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Kosovo Strategic Risk Assessment Results

Technical Report

Pristina, 7 – 9 February 2023

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Thanks!

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I also thank all representatives of health institutions and government institutions for their contribution to the risk assessment!

Background:

Kosovo covers an area of 10,887 km² and is home to approximately 1.8 million people (population density of 159 people per square kilometre). The Dukagjini Plain and Kosovo Plain dominate most of central Kosovo. The Sharri Mountains rise to the southwest and the Bjeshkt e Nemuna Mountains rise to the southeast. The capital and largest city is Pristina, with other notable cities including Prizren, Mitrovica, and Gjiilan.

Kosovo is located in southeastern Europe, in the centre of the Balkan Peninsula (Western Balkans). It stretches north latitude from 41°50'58" to 42° 15'42" and east longitude from 20° 01'02" to 21° 48'02". Kosovo's border with neighbouring countries is mostly mountainous and has a natural character. Kosovo's climate is influenced by Mediterranean-continental and European-continental climatic influences. Elevation, water, soil, and vegetation are the primary local factors that influence Kosovo's climate. The eastern part of Kosovo, the Plain e Kosovo, Llap, Drenica, and Ana-Morava, is colder than the western part, the Dukagjini Plain. The annual average temperature is 9.5° C, with July being the warmest month with an average temperature of 19.2° C and January being the coldest month with an average temperature of -1.3° C.

Kosovo's health system is divided into three levels: primary (concept of family medicine), secondary (covers some municipalities and provides specialized health care), and tertiary. The number of private clinics is high, and few adhere to the Ministry of Health's policy (high profile of specialized health care). Kosovo, like other Western Balkan countries, is suffering from a brain drain and a shrinking workforce. Simultaneously, systemic training is required for the current health workforce to improve performance quality.

Prior to the COVID-19 pandemic, Kosovo experienced stable economic growth of 3.63% per year on average between 2010 and 2019. The COVID-19 pandemic, on the other hand, caused a -6.89% recession in 2020. Furthermore, economic growth over the last decade has not been accompanied by robust job creation. The labour market is marked by low employment, with only 28.8% of working-age people (15-64 years) employed in 2019 and the WBs' largest gender gap. In 2019, women made up 21.1% of the labour force, while men made up 59.7%. (1). Several systemic barriers have contributed to women's low economic participation, including deep-rooted gender stereotypes and a rigid understanding of gender roles, which have exacerbated women's unpaid care burden and hampered their access to resources, property, and assets.

Despite Kosovo's average age of 29.5 years, youth unemployment (aged 15-24 years) is 49.4%, while female unemployment is 60.3% and male unemployment is 44.1%. These high rates of youth and female unemployment jeopardize Kosovo's prospects for economic growth and long-term development. Access to health services is unequal, and health outcomes in Kosovo are generally poor when compared to the WHO European Region. In 2019, female and male life expectancies at birth in Kosovo were 74.8 and 70.3 years, respectively. These figures are significantly lower than the WHO European Region averages of 81.29 years for females and 75.09 years for males in 2019. In recent years, Kosovo has made strides in improving maternal and child health indicators, such as lowering infant and under-five mortality rates, increasing immunization coverage, and expanding access to prenatal and postnatal care. However, neonatal mortality, defined as the death of a newborn within the first 28 days of life, remains a significant challenge.

Strategic Tool for Assessing Risks (STAR):

A risk assessment enables proper planning and prioritization of efforts to better prevent, mitigate, detect early, prepare for, be operationally ready for, respond to, and recover from a health emergency or disaster. Countries need to first identify hazards and assess their level of risk within the country before adopting a risk-based approach to managing health emergencies and mitigating risk.

The Strategic Tool for Assessing Risks (STAR) provides a comprehensive, user-friendly toolkit and approach to assist national and subnational governments in conducting a rapid strategic and evidence-based assessment of public health risks for planning and prioritization of health emergency preparedness and disaster risk management activities.

The STAR approach, which consists of six key steps, uses a participatory approach and the consolidation of existing evidence to describe the country's risks, including: 1) identifying country hazards and describing the most likely scenario that would necessitate the activation of a national response; 2) assessing the likelihood of the risk occurring; 3) estimating the risk's impact on the country, and 4) determining the estimated level of risk. 5) based on the risk ranking, develop key recommendations and priorities actions; 5) incorporate recommendations into the national and subnational action planning processes.

The main outcome of the STAR workshop is a country risk profile, which includes a risk assessment matrix that ranks risks visually on a 5x5 matrix, describing the likelihood and impact of the hazard. It also includes a risk summary for each hazard that describes the health consequences, scale of the hazard and identified population at risk, frequency of occurrence, likelihood to occur, seasonality, severity, vulnerability, coping capacity, potential impact, and confidence level in data available. Finally, the profile includes a workshop report that consolidates the risk matrix, risk summary, and initial prioritized short-term action planning.

WHO held a two-and-a-half-day workshop between February 7 and 9, 2023, at the request of the health authorities in Kosovo, to conduct a strategic risk assessment using the STAR tool.

STAR Objectives:

- To identify, describe and rank risks that may require a health emergency response.
- To have ready risk data to inform the update/development of national emergency preparedness and response plans.
- To prioritize risk-informed actions and programmes for emergency preparedness, readiness and response.
- To develop a seasonal risk calendar as well as review the coping capacity to manage concurrent emergency risks.

STAR Workshop Methodology:

Risk is the result of interactions between hazards, vulnerability, exposure, and coping capacity, and is defined as the probability of an event and the magnitude of its consequences. The STAR tool rank risks according to their likelihood, severity, vulnerability, and impact, as well as the health system's ability to cope. This data is typically derived from historical data on emergencies and disasters as well as participants' technical knowledge

and expertise in specific areas such as the current epidemiological situation, in-depth understanding of the health system, emergency response capacity, and service delivery. The tool also takes into account the confidence level, which is estimated based on the quality and completeness of the data and evidence provided to reach a given level of risk and is assessed based on participant consensus.

Following the first exercise in 2019, this is the second strategic risk assessment for Kosovo's public health sector using the STAR tool. During the workshop, a range of existing reference materials were used to identify hazards, including a list of notifiable diseases under the national surveillance system as well as a list of priority hazards highlighted by participants from other sectors such as emergency management, agriculture, hydrometeorology, and chemical, biological, radiological, and nuclear hazards (CBRN sectors).

Participants were divided into two groups during the workshop: one for the identified biological hazards and one for non-biological hazards such as weather-related, geophysical, technological, societal, and environmental hazards. Then, for each hazard, each group determined the immediate and secondary health consequences, as well as the scale at which an emergency would be declared and the overall likelihood of an emergency occurring as a result of that particular hazard. The severity, vulnerabilities, and coping capacities of natural/man-made hazards and infectious diseases were then assessed to determine the overall impact of each hazard on public health. The results of each group's work were then combined and reviewed hazard by hazard to ensure overall agreement and to assign confidence levels based on data availability, expert opinion, and group experience. Finally, participants identified the key priority actions for hazards with high and moderate risk levels, followed by a plenary discussion of the findings to build consensus.

Summary of the 2019 Risk Assessment Findings:

A total of fifty hazards were selected and discussed during a four-day workshop from October 23 to October 26, 2019. These hazards were classified into several categories: geological, hydrometeorological, industrial/technological, social, and biological. Biological hazards were classified as food and waterborne hazards, vaccine-preventable diseases, mosquito-borne diseases, sexually transmitted diseases, and other individual diseases such as botulism, cholera, HIV, hepatitis B and C, measles, anthrax, and others. Natural hazards were classified as floods, earthquakes, fires, extreme climate conditions, dam collapse, and so on.

Overall, anti-microbial resistance, healthcare-associated infections, dam collapse, food and water-borne diseases, hemorrhagic fever with renal syndrome, floods and air pollution were ranked as high risk, 10 as moderate risk, 21 as low risk, and 11 as very low-risk hazards. Table (1) below summarizes the hazards and their level of risk.

Table (1): Summary of hazards and risk levels for the 2019 STAR exercise:

2019 hazards and their risk levels		
High	Low	Very low
Healthcare-Acquired Infections (HAIs), Antibiotic resistance (AMR), Hemorrhagic fever with renal syndrome (hantavirus), Floods and flash floods, Food and water-borne diseases (Salmonella typhi, paratyphoid, Shigella, Rotavirus, Norwalk virus), Failure of dams, Annual emissions of PM10, and PM2.5 and CO, O3, NO2, SO2 and organic compounds	Blockage from the snow and avalanches/snowslips, Landfills of the mining industry, Landslides/ Rolling of rock masses, Setbacks and steep slope zones, Transportation of hazardous materials, Malaria, Viral meningitis, Invasive meningococcal disease/Bacterial meningitis, Other Hemorrhagic fever (LASSA, Marburg, Ebola), Poliomyelitis, Rabies, Leptospira, Brucella, Francisella Tularensis, Measles, Borrelia, TB, HIV, Food and water Contamination, Traffic Accidents (road, rail, air, etc.), Humanitarian Crisis (Refugee Crisis, Migrant influx, and conflict) in neighboring countries, Radiation hazard.	Extreme climate conditions (thunderstorms, storms, frosts and frosted rains, waves of cold and the snow, hail), Canine & snake (venomous) bites, Encephalitis (and TBEV), Vaccine preventable diseases (Diphtheria, Pertussis, Rubella, Tetanus), MERS, Coxiella burnetii (Q fever), Leishmania donovani, Anthrax, Vibrio cholera, Clostridium botulinum, CBRN (chemical, biological, radiological, nuclear)
Moderate		
Industrial toxic materials, West Nile Fever, Mosquito-Borne Diseases (Chikungunya fever, Dengue, ZIKA, West Nile, Yellow Fever), Earthquakes, Pandemic Influenza (SARS, Avian Influenza), Seasonal Influenza, CCHF, STIs (Syphilis, Gonorrhea), Hepatitis B&C, Fires (all types).		

Presentation 2023 Risk Assessment Findings:

Twenty-six hazards were identified and assessed individually which were later tailored down to twenty-four. These hazards included several categories: geophysical, weather-related, industrial/technological, societal, and biological. The biological hazards were broken down into faeco-oral diseases (acute watery diarrhea, gastroenteritis/food-borne diseases, and poliomyelitis), other Infectious hazards (antimicrobial-resistant microorganisms and disease X), airborne/droplets diseases (respiratory pathogens with pandemic potential such as influenza, coronavirus, orthopox virus, COVID-19, and measles), animal-human contact (Zoonosis) (leptospirosis, tularemia, and brucellosis), viral Haemorrhagic fevers (VHFs) (hemorrhagic fever with renal syndrome (HFRS), Crimean-Congo haemorrhagic fever, and finally vector-borne diseases (West Nile fever).

The non-biological hazards were also broken down into weather-related (flood and avalanche), geophysical (earthquake), environmental (air pollution and forest/wildfires), technological (nuclear, biological, radiation, and chemical agents), and societal (civil unrest).

Overall, none of the hazards was ranked as very high risk, seven hazards were ranked as high risk, six as moderate risk, ten as low risk and none of the hazards were ranked as very low risk. Kosovo's current risk matrix and risk summary are illustrated in the figures below.

Air pollution, acute watery diarrhea, food-borne diseases/gastroenteritis, chemical, radiation and nuclear agents and floods were identified as high-priority risks. This relates to the inevitability of their occurrence, transmission potential, the high rate of fatalities, and the limited coping capacity for the management of these incidents. On the other hand, forest fires, antimicrobial-resistant organisms, respiratory pathogens with pandemic potential, COVID-19 and earthquake-were considered as moderate priority events, although vulnerabilities and coping capacities to manage these events vary widely.

The overall confidence in the risk assessment was determined to be high based on the confidence levels assigned to each hazard. The vulnerabilities and coping capacities for each hazard were discussed in depth by the two

sub-working groups on biological and non-biological hazards. The tables below highlight the details of the risk assessment findings.

A. Health Consequences, details of the exposure and geographical areas:

No	Specific Hazard	Health consequences	Scale	Geographical Area	Exposure
1	Acute Watery Diarrhea	1)acute watery diarrhea "rice-water stools" 2)vomiting, restlessness, thirst, restlessness 3)(3) Dehydration (moderate to severe); which can lead to shock and death. 4)Increased hospitalizations further stretch health services at primary and secondary levels. 5)Socio-economic losses	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovice, Ferizaj, Gjakove, rural area	1,782,115 inhabitants with the most affected are Children <5 y (149, 735) and people living in rural areas (1,078,239).
2	Gastroenteritis/Foodborne diseases	1)Fever, abdominal pain, nausea, vomiting, diarrhea, restlessness. 2)Kidney and liver failure, brain and neural disorders, reactive arthritis, and death.	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovice, Ferizaj, Gjakove	1,782,115 inhabitants
3	Poliomyelitis	1)decreased strength and muscle endurance · pain · sleep problems · breathing, swallowing or speech difficulties, 2)permanent disability and death.	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovice, Ferizaj, Gjakove	Children < 6 years (179,648) which are unvaccinated and the RAE community which has huge gaps in vaccination
4	Antimicrobial-resistant microorganisms	1)Treatment failure leading to chronic problems, (2) Death	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovice, Ferizaj, Gjakove	1,782,115 inhabitants
5	Disease X	The group chose disease X in anticipation of a novel pathogen/disease appearing somewhere in the world and spreading to affect Kosovo. It is expected that the negative consequences of any novel diseases may be due to the following: 1) lack of immunity, which can result in a higher rate of illness and potentially severe symptoms; 2) Limited treatment options; 3) Overburdened healthcare system; 4) Disruption of daily life; 5) Fear and panic leading to increased stress and anxiety; and finally 6) Economic impact such as including lost income and productivity, increased	National	The entire territory is expected to be affected.	1,782,115 inhabitants

		healthcare costs.			
6	Respiratory pathogens with pandemic potential (influenza, coronavirus, orthopox virus, etc.)	1)otitis media, pneumonia, and invasive bloodstream infections 2)Allergic reaction, Inflammation, and respiratory diseases	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovica, Ferizaj, Gjakove	1,782,115 inhabitants
7	COVID-19	1)Fever, cough, anosmia, ageusia, shortness of breath, weakness, respiratory distress, organ damage, 2)Increased needs for mental health and psycho-support, 3)Socio-economic disruptions, including loss of family income 4)Disruption of the health system, including routine immunizations, increased demand for hospital services (including admissions + ICU), etc. 5)Post-COVID-19 condition is usually happen 3 months from the onset of COVID-19 with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, and cognitive dysfunction but also others generally have an impact on everyday functioning.	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovica, Ferizaj, Gjakove	1,782,115 inhabitants
8	Measles	1)Common complications are ear infections and diarrhea, 2)Serious complications include pneumonia and encephalitis, 3)Deaths	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovica, Ferizaj, Gjakove	Children < 6 years (179,648) who are unvaccinated and the RAE community (36,694 inhabitants) which have huge gaps in vaccination
9	Leptospirosis	1)kidney damage, meningitis (inflammation of the membrane around the brain and spinal cord), liver failure, respiratory distress, 2)severe systemic inflammatory syndrome with hemorrhagic features	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovica, Ferizaj, Gjakove	1,782,115 inhabitants
10	Tularemia	1) skin ulcers, swollen and painful lymph glands, inflamed eyes, sore throat, sores in the mouth, or pneumonia.	Sub-National	The following are the endemic Zones including	713,100 inhabitants

				Kline, Vushtrri, Skenderaj, Viti, Pristina, Obiliq, Prizren, and Ferizaj. The total number of people exposed is 713,100 inhabitants.	
11	Brucellosis	2)flu-like symptoms, including fever, weakness, malaise, and weight loss, 3)In severe cases, the central nervous system and the lining of the heart may be affected.	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovica, Gjakove, and Ferizaj. A total of 1,782,115 inhabitants are exposed.	1,782,115 inhabitants
12	Hemorrhagic Fever with Renal Syndrome (HFRS)	1)flushing of the face, inflammation or redness of the eyes, or a rash., 2)Later symptoms can include low blood pressure, acute shock, vascular leakage, and acute kidney failure, which can cause severe fluid overload.	Sub-National	The following municipalities are exposed including Decan, Junik, Istog, Drenas, Ferizaj (Jezerc), and Skenderaj. Approximately a total of 302,430 inhabitants are exposed.	302,430 inhabitants
13	Crimean-Congo haemorrhagic fever	1) The most common complications are hemorrhage, shock, DIC, and multi-organ failure which might result in death.	Sub-National	Prizren region (Malisheva, Rahovec, Suhareke), Peja region (Kline), Mitrovica region (Skenderaj)	258,742 inhabitants
14	West Nile fever	1)Fever, headache, tiredness, body aches, nausea, vomiting, occasionally with a skin rash (on the trunk of the body) and swollen lymph glands. 2)Can cause a fatal neurological disease in humans 3)Symptoms of severe disease or neuroinvasive disease, include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis.	National	All regions are exposed including Pristina, Peja, Prizren, Gjilan, Mitrovica, Ferizaj, Gjakove	1782115 inhabitants
15	Flood	1)Drowning (accounts for 75% of deaths in flood disasters) 2)Deaths from physical trauma, heart attacks, electrocution, carbon monoxide poisoning, or fire associated with flooding	National	The following municipalities are more at risk for floods including Lipjan,	90% of the territory (1,600,000)

		3)Water- and vector-borne diseases, such as cholera, typhoid or malaria 4)Injuries, such as lacerations or punctures from evacuations and disaster cleanup 5)chemical hazards 6)Mental health effects associated with emergency situations 7)Disrupted health systems, facilities and services, leaving communities without access to healthcare 8)Damaged infrastructure, such as food and water supplies, and safe shelter.		Drenas, Mitrovica, Skenderaj, Klina, Leposaviq, Podujeva, Rahovec, Gjakova, Peja, Istog, Prizren, Suhareka	
16	Avalanche	Deaths, injuries, hypothermia,	Local	the following rural and mountain areas are exposed; Brezovica, Rugova, Sharr,	2,500 people
17	Earthquake	1)Trauma-related injuries and deaths from building collapse or secondary effects like drowning from tsunamis or burns from fires. 2)(2) Infrastructural failure, including damage to health facilities and transportation 3)Disrupted health services 4)Health workers may not be able to reach health facilities and medical supplies may be lost 5)Environmental contamination 6)Increased need for mental health and psychosocial support	Sub-National	municipalities; Ferizaj 105663, Gjilan 73518, Viti 47473, Prizren193906, Istog 41119, Mitrovica 68288 Total: 530000	530000
18	Air pollution	1) Lung diseases, blood diseases, skin diseases, poisoning with heavy metals (lead),	Sub-National	municipalities; Pristina, Mitrovica, Hani Elezit	500000
19	Forest/Wildfires	1)Burns and injuries, deaths 2)Eye, nose, throat and lung irritation 3)Decreased lung function, including coughing and wheezing 4)Pulmonary inflammation, bronchitis, exacerbations of asthma, and other lung diseases 5)Exacerbation of cardiovascular diseases, such as heart failure 6)Resulting air pollution can cause a range of health issues, including respiratory and cardiovascular problems.	National	All territory of Kosovo	52% of the population/ 930,000 people
20	Nuclear agents	Health: genetic impact, different types of cancers, burns, deaths, and skin diseases	National	All territory of Kosovo	1.8 million
21	Biological agents				
22	Radiation agents	General health consequences, environmental contamination,	National	All territory of Kosovo	1.8 million
23	Chemical agents	General health consequences, environmental contamination, air pollution	Sub-National	municipalities; Peja, Pristina, Mitrovica	500000

24	Civil unrest	deaths, injuries, mental health	Sub-National	Pristina city	300000
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B. All-Hazards Risk Summary:

Risk	Risk Level	Likelihood	Impact	Vulnerability	Coping Capacity	Level of Confidence
Acute Watery Diarrhea	High	Very likely	Moderate	Partial	Partial	Good
Gastroenteritis/Foodborne diseases	High	Very likely	Moderate	Low	Partial	Good
Flood	High	Very likely	Moderate	Partial	Partial	Good
Air pollution	High	Almost certain	Moderate	High	High	Satisfactory
Nuclear agents	High	Likely	Critical	Very High	Very Low	Good
Radiation agents	High	Likely	Critical	Very High	Very Low	Good
Chemical agents	High	Likely	Severe	High	Very Low	Good
Antimicrobial-resistant microorganisms	Moderate	Likely	Moderate	Partial	Partial	Good
Disease X	Moderate	Likely	Moderate	Partial	Partial	Unsatisfactory
Respiratory pathogens with pandemic potential (influenza, coronavirus, orthopox virus, etc.)	Moderate	Likely	Moderate	Partial	High	Good
COVID-19	Moderate	Likely	Moderate	Partial	High	Good
Earthquake	Moderate	Likely	Moderate	Partial	Partial	Good
Forest/Wildfires	Moderate	Very likely	Minor	Low	Partial	Good
Poliomyelitis	Low	Unlikely	Minor	Low	Low	Good
Measles	Low	Likely	Minor	Partial	High	Good
Leptospirosis	Low	Likely	Minor	Very Low	High	Good
Tularemia	Low	Likely	Minor	Low	High	Good
Brucellosis	Low	Likely	Minor	Low	High	Good
Hemorrhagic Fever with Renal Syndrome (HFRS)	Low	Likely	Minor	Partial	High	Good
Crimean-Congo haemorrhagic fever	Low	Likely	Minor	Partial	High	Good
West Nile fever	Low	Likely	Minor	Low	Partial	Good
Avalanche	Low	Likely	Minor	Low	High	Good
Civil unrest	Low	Likely	Minor	Partial	Very High	Good
Biological agents						

C. Disaster Risk Calendar:

Specific Hazard	Risk Level	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acute Watery Diarrhea	High												
Gastroenteritis/Foodborne diseases	High												
Flood	High												
Air pollution	High												
Nuclear agents	High												
Radiation agents	High												
Chemical agents	High												
Antimicrobial-resistant microorganisms	Moderate												
Disease X	Moderate												
Respiratory pathogens with pandemic potential (influenza, coronavirus, orthopox virus, etc.)	Moderate												
COVID-19	Moderate												
Earthquake	Moderate												
Forest/Wildfires	Moderate												
Poliomyelitis	Low												
Measles	Low												
Leptospirosis	Low												
Tularemia	Low												
Brucellosis	Low												
Hemorrhagic Fever with Renal Syndrome (HFRS)	Low												
Crimean-Congo haemorrhagic fever	Low												
West Nile fever	Low												
Avalanche	Low												
Civil unrest	Low												
Biological agents													

D. Details of the impact assessment:

Hazard	Severity	Vulnerability	Vulnerability Details	Coping capacity	Coping capacity				Impact
					Governance and Resources	Health Sector Capacity	Non-Health Sector Capacity	Community Capacity	
Acute Watery Diarrhea	Moderate	Partial	The vulnerable populations are (children and elderly), Infrastructure (unsafe water in rural areas, sewage and waste management) (unsafe water in rural areas, sewage and waste management), Environmental aspects (floods)	Partial	The existence of national policies in public health, such as the law, as well as emergency operations plans and multi-sectoral coordination.	There is no health information system or early warning system in place, and the surveillance system is out of date. Furthermore, there is a lack of laboratory capacity in the regions as well as a lack of human capacities, particularly sanitary inspectors. There is no lab confirmation for cases (only clinical diagnoses) despite the availability of lab capacity.	Nonfunctional capacity to exchange data between health and non-health sector	Sufficient knowledge, attitude, and practices regarding hazards and existing prevention. There is no hydrometeorological system for EWS. Engagement of NGO, religious, and community leaders. There is a lack of community first-aid training.	Moderate
Gastroenteritis/Food borne diseases	Moderate	Low	The vulnerable population are (children and elderly), Infrastructure (unsafe and uncontrolled food, water in rural areas, sewage and waste management) (unsafe and uncontrolled food, water in rural areas, sewage and waste	Partial	The existence of national policies as well as emergency operations plans and multi-sectoral coordination.	There is no health information system or early warning system in place, and the surveillance system is out of date. Furthermore, there is a lack of laboratory capacity in the regions as well as a lack of human capacities, particularly sanitary inspectors. There is no lab confirmation for cases (only clinical diagnoses) despite the availability of	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture such population movement	Sufficient knowledge, attitude and practices about the hazard and existing prevention. Engagement of NGO, religion, and community leaders.	Moderate

			management), The presence of vectors			lab capacity.			
Poliomyelitis	Very Low	Low	Vulnerable population, (unvaccinated and RAE community due to the refusal of vaccination	Low	The existence of national policies as well as emergency operations plans and multi-sectoral coordination.	There is no health information system or early warning system in place, and the surveillance system is out of date. In addition, lack of human capacities in Public Health due to the staff retirement and no lab capacities exists.	Surveillance and early warning systems are not integrated with animal sectors and there are no functional capacities to capture such as population movement	Insufficient knowledge, attitude and practices regarding the hazard and existing prevention.	Minor
Antimicrobial-resistant microorganisms	Moderate	Partial	While AMR poses a threat to people of all ages, young children were found to be particularly high risk to elderly. This increases healthcare-associated infection (HAI).	Partial	The existence of national policies as well as emergency operations plans and multi-sectoral coordination.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of laboratory capacities in the regions and a lack of human capacities in public health and sanitary inspection.	Uncontrolled usage of antibiotics in humans and animals	Lack of knowledge, attitude and practices about the hazard and existing prevention.	Moderate
Disease X	High	Partial	A new disease or pathogen is expected to emerge somewhere in the world and spread to many places, including Kosovo. As a result, people are expected to be susceptible to such diseases.	Partial	Some of the critical capacities in responding to a novel pathogen are effective governance, which includes well-coordinated and transparent decision-making processes, communication systems, supply chain systems, research and development infrastructure, and international cooperation.	The health sector needs to have adequate resources, funding, and staffing in place to effectively respond to the emergence of a novel disease, as well as regular training and drills to maintain readiness.	Other sectors, such as emergency management, agriculture, education, and transportation, should collaborate in order to effectively respond to a novel pathogen and reduce its impact on public health	The existence of community organizations, such as volunteer groups, non-profits, and religious organizations, can provide critical assistance to those affected	Moderate

					These capabilities help with resource allocation and the development of effective disease prevention and control measures.		and the community.	by a novel pathogen, such as access to food, housing, and other resources.	
Respiratory pathogens with pandemic potential	High	Partial	The vulnerable population are the elderly, people with chronic conditions, as well as environmental and climate changes.	High	The existence of national policies, emergency plans as well as multi-sectorial coordination	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement.	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture such population movement	Sufficient knowledge, attitude and practices about the hazard and existing prevention. Engagement of NGO, religion, and community leaders.	Moderate
COVID-19	High	Partial	Vulnerable population (elderly people, chronic diseases, unvaccinated)	High	The existence of national policies and emergency plans.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement.	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture such population movement	Sufficient knowledge, attitude and practices about the hazard and existing prevention.	Moderate
Measles	Low	Partial	Vulnerable population, (unvaccinated people or people who refuse vaccination as well as the RAE community which has a high refusal rate for vaccination)	High	The existence of national policies and emergency plans.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement.	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture such population movement	Insufficient knowledge, attitude and practices about the hazard and existing prevention.	Minor

Leptospirosis	Low	Very Low	Vulnerable populations are farmers and mine workers. Sewer workers. Slaughterhouse workers. Veterinarians and animal caretakers. Fish workers. Dairy farmers)	High	The existence of national policies, emergency plans as well as multi-sectorial coordination	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement and sanitary inspection	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture such population movement	Lack of knowledge, attitude and practices about the hazard and existing prevention.	Minor
Tularemia	Low	Low	Vulnerable populations in the areas, foresters, hunters, farmers	High	The existence of national policies and emergency plans.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement.	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture population movement	Sufficient knowledge, attitude and practices about the hazard and existing prevention.	Minor
Brucellosis	Low	Low	Vulnerable populations in the endemic areas, farmers, veterinarians, butchers	High	The existence of national policies and emergency plans.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement.	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture population movement	Insufficient knowledge, attitude and practices about the hazard and existing prevention of dairy products and contact with animals)	Minor
Hemorrhagic Fever with Renal Syndrome (HFRS)	Low	Partial	Vulnerable populations in the endemic areas, farmers, temporary residents in the mountains	High	The existence of national policies and emergency plans.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture	Insufficient knowledge, attitude and practices about the hazard and existing prevention and contact with	Minor

)						retirement.	population movement	rodents	
Crimean-Congo haemorrhagic fever	Low	Partial	The vulnerable population are farmers,	High	The existence of national policies and emergency plans.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement.	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture such as population movement	Insufficient knowledge, attitude and practices about the hazard and existing prevention.	Minor
West Nile fever	Low	Low	Vulnerable population (elderly people)	Partial	The existence of national policies and emergency plans.	There is no health information system or early warning system in place, and the surveillance system is out of date. There is also a lack of human capacities in public health due to staff retirement.	Surveillance and early warning systems are not integrated with animal sectors and there is no functional capacity to capture such as population movement	Insufficient knowledge, attitude and practices about the hazard and existing prevention methods	Minor
Flood	Moderate	Partial	Insufficient infrastructure (sewage and drainage system), exploitation of the river, erosion due to deforestation, lack of a preventive plan, and poor water management	Partial	Existence of the following laws, plans, and policies; Law on "Protection against natural and other Disasters", Law on Prevention and Control of CD, Integrated emergency management system, National Response Plan, and Emergency Support Function 8. However, there are insufficient financial resources, no emergency funds, and no funds to support the field	Existence of the following capacities: surveillance system for communicable diseases, laboratory system and network, genomic sequencing in process of improvement, the system of medicine supply in place but needs to be improved, sufficient workforce and trainings are ongoing to increase capacities, strengthen health system capacities	Existing capacities are sufficient (local EOC, regional EOC, EMA EOC, and MoH EOC), the Food and Veterinary Agency (FVA) has animal health capacities, an early warning system (EWS) is operational at the hydrometeorology	Local NGOs exist, but they require additional training and information. There is also a lack of knowledge and skills regarding how to behave before, during, and after floods.	Moderate

					emergency response team.	for health response. Furthermore, there is an emergency medical team (EMT), but its capacity needs to be increased through training, as well as increasing capacities on IPC, and finally, the private sector is permitted by law.	institute, and inter-institutional coordination mechanisms exist.		
Avalanche	Moderate	Low	a small number of people are at risk.	High	Despite the existence of Emergency Support Function 8, there are still insufficient financial resources, no emergency funds, and no funds to support the field emergency response team.	Health Sector Capacity are sufficient to manage any situation caused by the avalanche	There is sufficient search and rescue capacity	Local NGOs exist, but they require additional training and information. There is also a lack of knowledge and skills regarding how to behave before to, during, and after an avalanche.	Minor
Earthquake	Moderate	Partial	Weak buildings, the density of neighbourhoods, high density of population, high level of poverty (18%), RAE community more vulnerable due to low education level, and the high unemployment rate	Partial	Existence of the following laws, plans, and policies; Law on "Protection against natural and other Disasters", Law on Prevention and Control of CD, Integrated emergency management system, National Response Plan, and Emergency Support Function 8. However, there are insufficient financial resources, no emergency funds, and no funds to support the field	There is a sufficient workforce and trained to increase capacities, and strengthen health system capacities for health response. Furthermore, there is an emergency medical team (EMT), but its capacity needs to be increased through training of existing teams, as well as increasing capacities on IPC, and finally, the private sector is permitted by law.	Existing capacities are sufficient (local EOC, regional EOC, EMA EOC, and MoH EOC), the Food and Veterinary Agency (FVA) has animal health capacities, an early warning system (EWS) is operational at the hydrometeorology	local NGOs exist but need further training, Information, lack of knowledge and skills on how to behave before, during and after the earthquake	Moderate

					emergency response team.		institute, and inter-institutional coordination mechanisms exist.		
Air pollution	Moderate	High	The high number of respiratory diseases, and the increase in the number of cancer cases.	High	The Institute of Hydrometeorology has the capacity to regularly monitor air quality, and there is an air protection law in place; however, there is insufficient funding.	The health system is covering all territory and is able to provide health services, and a sufficient workforce but there is a need for further and new equipment	Mitigate and eliminate the coal and fossil fuels	People lack adequate training and knowledge about air pollution. There are local non-governmental organizations (NGOs) whose mission is to protect the environment.	Moderate
Forest/Wildfires	Low	Low	There are no houses or neighbourhoods close to the mountain and forest where there is a high risk of forest fires.	Partial	Existence of the following laws and capacities: Law on "Protection against natural and other disasters," Integrated emergency management system, National Response Plan, Law on "Fire protection and rescue," and Forests Law.	A sufficient workforce needs to be trained, and IPC capacity needs to be increased.	Existing capacities are sufficient, and an inter-institutional coordination mechanism is in place.	local NGOs exist but need further training, Information, lack of knowledge and skills on how to behave before, during and after fire	Minor
Nuclear agents	High	Very High	All systems, people, the economy, infrastructure, and the environment are vulnerable.	Very Low	Existence of the following laws and plans: the Radiation Protection and Nuclear Safety Law, the National Plan for Radiation and Nuclear Safety, and the National Response Plan. There is, however, no dedicated budget.	There are no capacities for decontamination, or treatment, no laboratory, and there is no equipment.	Kosovo Security Forces unit for CBRN trained, and have capacities for detection, decontamination and evacuation	No capacity	Critical
Biological									

agents									
Radiation agents	High	Very High	All systems, people, the economy, infrastructure, and the environment are vulnerable	Very Low	Existence of the following laws and plans: the Radiation Protection and Nuclear Safety Law, the National Plan for Radiation and Nuclear Safety, and the National Response Plan. There is, however, no dedicated budget.	There are no capacities for decontamination, or treatment, no laboratory, and there is no equipment.	Kosovo Security Forces unit for CBRN trained, and have capacities for detection, decontamination and evacuation	No capacity	Critical
Chemical agents	Moderate	High	All systems, people, the economy, infrastructure, and the environment are vulnerable	Very Low	Existence of the following laws and plans: the Radiation Protection and Nuclear Safety Law, the National Plan for Radiation and Nuclear Safety, and the National Response Plan. There is, however, no dedicated budget.	There are no capacities for decontamination, treatment, no laboratory, and there is no equipment,	Kosovo Security Forces unit for CBRN trained, and have capacities for detection, decontamination and evacuation	No capacity	Severe
Civil unrest	Moderate	Partial	there are no details	Very High	Existence of the Law on gathering	There are sufficient capacities	There are sufficient capacities	No capacity	Minor

E. Risk Level Summary:

Very low	Low	Moderate	High	Very high
1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	- Measles - Hemorrhagic Fever with Renal Syndrome (HFRS) - Crimean-Congo haemorrhagic fever - West Nile fever - Avalanche - Civil unrest - Tularemia - Brucellosis - Leptospirosis - Poliomyelitis	- Disease X - Forest/Wildfires - Antimicrobial resistant microorganisms - Respiratory pathogens with pandemic potential (influenza, coronavirus, orthopox virus, etc.) - COVID-19 - Earthquake	- Air pollution - Nuclear agents - Radiation agents - Acute Watery Diarrhea - Flood - Chemical agents - Gastroenteritis/Food borne diseases	

F. Risk Matrix:

Impact →	Critical			• Nuclear agents • Radiation agents		
	Severe			• Chemical agents		
	Moderate			• Antimicrobial resistant microorganisms • Disease X • Respiratory pathogens with pandemic potential (influenza, coronavirus, orthopox virus, etc.) • COVID-19	• Acute Watery Diarrhea • Gastroenteritis/Food borne diseases • Flood	• Air pollution
	Minor		• Poliomyelitis	• Measles • Leptospirosis • Tularemia • Brucellosis • Hemorrhagic Fever with Renal Syndrome (HFRS) • Crimean-Congo haemorrhagic	• Forest/Wildfires	
	Negligible					
		Very unlikely	Unlikely	Likely	Very likely	Almost certain
		Likelihood →				

Recommendations & Priority Actions:

The following are the priority actions for the moderate and high-risk hazards:

Acute Watery Diarrhea:

- Enhance the lab capacities
- Digitalization of the communicable disease surveillance system as well as the Early Warning and Response System (EWRS)

Gastroenteritis/Foodborne diseases:

- Increase inspection capacity under the One Health Approach
- Digitalization of the communicable disease surveillance system as well as the Early Warning and Response System (EWRS)
- Enhance One Health Approach
- Enhance the lab capacities

Antimicrobial-resistant microorganisms:

- Digitalization of the communicable disease surveillance system as well as the Early Warning and Response System (EWRS) and integration with the animal-human sector.
- Review the strategy of AMR
- Enhance the surveillance of the antibiotic usage
- Strengthening the One Health Approach (animal and human)

Respiratory pathogens with pandemic potential (influenza, coronavirus, orthopox virus, etc.):

- Enhancement of the community engagements
- Hiring and training staff in PH
- Digitalization of the communicable disease surveillance system as well as the Early Warning and Response System (EWRS)
- Update the Pandemic Preparedness Plan for respiratory pathogens

Brucellosis:

- Digitalization of the communicable disease surveillance system as well as the Early Warning and Response System (EWRS) and integration with the animal-human sector.
- Enhancement of the lab capacities for biosafety.
- Enhance One Health Approach

Crimean-Congo haemorrhagic fever:

- Digitalization of the communicable disease surveillance system as well as the Early Warning and Response System (EWRS) and integration with the animal-human sector.
- Review the Action Plan including the development of a plan for CCHF

Hemorrhagic Fever with Renal Syndrome (HFRS):

- Enhancement of the lab capacities
- Digitalization of the communicable disease surveillance system as well as the Early Warning and Response System (EWRS)

Air pollution:

- Monitoring and evaluation of the implementation of "Law and strategy on air protection"
- Assessment of the impact of air pollution on health

Chemical agents:

- Storage and monitoring of the chemical material, their treatment

Flood:

- Build the implants to treat sewage (black water)
- Cleaning of rivers, building riverbanks

Nuclear agents:

- National plan for nuclear and radiological emergencies, establish early warning system for nuclear and radiological emergencies

Radiation agents:

- National plan for nuclear and radiological emergencies, establish EW system for nuclear and radiological emergencies, storage of radioactive materials

Earthquake:

- Increase and strengthen capacities including workforce through continuous training

Forest/Wildfires:

- Enhance human resources and equipment

Conclusion and Next Steps:

Kosovo's strategic risk assessment exercise using WHO's Strategic Tool for Assessing Risks (STAR) identified several key risks facing the health sector, including infectious disease outbreaks, natural, technological and societal hazards. Participants' recommendations to mitigate these risks can be grouped into the following areas:

- Enhancing surveillance and early warning systems for infectious disease outbreaks and developing and regularly updating a comprehensive pandemic preparedness plan that includes protocols for identifying, isolating, and treating patients with infectious diseases.
- Developing and implementing a comprehensive disaster management plan that includes protocols for responding to natural disasters, ensuring the continuity of essential healthcare services, and addressing the mental health needs of affected communities.
- Improving healthcare infrastructure by investing in equipment, technology, and personnel training, as well as improving access to essential medicines and supplies.
- Establishing sustainable financing mechanisms for the health sector, including innovative funding models, cost-effective policies, and public-private partnerships.

The next steps include the following:

- Endorsement and dissemination of risk assessment findings to relevant stakeholders within and outside the sector.
- Prioritizing mitigation strategies for the identified risks based on their potential impact, feasibility, and urgency, and assigning clear responsibilities for the implementation of each strategy.
- Establishing a monitoring and evaluation framework to assess the effectiveness of the mitigation strategies, including the identification of performance indicators and regular reporting.
- Promoting the integration of risk management into the health sector's decision-making processes, including policy development, planning, and budgeting.
- Building partnerships and collaboration with stakeholders, including healthcare providers, patients, and community organizations, to ensure that the mitigation strategies align with their needs and expectations.
- Conduct strategic risk assessment exercises at the regional level to support regional preparedness actions.

The health sector can effectively manage risks and improve the resilience of healthcare systems to future threats by implementing these risk mitigation strategies and promoting a risk management culture. The use of WHO's Strategic Tool for Assessing Risks (STAR) can enable a comprehensive and systematic approach to risk assessment and mitigation, ensuring that the health sector is better prepared to manage risks and protect communities' health and well-being.

Annexes

A. Annex 1: Workshop Agenda:

Day 1: 7 Feb 2023		
Time	Activity	Responsible
08:30–09:00	Registration	
09:00 – 9:30	Opening Session: • Welcome and opening remarks (MoH and WHO) • Workshop Objectives and expected outputs • Introduction of participants • Group photo	Arsim Berisha, Deputy Minister of Health Ababayehu Assefa Mengistu, Coordinator of the Balkan Health Emergencies Hub Isme Humolli
9:30 - 10:30	• Overview of strategic risk assessment using the STAR Methodology	Jetri Regmi Rawi Ibrahim
10:30 – 10:45	Break	
10:45 – 11:45	• Steps to conducting a strategic risk assessment & demonstration of the STAR data collection tool.	Jetri Regmi Rawi Ibrahim
11:45 – 12:00	• Assignment of participants to working groups • Identify key roles in working groups	Jetri Regmi Rawi Ibrahim Isme Humolli
12:00 - 13:00	Lunch break	
13:00 – 14:30	Step 1: Identification & agreement on country hazards (<i>plenary session</i>)	Jetri Regmi Rawi Ibrahim Isme Humolli
14:30–16:00	Step 2: Group Work: Description of the most likely scenario that would require a national-level health emergency response.	Jetri Regmi Rawi Ibrahim
	<i>Break (to be taken during the group work)</i>	
16:00 - 17:00	Step 2a: Plenary Discussion: Presentation of the results of the group work for confirmation from the larger group.	Jetri Regmi Rawi Ibrahim Isme Humolli
Day 2: 8 Feb 2023		
Time	Activity	Responsible
9:00 – 9:30	Overview of Step 3: Defining the identification of health consequences of hazards (immediate and secondary) based on the most likely scenario.	Jetri Regmi Rawi Ibrahim
9:30 – 11:00	Step 3a: Group work and agreement on the list of health consequences based on the most likely scenario: • Mapping exposure and extent of identified hazards. • Geographic area(s) likely to be affected. • Population settings.	Jetri Regmi Rawi Ibrahim Isme Humolli
11:00 - 11:30	Step 3b: Presentation of the group work results and agreement on the list of health consequences based on the most likely scenario.	Jetri Regmi Rawi Ibrahim Isme Humolli
11:30 – 11:45	Break	

11:45 – 12:00	Step 4: Facilitators introduce the concept of frequency, seasonality and likelihood in the STAR methodology	Jetri Regmi Rawi Ibrahim
12:00 - 13:00	Step 4a: Group work: assessment of: • frequency, • seasonality and • determining the likelihood for each hazard	Jetri Regmi Rawi Ibrahim Isme Humolli
13:00 – 14:00	Lunch Break	
14:00 – 15:00	Step 4b: Plenary: presentation of the results of group works and reach agreement on the frequency, seasonality and likelihood	Jetri Regmi Rawi Ibrahim Isme Humolli
15:00 – 15:15	Step 5: Presentation of the concept of severity in the STAR methodology.	Jetri Regmi Rawi Ibrahim
15:15 – 16:15	Step 5: Group work: identification, discussion and agreement on the level of severity for each hazard	Jetri Regmi Rawi Ibrahim Isme Humolli
	<i>Break (to be taken during the group work)</i>	
16:15 – 17:00	Presentation & Plenary Discussion: identification, discussion, and agreement on the level of severity for each hazard.	Jetri Regmi Rawi Ibrahim
Day 3: 9 Feb 2023		
Time	Activity	Responsible
9:00 - 9:15	Step 6: Presentation of the concept of vulnerability and coping capacity in the STAR methodology	Jetri Regmi Rawi Ibrahim
9:15 – 10:45	Step 6a: Group work: identification, discussion, and agreement on: • vulnerability and • coping capacity available for each hazard	Jetri Regmi Rawi Ibrahim Isme Humolli
10:45 – 11:00	Break	
11:00 – 11:30	Plenary Discussion: • presentation of the results of group work and agreement on vulnerability and coping capacities. • the confidence levels	Jetri Regmi Rawi Ibrahim Isme Humolli
11:30 – 12:30	Presentation of the strategic risk assessment results: • list of ranked hazards • 5x5 risk matrix level of risk for each hazard • Seasonal calendar of risks and Emergency and Disaster Risk Calendar	Jetri Regmi Rawi Ibrahim Isme Humolli
12:30 – 13:45	Drafting priority actions and next steps: • Link to the ERP • One Health	
13:45 – 14:00	<i>Closing Remarks</i>	
14:00 – 15:00	Lunch Break	

B. Annex 2: Participants List:

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