 'Pamje të rralla nga tërmeti i vitit 2002 në Gjilan; https://zeri.info/aktuale/309135/pamje-te-rralla-nga-termeti-i-vitit-2002-ne-gjilan/

Earthquakes can lead to the disruption of essential services for children, including healthcare and education, with implications for their health and wellbeing © UNICEF/UNI552862/Karahoda

b. The impacts on children

Physical impacts

In Kosovo, earthquakes pose a substantial risk to children due to Kosovo's location in a seismically active region and the inadequate resilience of its infrastructure, including schools and healthcare facilities. Families living in poorly constructed homes and urban areas, face the greatest vulnerability to future, strong earthquakes. During a strong earthquake, the structural weaknesses of buildings can lead to collapses, resulting in injuries or fatalities among children.

The disruption of essential services, such as medical care, is another critical concern. In the aftermath of an earthquake, hospitals and clinics may be damaged or overwhelmed, limiting the availability of urgent care for injured children and potentially leading to long-term health complications or even fatalities.

Mental health impacts

In addition to these physical dangers, the psychological impacts on children who experience earthquakes can be severe and enduring. The trauma of surviving an earthquake, witnessing destruction, or losing loved ones can lead to significant stress, anxiety, and Post-traumatic Stress Disorder (PTSD). Such psychological effects can adversely affect a child's emotional well-being, cognitive development, and academic performance, as well as their ability to feel safe in their daily lives, especially with the constant fear of future earthquakes.

3.4 Other Forms of Environmental degradation

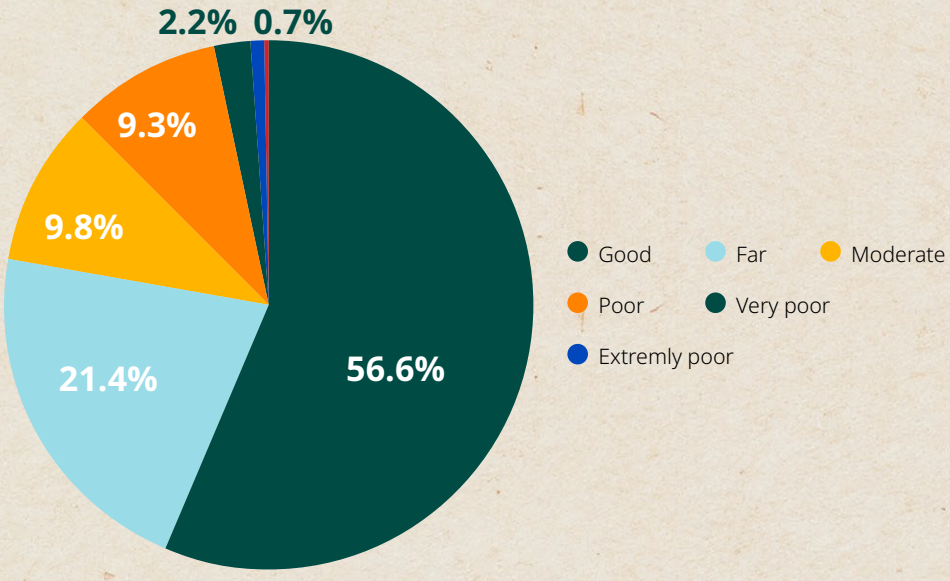
3.4.1 Air pollution and a lack of clean energy access

a. Observed trends and future projections

Kosovo's air quality is among the worst in Europe, where pollutants frequently exceed levels deemed safe for children by the World Health Organization (WHO) *(Fig.7).* Urban centres such as Pristina, Obiliq, Mitrovica, and Drenasi are the worst affected.

Key sources of pollution in Kosovo include emissions from coal-fired power plants, industrial sites, old mining facilities, vehicle emissions, and the burning of biomass and solid fuels like wood and coal in households.[142] These emissions lead to a multitude of harmful pollutants - all of which impact children's health and wellbeing *(Table.3).*

Fig.7 Average annual air quality across Kosovo143



Particulate matter, in particular fine particulate matter (PM2.5), is widely recognized as the most dangerous pollutant for children due to its ability to penetrate deep into the lungs and enter the bloodstream. Average annual levels of both PM2.5 and 10 have been found to exceed the recommended guidelines in most regions of Kosovo *(Fig.8)*. The majority of PM2.5 emissions originate from industrial activities and vehicle exhaust, posing a significant health risk to the youngest and most vulnerable populations.

142 USAID (2017) Climate Change Risk Profile https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf
143 Kosovo Hydrometeorological Institute (2024) Air Quality Portal https://airqualitykosova.rks-gov.net/en

Fig.8 Annual average Particulate Matter (2.5 and 10) concentrations in Kosovo (2023)144

Table.3 Key sources of air pollution that are harmful to children in Kosovo[145][146][147]

Air Pollutant	Key Sources	Impacts on Children
Particulate Matter (PM10 and PM2.5)	Industrial activities, vehicle emissions, construction sites, unpaved roads, burning of coal and wood for cooking/heating, fires and chemical reactions	Acute Respiratory Infections (ARIs), reduced lung function, aggravated allergies, ear infections, eczema and impaired cognitive development
Carbon Monoxide (CO)	Vehicle emissions, leaking chimneys, furnaces, gas stoves and the burning of waste and biomass	Impaired oxygen delivery to tissues, reduced brain and organ function, headaches, dizziness, developmental delays, and, in severe cases, death
Ozone (O3)	Vehicle emissions, industrial emissions and chemical reactions in the atmosphere	Decreased lung function, increased frequency of asthma attacks, respiratory infections, and increased hospital admissions for respiratory issues.
Nitrogen Oxides (NO_2)	Vehicle emissions, energy production, agriculture, industrial processes and human waste	Increased risk of asthma, wheezing, reduced lung function, respiratory infections, and exacerbation of pre-existing respiratory conditions
Formaldehyde (H2CO)	Industrial processes, building materials, tobacco smoke and household products	Causes irritation of the eyes, nose, and throat, aggravates asthma, increases the risk of respiratory issues, and may contribute to cancer with long-term exposure.
Benzene	Vehicle emissions, industrial activities, tobacco smoke, household products, paints and unvented gas appliances.	Increased risk of leukaemia, developmental and reproductive toxicity, dizziness, headaches, and long-term damage to the immune system.
Benzo(a) pyrene (BaP)	Vehicle emissions, industrial processes, cigarette smoke and wood burning	Known carcinogen, linked to increased risk of cancer, respiratory issues, and developmental toxicity, with potential impacts on lung function.
Heavy Metals	Industrial emissions, mining activities, lead-based paints and contaminated water and soil	Impaired cognitive development, lower IQ, attention disorders, behavioural issues, learning disabilities, and neurological damage.

144 National Institute of Public Health (2024) Air Quality in Kosovo https://ajri.niph-rks.org/
145 National Institute of Public Health (2024) Air Quality in Kosovo https://ajri.niph-rks.org/
146 Ukëhaxhaj, A.; Ramadani, N.; Moshammer, H.; Zogaj, D. Sources of Indoor Air Pollution in Schools in Kosovo. Buildings 2023, 13, 668. https://doi.org/10.3390/ buildings13030668
147 UNICEF (2024) Breathless Beginnings. https://www.unicef.org/eca/reports/breathless-beginnings-2024

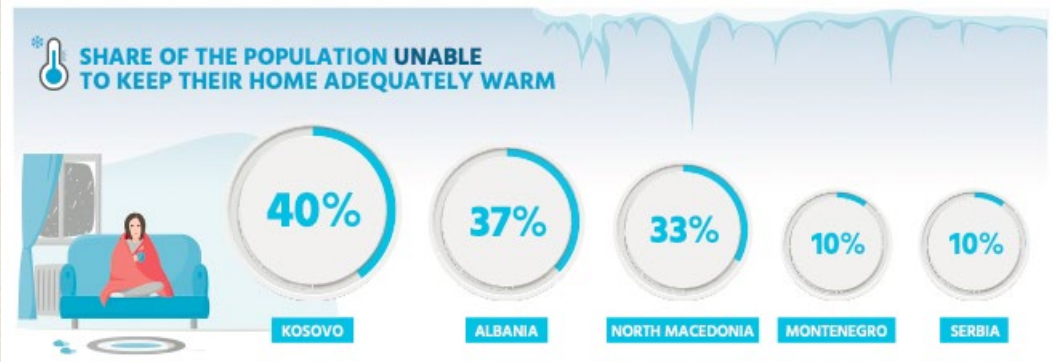
Sulphur Dioxide (SO_2)	Fossil fuel combustion (coal and oil), industrial processes and motor vehicles	Irritation of the respiratory system, worsening asthma symptoms, increased respiratory infections, and eye irritation.
Volatile Organic Compounds (VOCs)	Motor vehicles, industrial processes and household products (paints, solvents)	Causes eye, nose, and throat irritation, headaches, nausea, dizziness, and in long-term exposure, may contribute to liver, kidney, or central nervous system damage, along with developmental harm.

Children are particularly vulnerable, as their developing respiratory and immune systems are more sensitive to airborne irritants and allergens. Children in Pristina, Obiliq, Mitrovica, and Hani i Elezit, where outdoor (ambient) pollution levels frequently exceed WHO safety recommendations, face some of the greatest risks.[148] Children living close to power stations and industrial activity face some of the greatest exposures to these pollutants.

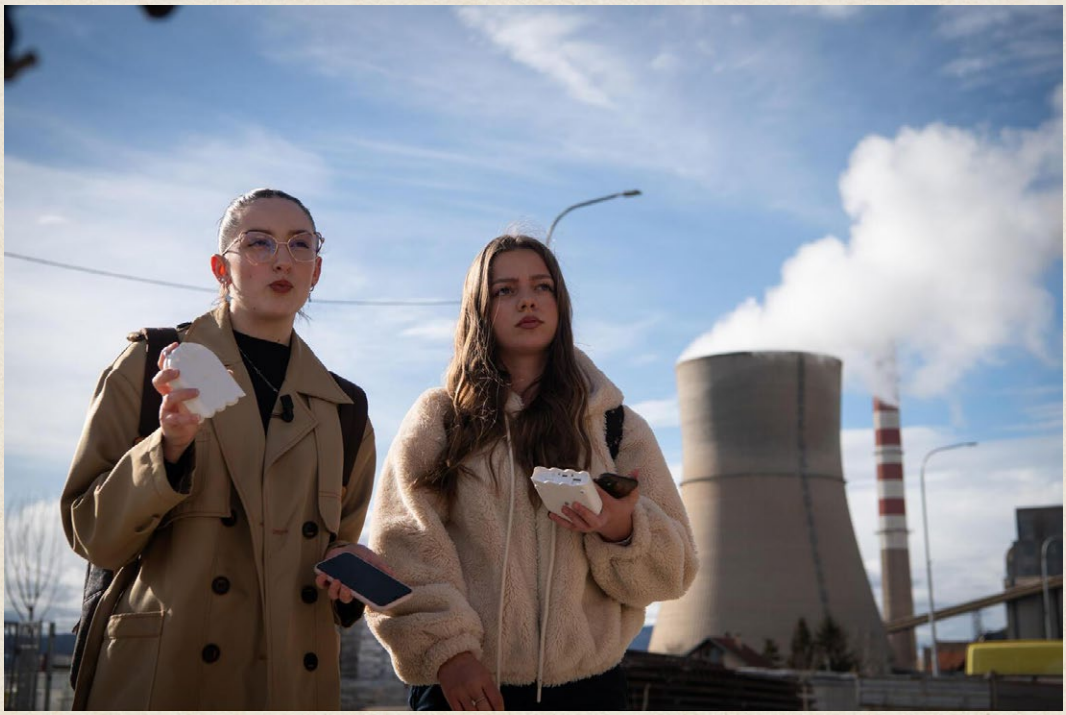
In Kosovo, air pollution is not only an outdoor issue; indoor pollution poses significant health risks for children also. Despite 100 percent of households now reportedly having access to electricity at home, just 20 percent of homes use clean fuels for cooking, heating, and lighting - and 40% struggle to keep their homes warm in the winter *(Fig.9).*[149] As such, more than 60 percent of the population still burn biomass to warm their homes in winter, a practice which is also fueling deforestation and the demand for coal *(Fig.10).*[150] The reliance on polluting sources is largely driven by the higher costs associated with cleaner options like gas or electricity, making it difficult for many households to afford these alternatives, particularly during the cold winter months. Children living in the Gjakova region and rural households have some of the worst rates of respiratory illness due to indoor air pollution.[151]

Despite recent investments aimed at upgrading energy infrastructure, Kosovo's air quality outlook remains concerning, with projections indicating that pollution levels could worsen without substantial additional investment.

Fig.9 Share of the population in Western Balkans unable to keep their home adequately warm in winter[152]



148 Kosovo National Institute of Public Health (2023) Raporti CAB. https://niph-rks.org/wp-content/uploads/2023/06/RaportiCAB.pdf
149 World Bank (2024) Access to electricity (% of population) - Kosovo https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=XK
150 Ibid.
151 Kosovo National Institute of Public Health (2023) Raporti CAB. https://niph-rks.org/wp-content/uploads/2023/06/RaportiCAB.pdf
152 Ibid.



Kosovo's air quality is among the worst in Europe, where pollutants frequently exceed levels deemed safe for children © UNICEF/UNI552863/Karahoda

Fig.10 Percent of households using biomass for heating in the Western Balkans[153]

The continued heavy reliance on coal, which accounts for 95% of Kosovo's electricity generation, and the widespread use of solid fuels for heating, suggests that emissions of harmful pollutants like $PM_{2.5}$, NO2, and SO2 will remain persistently high in the future. This issue is compounded by the rising rate of mo-

153 Health and Environment Alliance (HEAL). (2022). ***Biomass: A burning issue for health and climate***. https://www.env-health.org/wp-content/uploads/2022/01/Biomass_brief_EN.pdf

torization, which grew by 80% between 2010 and 2020, and the steady annual increase of 4.4% in road traffic emissions, both of which are expected to further deteriorate air quality, especially in urban areas.[154]

Fig.11 Solar power potential in Kosovo[155]

Fig.12 Wind energy potential in Kosovo[156]

To address these challenges, Kosovo must urgently shift towards renewable energy sources, such as solar, and wind, which are highly viable given Kosovo's abundant water resources, high levels of sunlight, and favourable wind conditions in certain regions *(Figs 11 and 12).* The electrification of the transport industry, including public and private vehicles, will also be a critical step in reducing Kosovo's emissions and cleaning the air for children.

b. The impacts on children

Health impacts

Fine particulate matter (PM2.5), a particularly dangerous air pollutant for children in Kosovo, where it is responsible for over three-quarters of the years of healthy life lost due to premature mortality and disability from environmental risks, more than any other environmental factor.[157]

In Kosovo, around 99% of children are frequently exposed to air pollution levels that exceed the World Health Organization (WHO) recommendations of 25µg/m3**, making it the largest environmental health risk for children in Kosovo.**[158][159][160] Approximately 17% of total infant deaths in five Western Balkan countries in 2021 were linked to air pollution, a rate more than double the European Union average.[161]

In Kosovo, daily PM2.5 levels have been reported to reach up to 367µg/m3**,**

154 IMF (2023) Republic of Kosovo: Request for Stand-By Arrangement and an Arrangement Under the Resilience and Sustainability Facility https://www.elibrary.imf.org/view/journals/002/2023/200/article-A002-en.xml#:~:text=In%20Kosovo%2C%20this%20could%20lead,or%20water%2Dscarce%20by%202050

155 Solargis (2021) Solar resource map Kosovo https://solargis.com/resources/free-maps-and-gis-data?locality=kosovo

156 Global Wind Atlas (2024) Kosovo https://globalwindatlas.info/en/area/Kosovo

157 National Institute of Public Health (2024) Air Quality in Kosovo https://ajri.niph-rks.org/

158 IMF (2023) Republic of Kosovo: Request for Stand-By Arrangement and an Arrangement Under the Resilience and Sustainability Facility https://www.elibrary.imf.org/view/journals/002/2023/200/article-A002-en.xml#:~:text=In%20Kosovo%2C%20this%20could%20lead,or%20water%2Dscarce%20by%202050

159 Ibid.

160 The WHO guidelines state that annual average concentrations of PM2.5 should not exceed 5 µg/m3, while 24-hour average exposures should not exceed 15 µg/m3 more than 3 - 4 days per year. World Health Organization (2021) WHO Global Air Quality Guidelines: Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide. https://www.who.int/publications/i/item/9789240034228

161 Institute for Health Metrics and Evaluation (IHME). (2021). ***Global Burden of Disease Study 2021 (GBD 2021) Air Pollution Exposure Estimates 1990-2021***. University of Washington. https://ghdx.healthdata.org/record/ihme-data/gbd-2021-air-pollution-exposure-estimates-1990-2021

Children with pre-existing conditions such as asthma, allergies and chronic respiratory conditions, including Cystic Fibrosis are highly vulnerable to both indoor and outdoor air pollution ©UNICEF/UNI552860/Karahod

more than 25 times the levels deemed safe for children.[162][163] Research has shown that for each 10 µg/m3 increment in PM2.5, the risk of under-5 mortality increases by up to 10%.[164] This means that the risk of under-5 mortality could be up to 300% higher than in areas where PM2.5 levels meet the WHO guidelines..

Children are especially vulnerable due to high ambient concentrations of PM2.5, which can penetrate deep into the lungs and enter the bloodstream, exacerbating conditions such as asthma, allergies, and chronic respiratory diseases, including cystic fibrosis.[165][166] In Kosovo, air pollution has been closely linked to Lower Respiratory Infections (LRIs) in children, contributing to increased hospitalizations, long-term health complications and death.[167][168] Additionally, this pollution increases the prevalence and severity of allergic reactions, such as asthma, rhinitis, and skin conditions.[169]

162 The WHO guidelines state that annual average concentrations of PM2.5 should not exceed 5 µg/m3, while 24-hour average exposures should not exceed 15 µg/m3 more than 3 - 4 days per year. World Health Organization (2021) WHO Global Air Quality Guidelines: Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide. https://www.who.int/publications/i/item/9789240034228

163 Health and Environment Alliance (2021). Air Quality and Health in Pristina: City Briefing. https://www.env-health.org/wp-content/uploads/2021/12/AQ_City_briefings_Pristina.pdf

164 Pengfei Li, Jingyi Wu, Ruohan Wang, Hengyi Liu, Tong Zhu, Tao Xue (2023) Source sectors underlying PM2.5-related deaths among children under 5 years of age in 17 low- and middle-income countries, Environment International, Volume 172, 2023, 107756, ISSN 0160-4120, https://doi.org/10.1016/j.envint.2023.107756

165 UNICEF (2022) How poor air quality is triggering poor health from birth in Kosovo's most polluted areas. https://www.unicef.org/kosovoprogramme/stories/how-poor-air-quality-triggering-poor-health-birth-kosovos-most-pollute

166 UNICEF (2024) Breathless Beginnings. https://www.unicef.org/eca/reports/breathless-beginnings-2024

167 Kallxo (2018) Këshillat e mjekut: Ndikimi i ajrit të ndotur te gratë shtatzëna https://kallxo.com/ndryshe/keshillat-e-mjekut-ndikimi-i-ajrit-te-ndotur-te-grate-shtatezena/

168 Shabani Isenaj Z, Berisha M, Gjorgjev D, Dimovska M, Moshammer H, Ukëhaxhaj A. Air Pollution in Kosovo: Short Term Effects on Hospital Visits of Children Due to Respiratory Health Diagnoses. Int J Environ Res Public Health. 2022 Aug 16;19(16):10141. doi: 10.3390/ijerph191610141. PMID: 36011773; PMCID: PMC9407926.

169 Kallxo (2018) Këshillat e mjekut: Ndikimi i ajrit të ndotur te gratë shtatzëna https://kallxo.com/ndryshe/keshillat-e-mjekut-ndikimi-i-ajrit-te-ndotur-te-grate-shtatezena/

Exposure to PM2.5, nitrogen dioxide and sulphate has additionally been linked to stunting among children.[170][171] This also has major implications for the long-term health and cognitive development of children.

Air pollution is also reportedly increasing the risk of miscarriage, premature birth, impaired foetal development and low birth weights among infants in Kosovo.[172][173][174] This leads to a multitude of long-term health impacts for children, including developmental delays and reduced earnings later in life.[175] Low birth weights have also been linked to extreme temperatures, further compounding the impacts of air pollution on children.[176] This is because air pollution traps heat, making temperatures more extreme and dangerous for children (see *3.2.1 Rising temperatures*).

Additionally, extreme air pollution may affect lung development of babies, while in the womb.[177] This also occurs indirectly when preterm labour causes a baby whose lungs are not fully functional to be born. Research has found that death tolls are three times higher on hot days that also have high levels of fine particulate air pollution (PM2.5).[178]

Furthermore, indoor air pollution, exacerbated by inadequate ventilation in schools, also poses serious health risks, with higher levels of formaldehyde found indoors compared to outdoor levels, particularly in newer school buildings.[179] A study conducted by the National Institute of Public Health and the WHO, which sampled chemical pollutants in and around ten schools in Kosovo, found excessively high concentrations of benzene and nitrogen dioxide (NO_2) in several locations.[180] Children's exposure to these pollutants can cause respiratory issues, immune system damage, increased cancer risk, and developmental and neurological problems *(Table.3).*

Unsafe levels of carbon monoxide in the home have also been reported in winter as a result of unsafe indoor heating facilities.[181] Carbon monoxide poisoning has been linked to memory loss, impaired motor skills and heart and lung problems, and even death among children.[182]

170 Amegbor, P.M., Sabel, C.E., Mortensen, L.H. et al. Early-life air pollution and green space exposures as determinants of stunting among children under age five in Sub-Saharan Africa. J Expo Sci Environ Epidemiol (2023). https://doi.org/10.1038/s41370-023-00572-8

171 UNICEF (2024) Breathless Beginnings. https://www.unicef.org/eca/reports/breathless-beginnings-2024

172 Kallxo (2018) Këshillat e mjekut: Ndikimi i ajrit të ndotur te gratë shtatzëna https://kallxo.com/ndryshe/keshillat-e-mjekut-ndikimi-i-ajrit-te-ndotur-te-grate-shtatezena/

173 UNICEF (2019) Clean the air for children https://www.unicef.org/sites/default/files/2019-02/Clear_the_Air_for_Children_Executive_summary_ENG.pdf

174 American Lung Association (2023) Health Risks of Air Pollution. https://www.lung.org/research/sota/health-risks.

175 American Academy of Pediatrics (2021) Ambient Air Pollution: Health Hazards to Children. Pediatrics 147 (6): e2021051484. https://doi.org/10.1542/peds.2021-051484

176 Chersich MF, Pham MD, Areal A, Haghighi MM, Manyuchi A, Swift CP, Wernecke B, Robinson M, Hetem R, Boeckmann M, Hajat S; Climate Change and Heat-Health Study Group. Associations between high temperatures in pregnancy and risk of preterm birth, low birth weight, and stillbirths: systematic review and meta-analysis. BMJ. 2020 Nov 4;371:m3811. doi: 10.1136/bmj.m3811. PMID: 33148618; PMCID: PMC7610201.

177 Rani P, Dhok A. Effects of Pollution on Pregnancy and Infants. Cureus. 2023 Jan 18;15(1):e33906. doi: 10.7759/cureus.33906. PMID: 36819435; PMCID: PMC9937639

178 UNDRR (2022) Heat waves + air pollution can be a deadly combination: The health risk together is worse than either alone https://www.preventionweb.net/news/heat-waves-air-pollution-can-be-deadly-combination-health-risk-together-worse-either-alone

179 Ukëhaxhaj, A.; Ramadani, N.; Moshammer, H.; Zogaj, D. Sources of Indoor Air Pollution in Schools in Kosovo. Buildings 2023, 13, 668. https://doi.org/10.3390/ buildings13030668

180 Ibid.

181 Ibid.

182 Medscape (2022) Paediatric Carbon Monoxide Toxicity https://emedicine.medscape.com/article/1009092-overview?form=fpf

Nexhare, 34, and her husband live next to Power Plant A, in Plemetin (Obiliq), with their five children for the past 10 years pointing out that this is making them sick ©UNICEF/UNI552860/Karahoda

In Kosovo, indoor air pollution means that a significant number of children experience eye, nose and throat allergies during the autumn and winter months, when they spend more time indoors.[183] This is in contrast to other European countries, where most child allergy cases tend to peak in the spring and summer months. Respiratory and cardiovascular diseases also peak during these months, due to the time spent indoors and the use of non-clean energy sources in the home.[184]

The lack of access to clean energy for cooking and heating in Kosovo's rural areas poses a significant risk of burn injuries to children, especially those under the age of five. The incidence of burn injuries in Kosovo is notably high, exceeding rates seen in most other European countries.[185] In Kosovo, children, particularly boys, are among the most vulnerable, with burns often resulting in trauma, depression and life-long impacts. Over half of burn injuries (53%) in children are due to scalding from steam, a reflection of the continued reliance on dangerous, traditional methods for boiling water and heating, particularly in Kosovo's rural areas.[186] While improvements in electricity access and cleaner cooking methods have reduced the number of burn injuries in the past decade, many rural households still use unsafe oil and gas appliances. These practices, combined with persistent power shortages, especially in rural areas, increase the risk of burns, putting children from the poorest households at the greatest risk.

183 Kosovo National Institute of Public Health (2023) Raporti CAB. https://niph-rks.org/wp-content/uploads/2023/06/RaportiCAB.pdf
184 Ibid.
185 Duci SB, Bektashi EM, Zatriqi VK, Buja ZA, Hoxha ET, Rrusta DA. Pediatric Burns in University Clinical Centre of Kosovo From 2011-2015. Ann Burns Fire Disasters. 2024 Mar 31;37(1):17-22. PMID: 38680835; PMCID: PMC11042038
186 Zejnë Buja, Enver Hoxha (2018) Burns in Kosovo: Epidemiological and therapeutic aspects of burns treated in University Clinical Center of Kosovo during the period 2003–2012, Burns Open, Volume 2, Issue 1, 2018, Pages 66-70, ISSN 2468-9122, https://doi.org/10.1016/j.burnso.2017.11.004

Education impacts

Air pollution, including PM2.5, NO2 and ozone, pose a significant threat to children's cognitive development in Kosovo. Research has shown these pollutants impair cognitive functions, affecting children's memory, attention, and overall academic performance.[187]

Research from Europe demonstrates that for every increase of 5 µg/m³ in PM2.5, there is a corresponding one-point decrease in Grade Point Average (GPA).[188][189] In Kosovo, daily PM2.5 levels can reach up to 367 µg/m, 25 times the limit deemed safe for children. This could potentially decrease children's GPA by approximately 68 points.

Children in Kosovo who are exposed to high levels of pollution face not only immediate learning difficulties but also long-term disadvantages in terms of employability, economic potential, and health outcomes, perpetuating cycles of poverty.

187 Lu W, Hackman DA, Schwartz J. Ambient air pollution associated with lower academic achievement among US children: A nationwide panel study of school districts. Environ Epidemiol. 2021 Nov 3;5(6):e174. doi: 10.1097/EE9.0000000000000174. Erratum in: Environ Epidemiol. 2022 Feb 25;6(2):e202. doi: 10.1097/EE9.0000000000000202. PMID: 34909554; PMCID: PMC8663889

188 Youn-Hee Lim, Josephine Funck Bilsteen, Laust Hvas Mortensen, Linnea Ranja Mignon Lanzky, Jiawei Zhang, Stéphane Tuffier, Jørgen Brandt, Matthias Ketzel, Trine Flensborg-Madsen, Cathrine Lawaetz Wimmelmann, Gunhild Tidemann Okholm, Emilie Rune Hegelund, George Maria Napolitano, Zorana Jovanovic Andersen, Steffen Loft, Lifetime exposure to air pollution and academic achievement: A nationwide cohort study in Denmark, Environment International, Volume 185, 2024, 108500, ISSN 0160-4120, https://doi.org/10.1016/j.envint.2024.108500

189 The WHO guidelines state that annual average concentrations of PM2.5 should not exceed 5 µg/m3, while 24-hour average exposures should not exceed 15 µg/m3 more than 3 - 4 days per year. World Health Organization (2021) WHO Global Air Quality Guidelines: Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide. https://www.who.int/publications/i/item/9789240034228

3.4.2 Land degradation

a. Observed trends and future projections

i. An overview

In Kosovo, land degradation has intensified over the past several decades due to a combination of industrial activities, inadequate waste management, and unsustainable agricultural practices. All of these pose severe risks to both environmental and child health.

Table.4 Some of the industrial hotspots with impacts on land pollution[190]

Industrial hot spots	Area covered
Industrial Park in Mitrovica	115.1 ha
Industrial Park in Zvecan	62.3 ha
Industrial landfill in Kelmend- Mitrovica	24 ha
Industrial landfill in Cikatova- Drenas	24 ha
Industrial landfill in Leposavic	20 ha
Ash landfill PP Kosovo A	182 ha
Ash landfill PP Kosovo B	183 ha
Phenol reservoirs	178 ha
Total area covered	**673.3 ha**

The most degraded land and water in Kosovo is primarily found in regions affected by extensive industrial activities, mining, and poor land management practices and unsafe landfill sites .

Twenty eight environmental hotspots have been identified in Kosovo *(Table.4)*.[191]

These are the lands and water bodies that are experiencing the most evident and dramatic degradation. Notable areas include Mitrovica, which is heavily impacted by the Trepça mining complex and Obiliq, due to its large number of coal-fired power plants. Additionally, parts of the Kosovo Plain suffer from significant soil degradation due to intensive agricultural practices involving chemical fertilisers and pesticides.[192]

These regions experience various forms of land degradation, including soil contamination, erosion and loss of fertility. **In total, around 23.45% of Kosovo's land surface area experiences high or extremely high levels of erosion and degradation.**[193] The degradation of natural resources undermines essential ecosystem services, such as clean air and water, fertile soil for agriculture, and natural flood regulation, which are critical for the well-being of Kosovo's children.

190 Kosovo Environmental Protection Agency (2012) https://www.ammk-rks.net/assets/cms/uploads/files/Publikime-raporte/raporti_i_hotospoteve_shqip_18122012.pdf
191 Ibid.
192 DP Plus (2023) From Policy to Practice The Challenge of River Pollution and Waste Management in Kosovo https://dplus.org/wp-content/uploads/2023/09/20-09-23_The-Challenge-of-River-Pollution-and-Waste-Management-in-Kosovo.pdf
193 Kosovo Environmental Protection Agency https://www.ammk-rks.net/assets/cms/uploads/files/Publikime-raporte//6._Treguesit_mjedisor_te_tokes_(dheut).pdf

Kosovo's forests are rich in biodiversity, providing a multitude of ecosystem services for the country's children, including clean air and water supply ©ProSilva

These environmental hazards directly impact children's health by increasing their exposure to pollutants, reducing access to clean water and nutritious food, and contributing to a myriad of health problems.

The following subsections provide a detailed analysis of these issues, highlighting the loss of forest cover and challenges with waste management. These trends are expected to continue or worsen without comprehensive intervention and stronger environmental policies to protect children and their environmental services they rely upon for their survival and development.

ii. Loss of forest cover

From 2001 to 2023, Kosovo lost 17.3 thousand hectares of tree cover, equivalent to a loss of more than 3.5 million trees since 2000.[194] In 2023 alone, Kosovo lost 1.41 k ha of natural forest, amounting to approximately 300,000 trees.[195][196] Kosovo's remaining forests face ongoing threats from illegal logging, overuse, and mismanagement, leading to habitat fragmentation and biodiversity loss. Inadequate law enforcement and economic pressures have exacerbated these challenges, with most trees being harvested for construction and firewood.[197][198] Trees are primarily harvested for construction and firewood in Kosovo. This ongoing deforestation threatens not only Kosovo's natural environment but also the well-being of its children, who depend on healthy ecosystems for clean air, water, and food.

194 Global Forest Watch (2024) Deforestation in Kosovo https://www.globalforestwatch.org/dashboards/country/XKO/
195 Global Forest Watch (2024) Deforestation in Kosovo https://www.globalforestwatch.org/dashboards/country/XKO/
196 Calculated based on the premise that typically have 100 to 200 trees per acre
197 Ministry of Agriculture, Forestry and Rural Development (2023) Green Report 2023 https://www.mbpzhr-ks.net/repository/docs/Green_Report_2023.pdf
198 Laze, K (2014) Identifying and understanding the patterns and processes of forest cover change in Albania and Kosovo, European Scientific Journal, https://www.researchgate.net/publication/261171454_Identifying_and_understanding_the_patterns_and_processes_of_forest_cover_change_in_Albania_and_Kosovo

The Balkan Lynx is one of many animal species that remain under threat as a result of habitat degradation and poaching ©Bernard Landgraf

Forests act as natural carbon sinks, helping to mitigate climate change impacts by absorbing carbon dioxide (CO_2). They also play a crucial role in maintaining water quality and preventing soil erosion, which is essential for agriculture and food security. The loss of forest cover exacerbates land degradation, increases the risk of floods and landslides, and reduces local resilience to climate change, all of which directly affect children, especially those in rural communities.

Moreover, forests are rich in biodiversity, providing habitats for countless species that contribute to ecological balance and resilience. Biodiverse ecosystems support a range of services that benefit children, such as pollination for crops, natural pest control, and the maintenance of clean air and water. When biodiversity is lost, these services are diminished, affecting food security, increasing health risks, and reducing opportunities for children to benefit from nature-based recreation and education. Protecting Kosovo's forests and biodiversity is therefore essential not only for safeguarding the environment but also for ensuring the health, safety, and future well-being of its youngest citizens.

Forests also hold cultural significance for the children of Kosovo, playing a vital role in children's cultural heritage and identity. These natural spaces offer children opportunities for outdoor play, learning, and exploration, fostering a sense of belonging and understanding of their environment.

iii. Waste management

Kosovo currently generates approximately 580,000 tonnes of municipal solid waste (MSW) annually, but only 26% of this waste is safely managed.[199] Poor waste disposal practices, including illegal dumping, are widespread, contributing to soil and water contamination and posing serious risks to children's health.

199 DP Plus (2023) From Policy to Practice The Challenge of River Pollution and Waste Management in Kosovo https://dplus.org/wp-content/uploads/2023/09/20-09-23_The-Challenge-of-River-Pollution-and-Waste-Management-in-Kosovo.pdf

A waste transfer station in Gjakova ©Kosovo 2.0

From 2014 to 2018, waste generation per capita in Kosovo more than doubled. Industrial waste has surged even more dramatically, rising by around 500% between 2010 and 2018, further exacerbating the problem.[200] Many regions, including urban centres, suffer from inadequate waste collection and treatment systems.[201]

Low rates of waste separation and inadequate facilities also means that Kosovo recycles just 2.5 percent of recyclable waste - one of the lowest rates in Europe, meaning most recyclable materials end up in landfills or illegal dumpsites.[202] This leads to the leaching of hazardous chemicals into both soil and groundwater, which harms ecosystems and contaminates food and water supplies for children.

More recently, microplastics, a new and emerging concern for children's health, have been found to be prevalent in test sites in Kosovo.[203] Microplastics originate from various sources, including the breakdown of larger plastic debris, microbeads from personal care products, and synthetic fibres from clothing. These plastics then accumulate in both plants and animals, making their way into children's bodies, where proportionally, they accumulate at a greater rate than in adults (Fig.11).[204] Children living close to waste disposal sites, including unprotected landfills and unofficial waste dumps face the greatest exposures to microplastics. Additionally, women and girls are disproportionately affected by plastics due to their greater exposure through cleaning, cosmetics, and hygiene products.[205]

200 Kosovo Environmental Protection Agency https://www.ammk-rks.net/assets/cms/uploads/files/Publikime-raporte//5._Treguesit_e_mbeturinave.pdf

201 Kosovo Environmental Protection Agency. (2019). Municipal waste management report 2019. https://www.ammk-rks.net/assets/cms/uploads/files/Publikime-raporte/Report_municipal_waste_2019_ENG_version.pdf

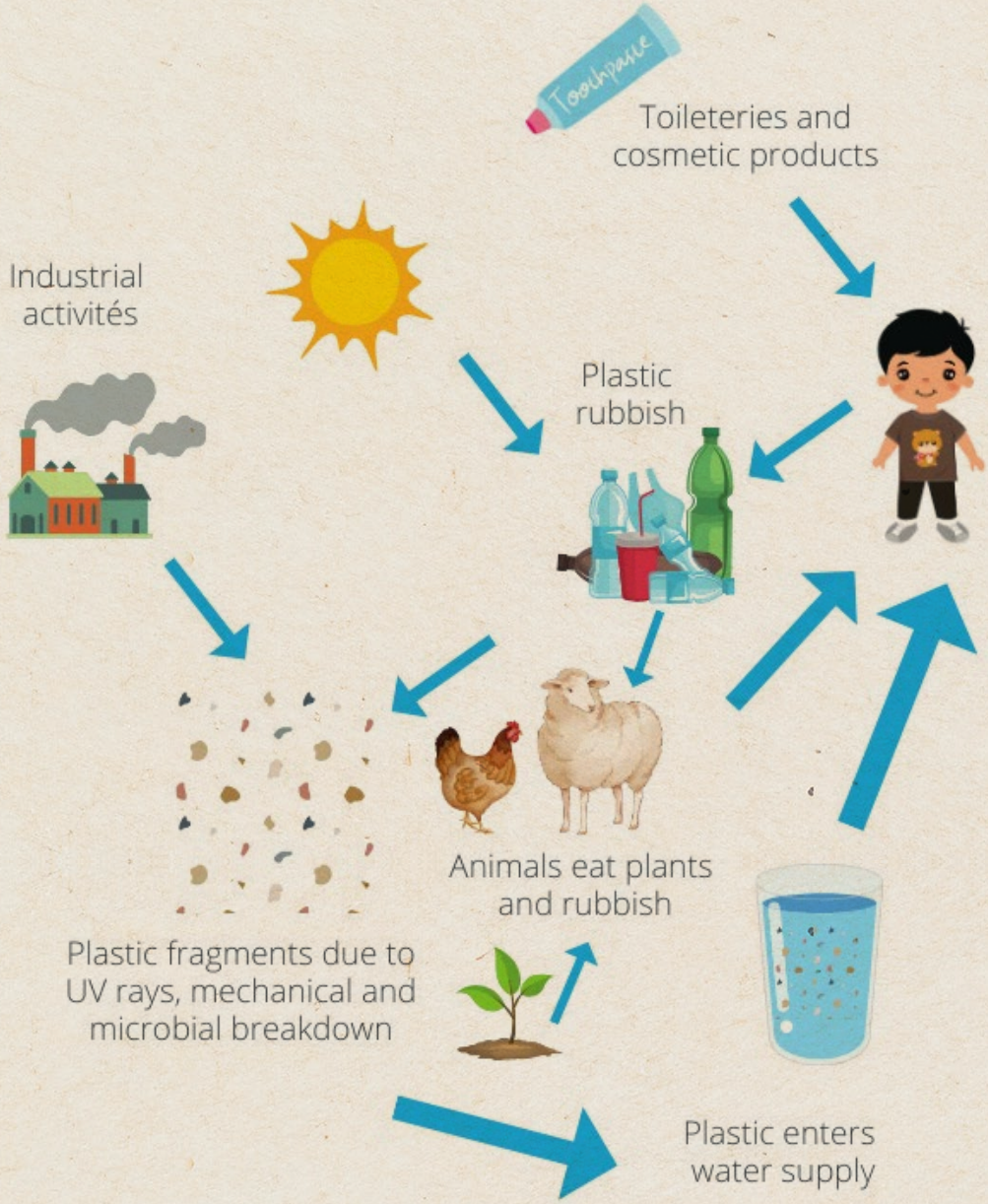
202 Koha Net(2023) Kosovo me së keqi në Evropë për riciklimin e mbeturinave https://www.koha.net/en/arberi/415446/kosova-me-se-keqi-ne-evrope-per-riciklimin-e-mbeturinave

203 Cakaj A, Lisiak-Zielińska M, Drzewiecka K, Budka A, Borowiak K, Drapikowska M, Cakaj A, Qorri E, Szkudlarz P. Potential Impact of Urban Land Use on Microplastic Atmospheric Deposition: A Case Study in Pristina City, Kosovo. ***Sustainability***. 2023; 15(23):16464. https://doi.org/10.3390/su152316464

204 Amran NH, Zaid SSM, Mokhtar MH, Manaf LA, Othman S. Exposure to Microplastics during Early Developmental Stage: Review of Current Evidence. Toxics. 2022 Oct 10;10(10):597. doi: 10.3390/toxics10100597. PMID: 36287877; PMCID: PMC9611505.

205 Yang J, Kamstra J, Legler J, Aardema H. The impact of microplastics on female reproduction and early life. Anim Reprod. 2023 Jul 24;20(2):e20230037. doi: 10.1590/1984-3143-AR2023-0037. PMID: 37547566; PMCID: PMC10399130

Fig.11 The key pathways for microplastic ingestion for children in Kosovo



Without substantial improvements in waste management practices, the situation is only expected to worsen, as the population continues to grow and consumption continues to increase. Improved waste management strategies, including investment in infrastructure, better enforcement of existing regulations, and public education, remain crucial in addressing these issues and protecting the environment.

Promoting a strong connection between children and their natural environment can foster a sense of belonging and cultural pride ©UNICEF 2024

b. The impacts on children

Food security and nutrition impacts

Land degradation in Kosovo, particularly the loss of fertile soils and deforestation, is intensifying rural poverty by depleting the natural resources communities depend on for livelihoods. The degradation of land is directly linked to worsening food and water security issues, with reduced agricultural productivity making it increasingly difficult for rural populations to sustain themselves (see *3.2.3 Drought and water scarcity*).

This vulnerability is further compounded by urbanisation, where the expansion of impermeable asphalt surfaces, such as in Rahovec, has significantly heightened the risk of flooding.[206] These surfaces prevent the absorption of rainwater, causing it to run off into low-lying areas, damaging homes, infrastructure, and agricultural fields (see *3.2.2 Heavy rainfall and flooding*)**.** The resulting floods not only displace children and their families and destroy livelihoods but also lead to repeated crop failures, reduced yields, and further strain on food supplies. This can increase the cost of local food supplies, placing a financial burden on families and increasing the reliance on foreign imports, which are often highly processed, with more sugar, salt and other additives, all of which harm children's health and nutrition.

206 Kosovo 2.0 (2023) Floods are taking Kosovo by surprise https://kosovotwopointzero.com/en/floods-are-taking-kosovo-by-surprise/

The combination of land degradation, increased flooding, and agricultural decline increases the risk of rural poverty in Kosovo. With fewer crops to harvest and sell, rural households face diminishing incomes, placing a heavier financial burden on already vulnerable populations. The knock-on effect is severe, as families struggle to recover from recurring natural disasters, perpetuating the cycle of poverty and food scarcity.

Health impacts

The microplastics, lead, and other toxins leaching into Kosovo's soils can significantly impact children's health, as they make their way into food and water supplies *(see 3.4.3 Water Pollution).* These pollutants tend to accumulate in greater concentrations in children, particularly infants, who are more vulnerable due to their immature immune systems and developing organs. Exposure to such toxins can lead to developmental delays and affect brain and behavioural development.

Mental health impacts

The loss of Kosovo's native flora and fauna, including species such as the Balkan Lynx, wolves and brown bears, represents a significant cultural loss for children and young people, diminishing the rich natural heritage that has been an integral part of Kosovo's identity for generations. This biodiversity loss deprives future generations of the opportunity to learn about and cherish the unique ecosystems that once flourished in their homeland.

Conversely, promoting a strong connection between children and their natural environment can foster a sense of belonging and cultural pride, while also supporting physical health, cognitive development, and emotional well-being.[207] Encouraging outdoor activities and nature-based education can help young people understand the importance of environmental stewardship and empower them to protect and restore natural habitats, ultimately contributing to long-term sustainability and reducing the risk of adolescent psychiatric disorders, such as anxiety and depression.

207 Vanaken GJ, Danckaerts M. Impact of Green Space Exposure on Children's and Adolescents' Mental Health: A Systematic Review. Int J Environ Res Public Health. 2018 Nov 27;15(12):2668. doi: 10.3390/ijerph15122668. PMID: 30486416; PMCID: PMC6313536

The Lepenc River clogged with plastic waste in August 2024 ©RFERL

3.4.3 Water pollution

a. Observed trends and future projections

Water pollution in Kosovo is a significant concern, particularly in regions with heavy industrial activity, inadequate wastewater treatment, and mining operations, leading to a multitude of health impacts for children *(Table.5).* Key areas affected include Mitrovica, where the Trepça mining complex has heavily polluted local water bodies with heavy metals and other industrial pollutants.[208] In Obiliq, coal-fired power plants are also contributing to significant water pollution through industrial discharge and ash disposal, notably affecting the Sitnica River. Pristina faces challenges with water pollution due to inadequate wastewater treatment facilities and urban runoff, impacting the Graçanka River. Drenas suffers from industrial pollution from construction material factories, while agricultural runoff in the Kosovo Plain further degrades water quality with fertilisers and pesticides. Additionally, all of Kosovo's eight major rivers and five lakes are blighted by illegal landfills.[209]

As a result, just 40% of Kosovo's rivers are considered to be in "good ecological state" and Kosovo has one of the lowest clean water availability per capita in the region.[210][211] Inadequate wastewater treatment facilities mean that most sewage from over 1.7 million residents ends up in rivers untreated, exacerbating contamination. In addition, around 46 per cent of communities in Kosovo are reportedly not connected to water supply from any of Kosovo's seven licensed

208 Alija AJ, Bresgen N, Bojaxhi E, Krenn M, Bajraktari ID, Eckl PM. River pollution in Kosovo: Cyto- and genotoxic effects of water samples in the primary rat hepatocyte assay. Toxicol Ind Health. 2018 Aug;34(8):563-570. doi: 10.1177/0748233718773027. Epub 2018 Jun 5. PMID: 29871550

209 Balkan Insight (2020) Muddy Waters: The Pollution Killing Kosovo's Lakes and Rivershttps://balkaninsight.com/2020/07/20/muddy-waters-the-pollution-killing-kosovos-lakes-and-rivers/#:~:text=Water%20pollution%20is%20not%20limited,water%2C%E2%80%9D%20Hasanaj%20told%20BIRN

210 Ramadani (2022) Kosovo, the Country that Exports Sewage https://prishtinainsight.com/kosovo-the-country-that-export-mag-mags-sewage/

211 EU (2021) Ecological status of surface waters in Europe https://www.eea.europa.eu/en/analysis/indicators/ecological-status-of-surface-waters

The contamination of drinking water sources with organic and inorganic pollutants has major implications for children's health, especially in infants, where these toxins accumulate in greater concentrations. ©UNICEF/2024

suppliers.[212] As a result water safety remains a significant concern for many of Kosovo's residents, highlighted by the 2021 incident in Deçan where hundreds were poisoned by contaminated water.[213]

b. The impacts on children

Health impacts

The contamination of drinking water sources with organic and inorganic pollutants has major implications for children's health, especially in infants, where these toxins accumulate in greater concentrations. *(Table.5).*[214][215][216]Children's immature defence systems, and developing organ systems also leave them particularly vulnerable.

Organic pollutants, including bacteria and other pathogens, increase the incidence of intestinal diseases in Kosovo, particularly during the summer. During the warmer months of the year, water scarcity and higher temperatures often cause these pathogens to bloom - an issue which is being exacerbated by the impacts of climate change (see also *3.2.3 Drought and Water Scarcity*). In 2020, 1,371 residents in Pristina contracted acute gastroenterocolitis as a re-

212 Balkan Insight (2022) Kosovars Pay Price of Unregulated Water Supply with their Health https://balkaninsight.com/2022/09/14/kosovars-pay-price-of-unregulated-water-supply-with-their-health/
213 Prishtina Insight (2022) Kosovo, the country that exports sewerage https://prishtinainsight.com/kosovo-the-country-that-export-mag-mags-sewage/
214 Ibid.
215 UNEP (2021) From Pollution to Solution https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution
216 The Executive Board of the International Fund for saving the Aral Sea in the Republic of Kazakhstan (2024) General Information https://kazaral.org/en/aral-sea/general-information/

sult of drinking water with organic pollutants (most likely faecal matter).[217] Similarly, in the summer of 2022, Kacanik, southern Kosovo, experienced an outbreak of gastroenteritis leading to 50 to 80 citizens per day seeking medical help with symptoms of vomiting and diarrhoea.[218]

Additionally, inorganic pollution, including heavy metals, pharmaceuticals and other toxins have been found in surface water samples across Kosovo.[219] These toxins have been found to cause a myriad of health issues for Kosovo's children, including Neural Tube Defects (NTDs).[220] A study in Mitrovica found that 47% of children living in camps for Internally Displaced Persons (IDPs), including children, had dangerously high levels of lead in their blood, which has been linked to cognitive impairment, behavioural issues, developmental delays and damage the nervous system, kidneys and other organs.[221][222] High levels of sulphates have also been found in the Gracanka river, as a result of mining activities, leading to reports of dehydration and diarrhoea among local children.[223] School visits by MFMC in Obiliq have also revealed that oral health issues are prevalent among children, with 36 percent of students exhibiting dental problems, as a result of consuming water contaminated with ash from the nearby power plant.[224]

217 Maxhuni L, Nushi Latifi B. Impact of Drinking Water Contamination on Public Health. Balkans Joint Conference on Water and Environmental Engineering; 2022. Available at: https://balkansjointconference.org/wp-content/uploads/2022/11/01.Lindita-Maxhuni-Burbuqe-Nushi-Latifi.pdf

218 Balkan Insight (2022) Kosovars Pay Price of Unregulated Water Supply with Their Health. https://balkaninsight.com/2022/09/14/kosovars-pay-price-of-unregulated-water-supply-with-their-health/

219 Hoxha B, Retkoceri R, Mrdja B, et al. (2018) Environmental contamination with cytotoxic drugs in Kosovo hospitals and associated health risks: An exploratory study. ***Int J Hyg Environ Health.*** 2018;221(7):1049-1056. doi:10.1016/j.ijheh.2018.06.002

220 Ibid.

221 Mary Jean Brown, Gerry McWeeney, Rokho Kim, Ardita Tahirukaj, Petar Bulat, Skender Syla, Zoran Savic, Yona Amitai, Timothy Dignam, Dorit Nitzan Kaluski (2009) Lead poisoning among internally displaced Roma, Ashkali and Egyptian children in Kosovo, European Journal of Public Health, Vol. 20, No. 3, 288–292

222 UNICEF (2020) Toxic Truth: Children's Exposure to Lead Pollution https://www.unicef.org/reports/toxic-truth-childrens-exposure-to-lead-pollution-2020

223 Kadriu S., Sadiku M., Kelmendi M., Aliu M., Mulliqi I., Hyseni A. 2021. Impact of Kishnica mines on pollution of the Graçanka River and water wells nearby, Kosovo. Journal of Water and Land Development. No. 48 (I–III) p. 16–21. DOI 10.24425/jwld.2021.136142

224 Kosovo Two Point Zero (2022) Jeta mes tymit e hirit vdekjeprurës. https://kosovotwopointzero.com/en/jeta-mes-tymit-e-hirit-vdekjeprures/

Just three of the country's key climate and environment, and other sectoral strategies include specific measures to protect children from the impacts of climate change and environmental degradation ©UNICEF 2024

Table. 5 Key sources of water pollution and their potential impacts on children in Kosovo

Pollution category	Example types	Key sources	Impacts on children
Organic pollution	Bacteria and other pathogens	Unprotected latrines and poorly maintained sewerage systems. Faecal contamination from farm animals.	Diarrhoea and other forms of water-borne disease Reduced nutrient absorption and stunted growth Decreased cognitive development and school attainment.
	Pesticides	Agriculture Household gardens	Hormone disruption in children, including early puberty, obesity and thyroid issues. Low birth weights, impaired cognitive functioning and development. Cancer
	Fertilisers		Promote algal blooms, toxic to children. Hormone disruption, including thyroid disruption Cancer
	Solvents, dyes, and detergents	Industrial pollution Household products Unprotected landfills Automotive services	Skin and eye irritation Neurological impacts Cancer Gastrointestinal issues Hormone disruption

Inorganic pollution	Pharmaceuticals, narcotics and stimulators	Wastewater discharge Healthcare effluents Improper disposal of medications	Hormone disruption in children, including early puberty and thyroid issues. Antibiotic resistant bacteria Impacts on mood and mental health
	Salt	Agriculture fertilisers Mining operations Road salts (for de-icing)	Hypertension Impaired cognitive development
	Sulphates	Industrial discharges Agricultural runoff Wastewater treatment plants	Diarrhoea, dehydration, and gastrointestinal irritation Nutrient malabsorption, leading to malnutrition
	Heavy metals	Heavy industry, including steel plants Corrosion of old pipes and plumbing fixtures Paint, batteries, electronic and household waste Unprotected landfills and poor solid waste management	Lifelong neurological, cognitive and physical impairment. Mental health and behavioural problems Liver and kidney problems
	Hydrocarbons	Gasoline and petroleum products Urban run-off Natural seepage from underground oil reserves	Foetal impacts, including low birth weights, skeletal malformations, and increased incidence of miscarriage Decreases in the numbers of blood-forming cells Respiratory difficulties including bronchitis, asthma, and wheezing Cancer, including blood and lymph cancers.
	Polychlorinated biphenyls (PCBs)	Industrial processes Electrical equipment Improper disposal of PCB-containing products	Reduced IQ and behavioural issues. Fetotoxic effects with reduced birth weight Increased congenital anomalies such as cleft lip
	Polyfluoroalkyl substances (PFAS)	Non-stick cookware Waterproof clothing Food packaging Fire Fighting foams	Weakened immune response Developmental delays Low birth weight Liver damage Hormonal disruptions Cancer
	Microplastics	Plastic waste and unprotected landfills	Hormone disruption, including early puberty Low birth weights Impaired cognitive functioning and development

04 THE POLICY ENVIRONMENT FOR CHILDREN

In recent years, Kosovo has made significant strides in aligning its climate policies with European Union (EU) standards, despite not being formally recognized by the United Nations and therefore not a signatory to international climate agreements such as the UN Framework Convention on Climate Change (UNFCCC). Following its signing of the Stabilization and Association Agreement with the EU in 2015, Kosovo has actively worked to harmonise its legislative framework with EU laws on environmental protection and disaster risk reduction. It is also in the process of developing a "voluntary" NDC based on Kosovo's target to reduce greenhouse gas emissions by 16.3% compared to 2016 levels.[225]

The Climate Change Strategy for 2019–2028 serves as the cornerstone of Kosovo's efforts to establish robust climate policies, enhance risk reduction mechanisms, improve adaptive capacities, and strengthen institutional frameworks for climate action.[226] Nevertheless, there remain significant regulatory gaps, particularly in terms of climate adaptation. Although the Law on Climate Change was recently adopted, it still lacks the necessary secondary legislation to ensure its full implementation.

With the signing of the Sofia Declaration on the Green Agenda in November 2020, Kosovo committed to decarbonization by 2050.

A milestone for this target is the adoption of renewable energy, energy efficiency, and GHG reduction targets by 2030. Mitigation efforts in Kosovo are also currently being guided by the 2019–2028 Climate Strategy, which outline targets for reducing greenhouse gas emissions and transitioning to renewable energy sources.[227] The Government has approved a new Energy Strategy for 2022–2031, which aims for a 32% reduction in GHG emissions in the power sector and sets a goal of achieving 35% renewable energy consumption by 2031.[228] This strategy outlines a pathway to reducing GHG emissions by approximately 16.3% (or 8.95 million tonnes of CO_2 equivalent) by 2030, compared to 2016 levels.[229] The strategy also calls for a total installed renewable energy capacity of 1,600 MW by 2031, alongside major energy efficiency improvements. Key legislation, such as the Law on Energy Efficiency (2018) and the Law on the Energy Performance of Buildings (2016), is currently under government review to further support these objectives.[230]

A multitude of other environmental laws also exist in Kosovo, which act as the main legal basis for protecting Kosovo's natural resources. Kosovo Assembly adopted Law Nr. 04/ L-027[231] (22 september) 2011 on 'Protection Against Natural and Other Disasters,' which serves as the key legal basis for disaster protection and response.

225 UNDP (2024) Kosovo Climate Promise https://climatepromise.undp.org/what-we-do/where-we-work/kosovo
226 Republic of Kosovo (2018) Climate Change Strategy https://www.lfmwb.net/publication/climate-change-strategy-2019-2028-and-climate-change-action-plan-2019-2021/
227 Ibid.
228 Republic of Kosovo (2022) Energy Strategy https://me.rks-gov.net/wp-content/uploads/2023/04/Energy-Strategy-of-the-Republic-of-Kosovo-2022-2031-1-1.pdf
229 Ibid.
230 Ibid.
231 Law on Environmental Protection (2009) Law No. 03/L-025, Republic of Kosovo. https://gzk.rks-gov.net/ActDocumentDetail.aspx?ActID=2775

Kosovo Government officials attending the Sofia Declaration on the Green Agenda for the Western Balkans (GAWB) in 2020 ©GIZ/EUKI 2024

Despite these policy advancements, Kosovo's approach to climate adaptation and resilience remains fragmented. The National Adaptation Strategy (NAS) 2014-2024 has yet to be fully adopted, and progress toward the development of the National Energy and Climate Plan (NECP) has been limited, with only preliminary steps taken to revise modelling assumptions based on 2030 targets.[232] The NECP is intended to align with the Energy Strategy 2022–2031 and ensure consistency with the Energy Community's 2030 targets for Kosovo. Meanwhile, a comprehensive carbon taxation framework is still under development, with plans to introduce carbon pricing by the end of 2025. Current excise taxes on fossil fuels do not adequately reflect their negative externalities or incentivize energy-efficient practices, highlighting a critical gap in the existing regulatory framework.

Additionally, Kosovo's efforts to integrate children's needs and vulnerabilities into climate policy remain insufficient. While the Ministry of Environment, Spatial Planning, and Infrastructure (MESPI) oversees climate policies, and the Emergency Management Agency is responsible for conducting risk assessments for both natural and human-made disasters, the specific impacts of climate change on children often remain overlooked.

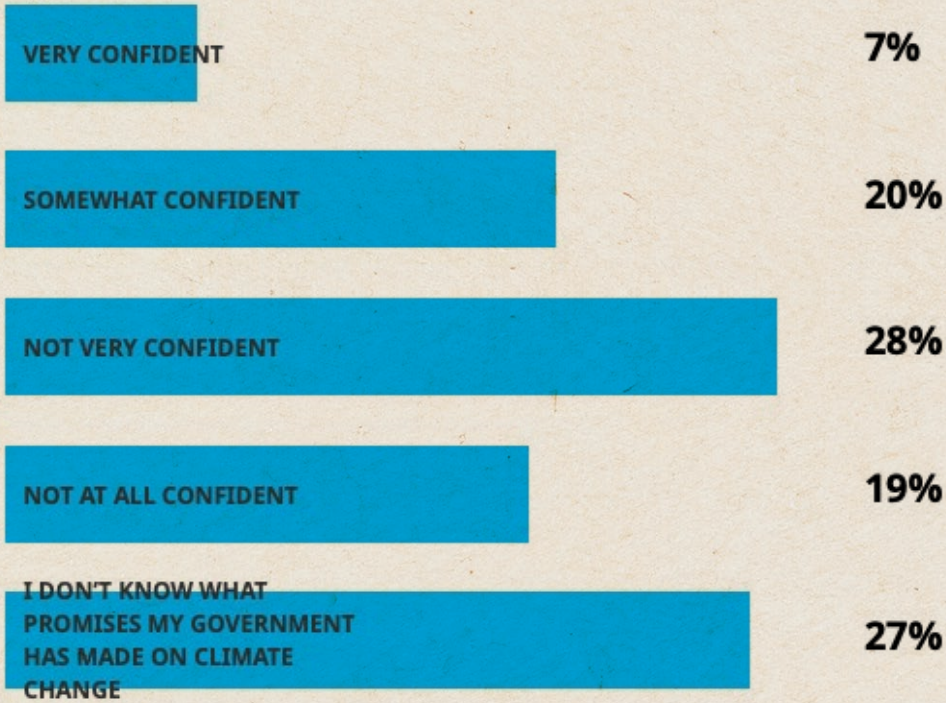
As such, just three of the Kosovo's key climate and environment, and other sectoral strategies include specific measures to protect children from the impacts of climate change and environmental degradation (see *Annex I: Child-focused Climate Energy and Environment (CEE) Policy Analysis*). Even fewer policies have been crafted with direct input from young people Furthermore, environmental impacts of disasters are not adequately considered in existing preparedness and response plans, leaving children particularly exposed to cli-

232 Republic of Kosovo (2014) Kosovo Strategy on Climate Change 2014-2024. https://www.preventionweb.net/publication/kosovo-strategy-climate-change-2014-2024

mate and environment-related risks.

Kosovo will require substantial investment, estimated at at least $5.5 billion, for the mitigation and adaptation activities needed to protect its children from the impacts of climate change. This will require the significant mobilisation of both public and private sector resources.[233][234][235] While Kosovo has made efforts to reestablish the Climate Change Council and initiate the development of voluntary NDCs, financial resources to support projects specifically targeting the needs of children remain limited. As such significant financing gaps remain, and Kosovo must strengthen its capacity to leverage international support, from the private sector, International Financial Institutions (e.g. World Bank and IMF) and other international donors, such as the major climate funds.

Fig.13 Youth U-Report Poll: Do you feel that your government will follow through with its promises to tackle climate change?[236]



Kosovo is not directly accredited to the Global Environment Facility (GEF) or the Green Climate Fund (GCF), largely due to its political status and non-recognition as a member state by the United Nations. This lack of recognition affects Kosovo's ability to access major climate financing directly from these funds. However, Kosovo can still potentially access GCF resources indirectly through accredited international or regional entities that can submit projects on its behalf. These entities can include various public, private, and non-govern-

233 World Bank (2023) Western Balkans Regular Economic Report No. 23: Western Balkans Climate and Development Report. https://www.worldbank.org/en/region/eca/publication/western-balkans-6-ccdr
234 Ibid.
235 Ministry of Economy of Kosovo (2023) First Draft of the National Energy and Climate Plan (NECP) 2025-2030. https://www.energy-community.org/dam/jcr:e6badfbe-313d-4ebc-a450-416dcdbd5499/20230714_Final%20Version_First%20Draft%20NECP%202025-2030%20of%20Kosovo.pdf
236 U-Report (2024) U-Report Regional climate change & green skillshttps://westernbalkans.ureport.in/opinion/3845/

mental organisations that are already accredited by the GCF or GEF and can act as intermediaries to support projects in Kosovo. The ongoing development of the NECP and the introduction of carbon taxation, provide key opportunities to leverage international funding.

Kosovo's children are increasingly calling on the government to take more decisive action to protect them from the impacts of climate change, recognizing that their future health, safety, and opportunities are at stake. As Kosovo pursues deeper economic integration with Europe and strives toward EU membership, there will be additional opportunities to enhance climate and environmental ambitions that directly benefit the younger generation. Aligning with EU climate policies and regulations offers a pathway for Kosovo to access financial resources, technical support, and investment opportunities aimed at reducing emissions and building resilience to climate impacts. Moreover, as the EU is Kosovo's largest trade and investment partner, aligning with European standards could facilitate entry into value chains that prioritise sustainability, creating new economic prospects while safeguarding the environment for future generations. This dual focus on economic integration and environmental stewardship is crucial in responding to the demands of Kosovo's children for a healthier and more sustainable future.

05 CONCLUSION

The Climate Landscape Analysis for Children (CLAC) in Kosovo reveals a complex and alarming array of climate and environment-related hazards that threaten the health, safety, and overall well-being of children. These include extreme heat, water scarcity, flooding and environmental degradation, including air and water pollution, are increasingly impacting children's health and right to a safe, healthy environment. Additionally, these hazards undermine children's access to services such as water, education, health, food, and basic protection.

Across Kosovo, all regions scored either "Highly" or "Extremely Highly" in terms of overall exposure to climate and environment-related hazards. This makes children in Kosovo among the most exposed to climate extremes in Europe, an issue that is compounded by high levels of vulnerability, as a result of poverty. Children residing in rural areas or informal settlements — particularly those near power plants, mines, and other pollution sources — face heightened risks. Additionally, children with disabilities, pre-existing conditions, and those from marginalised communities, such as Roma, Ashkali, and Egyptian households, endure further layers of vulnerability, severely jeopardising their health and overall well-being.

The leading causes of death among children in Kosovo remain closely related to climate change and the environment. For example, the leading causes of death among infants under-1 are Lower Respiratory Infections (LRIs) and diarrhoea, both of which are exacerbated by temperature extremes and a lack of safe water access. Additionally, LRIs in children have also been closely linked with air pollution in Kosovo.

These challenges underscore the urgent need for coordinated action to protect Kosovo's natural resources and secure a safe, sustainable future for its youngest citizens. While the Government has made some strides in tackling these issues, significantly more effort is required to safeguard the Kosovo's natural environment and uphold children's right to a healthy life. A list of recommendations, organised by each of UNICEF's programming pillars, are listed below.

UNICEF is calling on the Government, civil society, and international partners to work together to implement the recommendations of this report and ensure a safer, healthier future for all children in Kosovo.

06 RECOMMENDATIONS

6.1 ENVIRONMENTAL HEALTH (EARLY CHILDHOOD DEVELOPMENT AND HEALTH)

i. Evidence generation

a. Strengthen the collection and monitoring of climate and environment-related data for children at the municipal level by integrating climate-relevant indicators into existing monitoring systems, such as MICS and DHS. This includes tracking the impacts of climate variations on children's health (e.g., acute respiratory infections and water-borne disease) and conducting post-disaster assessments to identify specific effects on children and address resilience gaps. It also includes strengthening nutrition surveillance mechanisms in high-risk areas and updating and modernising emission inventories using frameworks established by the Convention on Long-Range Transboundary Air Pollution.[237]

b. Strengthen and scale-up Early Warning Systems (EWS) for climate-related hazards, diseases and air pollution. This includes ensuring the integration of routine health and nutrition data and air quality alerts into these systems, and ensuring these alerts rapidly reach media outlets, healthcare centres and kindergartens across Kosovo, as required, to help protect children from climate and environment-related hazards. The Foleja platform can also be leveraged to send real-time notifications to parents and caregivers. This system would build on the existing communication channels, such as those used by the National Institute of Public Health (NIPH), to deliver critical climate and disaster-related alerts through a coordinated health system response.

c. Ensure all children have access to tests for exposure to key environmental toxins. This, for example, includes blood lead level testing, and integrating these results into national surveys, sentinel surveillance and Early Warning Systems.

ii. Policy and advocacy

a. Ensure that all national climate, environment and energy policies and strategies, and sectoral policies (e.g. National Health, Education and Youth strategies) include specific measures to protect children and youth from the impacts of climate change and environmental degradation. Specific opportunities for integrating these considerations include the development of the upcoming finalisation of the voluntary NDC and National Adaptation Plan. This also includes advocating for the integration of climate change, environmental, and disaster risks considerations into health and ECD-related budgets.

b. Promote air quality standards in line with the WHO Air Quality Guidelines (WHO AQGs)[238]: This can be achieved by revising national regulations to meet stricter limits for pollutants, enhancing air quality monitoring systems across all municipalities, and integrating air quality considerations into urban planning. This also includes the development of action plans to reduce emissions

237 United Nations (1992) United Nations Framework Convention on Climate Change. https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-1&chapter=27&clang=_en

238 World Health Organization (2021) WHO Global Air Quality Guidelines: Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide. https://www.who.int/publications/i/item/9789240034228

from key sources like transportation and industry.

c. Mandate that all healthcare and ECD facilities create and regularly update Emergency Response Plans. This includes protocols for various types of emergencies, such as natural disasters, disease outbreaks and air pollution, including clearly defining communication channels, roles and responsibilities for all staff members during emergencies.

d. Advocate for the Government to take urgent and decisive action to reduce greenhouse gas emissions and other pollutants to improve air quality and protect childrens' health. This includes advocating for the poorest families to have access to consistent, clean energy supply, especially during the winter months, reducing the dangerous reliance on coal and firewood. It also includes advocating for cleaner technology and energy efficiency, in addition to standards and incentives to reduce air pollution from industry and vehicles in Kosovo.

d. Advocate for investments in capacity development to protect children's health, early development and well-being from current and emerging environmental threats. As new pollution-related and climate-sensitive diseases are rising, the capacity of health and ECD practitioners must be strengthened to protect children from these health risks while ensuring greater availability and delivery of climate resilient healthcare and ECDs services.

e. Advocate with businesses, communities and decision-makers for the adoption of green practices and systems that support sustainable choices for parents in their child's early years. This includes advocating for more affordable sustainable products for infants; sustainable systems such as kindergartens that encourage sustainable behaviours; and sustainable practices like providing washable nappies over single-use nappies.

f. Advocate for the creation and maintenance of safe, inclusive green spaces and protective infrastructure tailored for young children and their caregivers across Kosovo. These spaces should be designed to meet the specific needs of children, promoting their physical, cognitive, and emotional development, while also providing safe, accessible environments for mothers to gather, relax, and engage in community activities. More specifically, this includes the development of child-friendly play areas, accessible designs, safe walking paths, community gardens, shaded and quiet zones and protective infrastructure and safety features for children.

iii. Implementation

a. Ensure Healthcare and ECD facilities in vulnerable areas are resilient to climate change and disasters. More specifically, this includes improving the siting and construction of facilities, including climate-resilient WASH and waste disposal facilities and scaling-up the use of solar power systems, generators and water storage services, to ensure the continuity of healthcare during extreme weather events.

b. Reduce exposure to climate-related hazards and pollution in healthcare facilities, early childhood spaces, childcare and kindergartens through physical and social infrastructure solutions. This, for example, includes introducing clean energy solutions, such as solar power, air conditioning

and filtration systems and water treatment systems, as required. This is particularly critical in neonatal intensive care units and all Healthcare Centres must invest in high quality heating, ventilation and cooling (HVAC) systems, or in resource-constrained settings through wall-filtered ventilation or standalone mechanical air-filtration units.

c. Establish Primary Health Care facilities as key entry points for emergency response in every town and village. PHC facilities should be the first line of defence in safeguarding children's health during crises, based on their proximity to communities and their trusted role in health service delivery. This includes capacity building for PHC staff on emergency response plans, ensuring they are well-prepared to support vulnerable groups during disasters, and integrating these services into the broader disaster response framework. It can also include collaboration with training institutions to better integrate climate and environment-related health issues into the curriculum and equipping healthcare centres, including in rural regions, with testing kits to rapidly detect heavy metals and other toxins in children's blood. Drills and simulations to practise emergency scenarios should also be carried out for staff, to ensure they are prepared to respond in emergencies.

d. Build the capacity for 'green' parenting to protect and prepare young children from the early years through to adolescence. This includes educating parents on sustainable practices, reduces children's exposure to toxins and cultivates good habits early in their lives, through channels such as the Foleja app. It also means advocating for home air purification for pregnant women to mitigate impacts of residential coal smoke exposures, to improve birth weight outcomes, IQ' and childhood cognitive development. Finally, home visiting programmes by healthcare workers are a critical mechanism to provide pregnant women and parents with information and advice on protecting their babies from the health effects of climate change and pollution.

e. Develop and promote dietary guidelines for parents, caregivers and children that promote healthy eating and sustainability. This also involves the use of Behaviour Change Communication (BCC) channels to encourage the consumption of healthier, more sustainable foods for children and promoting Early and Exclusive Breastfeeding (EEB).

f. Scale-up the implementation of the newly developed ECD curricula across all schools. This also includes ensuring that ECD staff have the training and resources required to effectively teach the newly added climate change and green skills component of the curricula.

g. Ensure all Healthcare Facilities (HCFs) in hazard-prone areas maintain a sufficient stockpile of medical supplies. This includes medications, bandages, disinfectants, and Personal Protective Equipment (PPE) and testing equipment, to allow them to respond to climate and environment-related emergencies, as and when they arise.

h. Integrate climate change awareness into primary healthcare services. Ensure that Primary Health Care (PHC) staff include climate change awareness in their consultations with children and their families. This can involve educating parents and caregivers about indoor and outdoor pollution and how it impacts children's health, while promoting safe environmental practices at home. This also includes providing emergency response training for caregivers and parents, empowering

them to better protect children in the event of climate-related disasters, such as floods or extreme weather events. This training will improve family resilience and preparedness in times of crisis, ensuring better outcomes for children.

6.2 EDUCATION AND ADOLESCENT DEVELOPMENT AND PARTICIPATION (ADAP)

i. Evidence generation

a. Localise research and data on climate change and environmental issues and make it easily accessible to children and young people to boost their advocacy skills and strengthen their influence in policy discussions. This includes developing e-tools and other innovative learning tools for young people in local languages.

b. Implement participatory action research involving adolescents and young people. This research will explore and share insights on sustainability, climate change, and disaster risks, needs, experiences, and solutions for influencing policies and practices.

ii. Policy and advocacy

a. Ensure that all national education and youth policies and strategies include specific measures to protect children and youth from the impacts of climate change and environmental degradation, in line with the Convention on the Rights of the Child.[239] Specific opportunities for integrating these considerations include the upcoming voluntary Nationally Determined Contribution (NDC) and National Adaptation Plan (NAP).

b. Establish Minimum Standards for School Construction, ensuring they include climate and environment-related considerations (including extreme heat, flood risk and earthquakes) during site selection, design and construction. The Standards must also be effectively disseminated and enforced across Kosovo.

c. Provide guidance for response preparedness, including contingency plans Standard Operating Procedures (SOPs) for disasters and emergencies in schools. This includes earthquake drills, maintaining response provisions, and early action in response to early warnings, including for flooding, heat waves and air pollution.

d. Ensure environmental education at all levels and institutions is made more practical and relevant to young people. This includes mainstreaming climate and environmental education across all science-related subjects from preschool to upper secondary education, introducing new modules on water safety and conservation, climate change, pollution, and reuse and repair. The curriculum should also require children and teachers to go outside of the classroom, connect with nature and address environmental issues in their communities and investments must be made in generating locally-appropriate textbooks

239 OHCHR (2023) General Comment No. 26 (2023) on Children's Rights and the Environment with a Special Focus on Climate Change. https://www.ohchr.org/en/documents/general-comments-and-recommendations/crccgc26-general-comment-no-26-2023-childrens-rights

and other guidance materials.

e. Advocate for the expansion of the Green Schools initiative, ensuring adequate training, budget and guidance for all schools. This also includes establishing a green star rating accreditation for all educational institutions in Kosovo.

f. Establish frameworks and mechanisms that compel decision-makers to engage young people in the development, implementation, and evaluation of policies related to climate change, environmental degradation, and disaster risk reduction. This includes the strengthening of... youth parliaments and / youth councils, in addition to creating new and innovative channels, in collaboration with partners such as UNDP and YOUNGO.

iii. Implementation

a. Ensure schools are made more resilient to climate-related hazards and pollution, providing a safer, more conducive school environment for all students. This includes: implementing a risk-informed prioritisation plan and guidance for existing schools, particularly those in high-risk areas, to identify and intervene where refurbishment, rehabilitation, repair, retrofit, reconstruction or replacement, is required. It also means working with partners to ensure climate-resilient WASH in Schools services, clean energy (e.g. solar power) and cooling technologies for the summer months (e.g air conditioning or fans), to ensure the continuity of education during extreme weather events.

b. Ensure all schools in hazard-prone areas maintain a sufficient stockpile of emergency supplies. This includes emergency water treatment and basic safety equipment to ensure the protection and well-being of children during such events.

c. Support schools in establishing dedicated Eco-Clubs at all schools. This should build upon previous initiatives already being implemented by the Ministry of Education, Science and Technology (MoEdST) and other partners such as CARITAS.

d. Supporting the training of new and existing teachers on better, more modern teaching practices, for both environmental science and all other subjects. This also includes providing teachers with all the teaching materials and other resources required to teach the curricula in a more meaningful and effective manner.

e. Establish programmes to enhance Green Skills training and mentorship for young people, particularly those from the most disadvantaged communities. Specific opportunities for this may include ensuring existing youth training programmes, such as Upshift, include a stronger environmental component and working with the private sector to establish an annual youth Climate Hackathon, with seed money and paid internship opportunities being provided to the winners. It also involves promoting the inclusion of improved green skills training in professional schools and excellence centres and promoting green career guidance. It also includes working with the private sector, government and Civil Society Organisations (CSOs) to establish a paid Environmental Internship and Mentorship Programme for youth, to increase their employment prospects in the Green Economy.

f. Collaborate with youth volunteer networks to launch public awareness campaigns that advocate for safe and sustainable behaviours, filling gaps in outreach and ensuring continuity and resilience in communities. For example, organising hands-on activities like developing school gardens, waste cleanups and tree and flower planting activities at the community level.

6.3 SOCIAL PROTECTION AND CHILD RIGHTS MONITORING

i. Evidence generation

a. Assess the social and economic impacts of climate change, environmental degradation, and disasters – as well as climate change mitigation measures – on children and young people in vulnerable populations. Understanding these impacts can guide child-focused policies that address the needs and protect the rights of the most vulnerable children and young people, including in displaced and migrant communities.

b. Integrate climate, disaster, and environmental dimensions into child poverty analysis at national and sub-national levels and assess climate risks and impacts on child poverty. This will help ensure the improved targeting and design of programmes for the most at-risk children in Kosovo.

ii. Policy and advocacy

a. Ensure all Social Protection and Child Protection policies and strategies, include climate and environment-related considerations and measures to safeguard children. More specifically, this includes developing a multi-sectoral plan of action to prevent and respond to all forms of violence against children including specific measures to shield children from violence and exploitation, in the face of climate change and environmental degradation. This also means working with other sector partners to tackle poverty which is a key driver of protection issues in Kosovo.

b. Ensure social protection systems are shock responsive, allowing them to respond more quickly to crises. This includes establishing an emergency contingency fund for all social protection programmes, to fund humanitarian cash transfers in case of emergencies. It also includes implementing Standard Operating Procedures (SOPs) for an efficient and coordinated social protection response to emergencies, ensuring they cover responses to climate and environment-related emergencies at both central and local levels.

c. Advocate for the strengthening of regular (non emergency) social protection programmes to ensure effectiveness during both day-to-day and during emergencies. This includes services that provide economic support to families to build resilience against climate shocks, and ensure timely cash transfers and complementary social services for participating households.

iii. Implementation

a. Further strengthen community-level child protection mechanisms to foster a safer environment for children. More specifically, this involves preventing and addressing violence against children and gender-based violence, by reinforcing existing reporting channels and support services. It also involves identifying climate-related threats at the community level and collaborating with communities to mitigate and respond to these risks, safeguarding the most vulnerable children, whilst also ensuring continuous access to resilient Child Protection services during and after climate-related hazards and other emergency events.

b. Support programmes that offer vulnerable households financial incentives to enhance energy efficiency and adopt clean, renewable energy technologies. This includes solar power and the use of clean heating and cooking fuels, particularly in rural areas.

c. Support the government in implementing inclusive and shock-responsive social protection systems, particularly in areas vulnerable to climate and disaster risks. Particular attention must be given to children living in or near poverty, Roma, Ashkali and Egyptian children, children with disabilities, and migrant and displaced children.

ANNEX I: CHILD-FOCUSED CLIMATE, ENERGY AND ENVIRONMENT (CEE) POLICY ANALYSIS FOR KOSOVO

No.	Title	Ministry	Year	Summary	Mentions of children and youth in relation CEE?			Specific measures to tackle the impact of CEE on children
					Climate	Energy	Environment	
Climate, Energy and Environment Policy and Strategy								
1	Climate Change Strategy 2019 - 2028	Ministry of Environment and Spatial Planning	2018	The Climate Change Strategy 2018-2027 sets out the policies for reducing greenhouse gas emissions (GHG) and adaptation to climate change. Also, it presents an opportunity to find and define measures - to reduce greenhouse gas emissions and adapt to climate change, the hidden component that will promote sustainable development.	✕	✕	✕	None mentioned
2	Climate Change Strategy and Action Plan, 2018	Ministry of Environment, Spatial Planning and Infrastructure	2018	Address the challenges of climate change in Kosovo, proposing measures to mitigate and adapt to its impacts through cross-sectoral cooperation and integration of climate considerations into development planning.	✕	✕	✕	None mentioned.
3	National Adaptation Strategy	Ministry of Environment and Spatial Planning	2014	The purpose of the strategy is to address the reduction of risks and damages from the current and future impacts of climate change in a cost-effective manner and to exploit the potential benefits arising from climate change.	✕	✕	✕	None mentioned.

4	State Strategy for Disaster Risk Reduction 2023-2028	Ministry of Internal Affairs	2022	Aims to reduce the risk of natural and other disasters in Kosovo from 2023 to 2028, focusing on prevention, preparedness, response, and recovery to enhance the resilience of communities.	✓	✓	✓	Highlights that the most vulnerable communities should be prioritised, including plans and programs aimed at educating and sensitising children and youth.
5	Kosovo Spatial Development Strategy 2030	Ministry of Environment, Spatial Planning and Infrastructure	2030	Outlines the spatial development plan for Kosovo up to 2030, aiming to achieve balanced regional development, sustainable urbanisation, and efficient use of resources.	✗	✗	✗	None mentioned
6	Kosovo Energy Strategy 2022-2031	Ministry of Economy	2022	Provides a framework for the development and management of energy resources in Kosovo from 2022 to 2031, emphasising sustainability, efficiency, and energy security.	✗	✗	✗	Provides action plans regarding the whole population, but no specific mentions of children and adolescents.
7	Kosovo Water Strategy 2021-2030	Ministry of Environment, Spatial Planning and Infrastructure	2021	Focuses on the management and protection of water resources in Kosovo, aiming to ensure sustainable use and quality of water for various needs.	✗	✗	✗	None mentioned.
8	Integrated Waste Management Strategy (2021-2030)	Ministry of Environment, Spatial Planning and Infrastructure	2021	Outlines goals for waste management, emphasising sustainability and pollution reduction from 2021 to 2030.	✗	✗	✓	Mentions the need to include waste management and environmental protection in the national curriculum

Other sector strategies								
9	Education Strategy of Kosovo 2022-2026	Ministry of Education, Science, Technology, and Innovation	2022	Outlines the strategic goals and actions for improving the education system in Kosovo from 2022 to 2026, focusing on quality, inclusiveness, and alignment with labour market needs.	✗	✗	✓	States importance of identifying appropriate environmental locations for new school construction based on needs assessments, and developing materials to promote a healthy school environment
10	State Strategy for Youth 2024-2032	Ministry of Culture, Youth, and Sport	2024	Outlines the goals and initiatives for youth development in Kosovo from 2024 to 2032, focusing on education, employment, health, and civic engagement to improve the overall well-being and opportunities for young people.	✗	✗	✗	None mentioned.
11	Strategy on the Rights of the Child (2019-2023)	Office of the Prime Minister	2019	Outlines Kosovo's comprehensive approach to mitigating the risks and impacts of natural and other disasters. The strategy emphasises the importance of preparedness, prevention, and response, focusing on creating resilient communities.	✗	✗	✓	Acknowledges the significant impact of disasters on children and young people and highlights the importance of safe educational environments, integrating disaster preparedness into the curriculum, and conducting drills and exercises to prepare students and youth for disaster situations.
12	Sectoral Health Strategy (2009-present)	Ministry of Health	2016	The primary document outlining the medium-term strategic development direction and approach for the Republic of Kosovo's health system. This document aims to put into practice the nation's vision for offering all citizens safe, high-quality healthcare.	✗	✗	✗	None mentioned.

ANNEX II: LIST OF CHILDREN AND YOUTH-FOCUSSED ORGANISATIONS CURRENTLY WORKING ON CLIMATE AND ENVIRONMENT-RELATED ISSUES IN KOSOVO

Government	UN Agencies	Academic partners and research institutions	NGOs	Youth organisations	Other
Ministry of Environment, Spatial Planning and Infrastructure Ministry of Health Ministry of Social Welfare Ministry of Education, Science, Technology and Innovation Ministry of Internal Affairs Ministry of Agriculture and Forestry Ministry of Regional Development National Council on Climate Changes Kosovo Environmental Protection Agency Environmental Protection Agency of Kosovo Hydrometeorological Institute of Kosovo National Institute of Public Health	UNICEF UNDP FAO WFP WHO	University of Prishtina / Faculty of Mathematics and Natural Sciences University of Prishtina / Faculty of Education University of Prishtina / Center for Energy and Sustainability University of Prishtina / Faculty of Agriculture and Veterinary Medicine Kosovo Academy of Sciences and Arts	Climate Awareness Association - CAA Green Art Center EcoZ Syri i Vizionit Ec ma Ndryshe Center for Education and Development of Environment - CEDE Balkan Green Foundation The International Organization for Migration (IOM) Forum for Civic Initiatives (FIQ) Gjethi	Youth Reference Group (UNICEF Kosovo) Peer Educators Network (PEN) TOKA Let's do it Kosova Let's do it Peja Local Youth Action Councils	Save the Children in Kosovo Caritas Switzerland in Kosovo SDC USAID SIDA GIZ JICA European Commission World Bank MCC The Kosovo Civil Society Consortium for Sustainable Development, KOSID Kosovar Foundation for Civil Society (KCSF) Kosovo Millennium Foundation


unicef
for every child