Project

Making Cities Resilient 2030 (MCR2030)

Bosnia and Herzegovina

Disaster Resilience Scorecard Assessment and Public Health Scorecard Addendum Analysis

Gaps, Challenges and Recommendations
INDEX

1. BACKGROUND ......................................................................................................................................3
2. INTRODUCTION ................................................................................................................................... 4
3. SCORECARDS ASSESSMENT: PROCESS AND METHODOLOGY .............................................................5
4. CITIES / MUNICIPALITIES / CANTONS INVOLVED IN SCORECARD ASSESSMENTS ...........5
4.1. Central Bosnia Canton ........................................................................................................................5
4.1.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges ........7
4.1.2. Recommendations for improvement .............................................................................................9
4.1.3. Results of Public Health Scorecard Addendum ........................................................................ 10
4.1.4. Recommendations for improvement .......................................................................................... 12
4.2. City of Bihać ...................................................................................................................................... 13
4.2.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges ........13
4.2.2. Recommendations for improvement .......................................................................................... 15
4.2.3. Results of Public Health Scorecard Addendum ........................................................................ 16
4.2.4. Recommendations for improvement ........................................................................................... 18
4.3. City of Bijeljina ................................................................................................................................. 19
4.3.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges ............20
4.3.2. Recommendations for improvement .......................................................................................... 22
4.3.3. Results of Public Health Scorecard Addendum ........................................................................ 22
4.3.4. Recommendations for improvement .......................................................................................... 25
4.4. City of Gradačac ............................................................................................................................... 26
4.4. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges ........27
4.4.2. Recommendations for improvement .......................................................................................... 28
4.4.3. Results of Public Health Scorecard Addendum ......................................................................... 30
4.4.4. Recommendations for improvement .......................................................................................... 31
4.5. Municipality of Olovo ......................................................................................................................... 32
4.5. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges ........33
4.5.2. Recommendations for improvement .......................................................................................... 35
4.5.3. Results of Public Health Scorecard Addendum ......................................................................... 36
4.5.4. Recommendations for improvement .......................................................................................... 37
REFERENCES ....................................................................................................................................................37
1. BACKGROUND

Bosnia and Herzegovina faces risks from a range of natural disasters such as earthquakes, droughts, floods and landslides, as well as man-made hazards such as mines (unexploded ordinances), pollution and chemical-biological disasters.

The country is particularly vulnerable to extreme precipitation (snow and rain) and river basin flooding, which sometimes result in high financial losses, damage to infrastructure and agricultural production, and food insecurity. More than 20 per cent of Bosnia and Herzegovina’s territory is prone to flooding: on average, flooding affects about 100,000 people a year and causes annual losses of about US$600 million in gross domestic product (GDP). In 2014, unprecedented rainfall affected 25 per cent of the population and severely disrupted the economy. River floods inundated fields in 81 municipalities, with severe consequences for agriculture workers, who make up 20 per cent of the country’s total workforce. Flooding also triggered more than 3,000 landslides, with losses of nearly 15 per cent of GDP.

The country’s mountainous geography, ageing infrastructure and high rate of urbanization compound its vulnerability to earthquakes and landslides. A magnitude 6.0 earthquake in 1969 resulted in 14 deaths and over $300 million in damages. Based on current exposure, the same earthquake occurring today would have caused over 400 deaths and more than $4 billion in damages (GFDRR 2017). Given the nature of the disasters facing the country – which are likely to be more frequent in the future given the predictions for climate change – there is an urgent need to implement a range of actions, from reconstruction to the strengthening of infrastructure to make it more resilient to disasters. Moreover, the country has not yet completely recovered from previous crises such as flooding in recent years, and is still at risk from the continued presence of landmines and unexploded ordnance (UXO).

The region is very seismologically active, with earthquakes and small tremors recorded throughout the year. However, these tend to be small earthquakes that do not cause either human casualties or material damage. The last major earthquake in BiH occurred in Banja Luka on October 26, 1969. It registered 6.0 on the Richter scale and left 15 dead and over 1,000 people injured. In addition, heavy rains frequently cause large rivers to overflow. Previously, major floods destroyed thousands of homes and displaced people throughout the country. Forest fires are also common in Herzegovina (particularly in the southern part of the country) during summer heat waves, predominantly in inaccessible areas. Fires are normally kept under control, but if they get close to populated areas, they often result in road closures.

Bosnia and Herzegovina is taking steps to address climate change both nationally and internationally. Within the country, climate change is increasingly recognized as an issue of key strategic importance, particularly by the government and the scientific community. The country’s vision for its development is that, by 2025, Bosnia and Herzegovina will be a sustainable and prosperous ‘green economy’. Bosnia and Herzegovina plans to enter the European Union (EU) as a Member State with low emissions, a high quality of life for everyone, healthy natural ecosystems, sustainable natural resources management and high levels of climate resilience. Increasing levels of energy efficiency, greater renewable energy use, and improved energy and transport infrastructure and services will lead to international investment, job creation and new business enterprises in a resource-efficient economy. This will be achieved through the implementation of the Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina, which has two main goals:

1. Increase resilience to climate variability and climate change, and in so doing secure development gains;

2. Reach a peak in greenhouse gas emissions around 2025 at a level that is below the EU27 per capita average.

Although Bosnia and Herzegovina has one of the lowest levels of per capita greenhouse gas emissions in Europe (five tons CO2 equivalent per capita per year; approximately half of the EU average), climate

2. Bosnia And Herzegovina Floods, Recovery Needs Assessment, GFDRR 2014,
change is already evident. Bosnia and Herzegovina is particularly vulnerable to climate change due to its geographical position, the economic importance of its agriculture and forestry sectors, and its limited adaptive capacity. Summer temperatures have increased in some places by 1.2°C over recent decades, and rainfall patterns have altered significantly.3

Landmines left over from the 1992-95 war have further complicated efforts to deal with wildfires. Flash floods and landslides, which remain a risk in all parts of Bosnia and Herzegovina after heavy rain, move minefields and destroy minefield markings. The excessive use of coal, wood and more noxious materials for heating residences, means that during the winter months Sarajevo and other cities experience several weeks of dense smog, with air pollution often reaching hazardous levels.

The World Health Organization declared the outbreak of a COVID-19 pandemic in March 2020 and it subsequently spread to more than 200 countries, with severe public health and economic consequences. In the November 2021 Bosnia and Herzegovina (BiH) had more than 3,601 confirmed death cases per 1 million inhabitants4.

The country’s GDP was approximately $15.3 billion in 2015 – a per capita GDP of $4,030 – with about 90 per cent derived from services, industry and, to a lesser extent, agriculture.

2. INTRODUCTION

Bosnia and Herzegovina faces a range of natural and man-made hazards. As a result, a wide variety of domestic and international NGOs, organizations and initiatives have provided funding, expertise and capacity-building activities over the last 20 years to support areas such as governance, human rights, gender equality, economic empowerment and infrastructure development, as well as disaster risk reduction and disaster risk management.

One of the main baselines for DRR and resilience-building in BiH is the implementation of the Sendai Framework for Disaster Risk Reduction (2015-2030). The Sendai Framework emphasizes the need for strengthening competencies, management and capacity-building at different levels of government as a prerequisite for enhancing disaster risk reduction. This includes a comprehensive approach to building resilient communities and ensuring the security of all people, as well as comprehensive risk assessments that evaluate potential risks at all levels.

BiH recently began implementing the ‘Making Cities Resilient 2030 (MCR2030)’ initiative, a unique multi-stakeholder initiative for improving local resilience through advocacy, sharing knowledge and experiences, establishing mutually reinforcing city-to-city learning networks, injecting technical expertise, connecting multiple layers of government, and building partnerships. By delivering a clear roadmap for urban resilience, providing access to knowledge and monitoring and reporting tools, MCR2030 aims to support cities, municipalities, cantons or other levels of local governance on their journey towards reducing risk and building resilience. The ultimate goal of MCR2030 is to ensure that cities/municipalities and cantons (or other levels of governance) are inclusive, safe, resilient and sustainable by 2030, contributing directly to the achievement of Sustainable Development Goal 11 (SDG11) and other global frameworks such as the Sendai Framework for Disaster Risk Reduction, the Paris Agreement and the New Urban Agenda.

In 2021, MCR2030 was rolled out across BiH, with four cities/municipalities and one canton actively taking up the initiative: the City of Bihać, the City of Bijeljina, the City of Gradačac, the Municipality of Olovo, and the Central Bosnia Canton.

3. SCORECARDS ASSESSMENT: PROCESS AND METHODOLOGY

The MCR Campaign promotes the use of a ten-point checklist (the Ten Essentials for Making Cities Resilient) to guide city governments in resilience planning and decision-making. Over 4,350 cities have signed up to the MCR Campaign during the past decade and have adopted the ‘Ten Essentials’. Cities that joined the MCR Campaign have made greater progress in reducing disaster risk than those that have not gone through a similar process.

These Ten Essentials are assessed through a ‘Disaster Resilience Scorecard for Cities’. The responses to the Scorecard are based on comprehensive data collection and input from a range of relevant stakeholders, including in areas such as civil protection, communications, water, sanitation, energy, health care, welfare, education, business and social protection. Through a process of cooperation and information sharing, representatives of the four cities/municipalities and one canton completed the ‘Disaster Resilience Scorecard for Cities’, along with the ‘Public Health System Resilience Addendum’, which examines many aspects of public health that are relevant to disaster planning, mitigation and response.

The Scorecards, which are based on Sendai Framework indicators, provide a tool that enables local governments to assess their current disaster resilience status and to monitor and review challenges in the implementation of the Sendai Framework. The methodology largely consists of compiling, analysing and synthesizing data and secondary sources. After joining the MCR2030 initiative, the participating cities, municipality and canton started preparatory activities for the scorecard assessment. This included a wide range of consultations and data collection at local level in cooperation with key stakeholders such as DRR platforms, crisis headquarters\(^5\), civil protection agencies, cantonal ministries, municipal and other public services, and NGOs.

The cities of Bihać, Gradačac and Bijeljina are three of the ten cities and municipalities included in the joint Swiss–UN Programme, ‘Disaster Risk Reduction for Sustainable Development in Bosnia and Herzegovina’.\(^6\) The programme is a collaboration between the Government of Switzerland and five UN agencies (UNDP, UNICEF, UNESCO, UNFPA and FAO). It has helped to establish city DRR platforms consisting of representatives from relevant sectors and institutions (civil protection, agriculture, education, social and child protection, and health). One of the key tasks of these platforms is to update existing methodologies for integrating DRR into local development strategies.

The cities of Bihać, Gradačac and Bijeljina have also created and established a Disaster Risk Analysis System (DRAS system) with the support of UNDP, an innovative tool that enables access for decision makers and citizens to scientific data on the risks of floods, landslides, earthquakes and unexploded mines. The system aims to increase awareness of disaster risks in specific localities.\(^7\)

4. CITIES / MUNICIPALITIES / CANTONS INVOLVED IN SCORE CARD ASSESSMENTS

4.1. Central Bosnia Canton

Central Bosnia Canton is one of ten cantons in the Federation of Bosnia and Herzegovina. The cantons were created by the Law on Federal Units (1996), which was based on the Washington Agreement. Each canton has its own government headed by a prime minister, with his/her own cabinet, who is assisted in his/her duties by various cantonal ministries, agencies and services.

Central Bosnia Canton is located in the center of the country, to the west of the capital, Sarajevo. The Canton government is based in the municipality of Travnik. At the time of the 2013 census, the Canton had a population of 273,149. It covers an area of 3,189 km\(^2\) with a population density

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5. Crisis headquarters are permanent multi-agency coordinating bodies who are existing on all levels (municipal, cantonal and entity levels) who are activating and operating when crisis situations arise.
7. https://drasinfo.org/
of 85.65/km. The Canton consists of 12 municipalities: Bugojno, Busovača, Dobretići, Donji Vakuf, Fojnica, Gornji Vakuf-Uskoplje, Jajce, Kiseljak, Kreševo, Novi Travnik, Travnik and Vitez.

Central Bosnia Canton has identified flooding as the major risk since the Canton is situated along two main rivers, Vrbas and Lašva, as well as several smaller rivers. Fires and pandemics are also seen as a key risk, with the potential to have a serious impact on the Canton. Of the total area, 57 per cent is covered by forests and 34 per cent consists of agricultural areas (dominated by livestock). In addition to agriculture, the most important areas of the economy are trade, tourism, forestry, mining, construction, manufacturing and industrial production.8

In February 2012, the entire Canton was affected by heavy snowfall and extremely low temperatures (the coldest month since 1956). The snowfall was of such intensity that in a very short time it blocked roads in all the municipalities. The height of snow reached between 70 cm and 250 cm in mountainous areas. Snow and low temperatures, which dropped as low as -23°C, caused widespread damage to goods and assets, especially to greenhouses and auxiliary facilities/barns, and raspberry strawberry and blueberry plantations. A state of natural disaster was declared in three municipalities (Gornji Vakuf-Uskoplje, Fojnica and Kreševo).

Two years later, in May 2014, Bosnia and Herzegovina was hit by the largest floods since hydrometeorological measurements were introduced in 1892. Intense rainfall led to large river overflows that exceeded the return period of 500 years. In Central Bosnia Canton, flooding affected most of the municipalities. There were no human casualties, but the floods caused extensive material damage. The heavy rainfall triggered a large number of landslides, which caused a great deal of damage to facilities and infrastructure.

In February 2019, following heavy rainfall, flooding once again hit most of Central Bosnia Canton, causing yet more material damage. In response to these events, representatives from the Canton started to seek out and engage proactively with different projects and activities to build up the capacities of local communities, increase resilience and reduce the impact of disasters in the Canton.

The Canton carried out a number of disaster risk reduction activities, including:

1. Adopting the ‘Strategy for the Development of the Central Bosnia Canton, 2021-2027’. The strategy identified three strategic goals that represent the basis for determining priorities and measures, as well as further steps for development planning:
   a) Encourage sustainable economic development
   b) Improve the quality of life and promote a sustainable social environment for all citizens
   c) Improve the state of the environment and public infrastructure.

2. Initiating an update of the risk and vulnerability assessment for the Central Bosnia Canton to natural and other disasters

3. Initiating activities for the development of a Strategy for the Development of Civil Protection


Between 2015 and 2020, with the support of the UNDP project, ‘Integrating Climate Change into Flood Risk Reduction in the Vrbas’ Basin’, as well as the Global Fund and Federal Department of Civil Protection, a number of activities were implemented:

a) An automatic hydrometric monitoring network was established in the Vrbas basin – the first basin in Bosnia and Herzegovina with sufficient coverage. The network consists of 7 hydrological, 2 meteorological and 20 precipitation stations; data collection and processing are centralized in hydrometeorological institutes.

b) Municipal civil protection services have been equipped with radio stations and digital sirens, and a transmitter has been assigned to the Canton’s Civil Protection Administration, which has significantly improved the early warning system for impending flood events.

c) Hazard maps and flood-risk maps have been developed and submitted to agencies and municipalities.

d) Flood protection and rescue plans have been developed for each of the municipalities.

e) Vrbas GeoPortal was created and operationalized (http://vrb.pmfbl.org/). The portal provides access to flood hazard and risk maps, flood sensitivity models, a landslide and torrent flow register, real-time hydrometric measurement data and participatory GIS to aid flood-risk management in local communities.

4.1.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges

Following the rollout of the MCR2030 initiative in BiH in 2021, Central Bosnia Canton was the first area to express an interest and join the initiative. The Prime Minister of Central Bosnia Canton signed a letter of interest and named two coordinators for implementing activities. After several online meetings and consultations with the UNDRR Coordination and Project Support Specialist for BiH, several preparatory activities for implementing the ‘Disaster Resilience Scorecard for Cities’ and ‘Public Health System Resilience Addendum’ took place.

On the 5 June 2021, a one-day workshop to complete the Preliminary Disaster Resilience Scorecard for Cities (and Public Health Scorecard Addendum) took place in Travnik. The workshop brought together representatives from cantonal ministries and other DRR and public health stakeholders to work on finalizing the Scorecards.

9. Vrbas is one of the main rivers in Central Bosnia Canton
10. This includes municipalities along the Vrbas River Basin, municipalities from Republic of Srpska, and the municipalities of Gornji Vakuf-Uskoplje, Bugojno, Donji Vakuf and Jajce.
During the workshops, participants had an opportunity to discuss and share their opinions on each of the questions, especially those that related to their area of expertise, and verify their answers with the other participants. After the workshop, the results were collected and compiled by the coordinators.

The following is a summary of the findings from the Scorecard Assessment:

- The overall score for the Preliminary Disaster Resilience Scorecard was **65 out of a possible 141**.

- The ‘most likely’ (probable) risks are floods and epidemics/pandemics, but also earthquakes, unexploded ordinances, extreme temperatures, droughts, zoonotic diseases, landslides and fires.

- The ‘most severe’ risks are floods and epidemics/pandemics.

- The Canton does not have any DRR, climate or resilience master plan or relevant strategy in line with or based on the Sendai Framework. There are a number of different plans but they are predominantly developed independently, are only partially compliant with the Sendai Framework and do not cover all of the Ten Essentials.

- The Canton’s authorities and stakeholders have knowledge of the key hazards that the Canton faces, and their likelihood of occurrence, but there are no agreed plans for updating this information.

- There is a relatively comprehensive collective understanding of cascading impacts but only for some disaster scenarios.

- There is some sharing of risk information between the cities/municipalities in the Canton and various utility providers and some consensus on points of stress.

- Hazard maps and data on risks for most hazards exist, but it is not clear whether there are any plans to update these.

- In terms of institutional capacity for resilience, the Canton can access most of the skills/experience and resources it needs to respond to identified disaster scenarios, but there are some gaps relating to pre-event planning, and during and post-event response.

- In regards to public education and awareness, some useful programmes and channels exist for disseminating hazard, risk and disaster information, but there is significant room for improvement in order to reach a greater proportion of the public.

- Currently knowledge-sharing is insufficient and is usually done ad hoc, although the Canton is proactively seeking to exchange knowledge and learn from other cities/cantons that are facing similar challenges.

- There is some societal capacity in the Canton for resilience. Different grassroots organizations are engaged in some locations or in some aspects of the planning or response, but it is not comprehensive.
There are no regular training programmes provided within the Canton for the most vulnerable populations or the very poor, and limited mapping of socially vulnerable populations.

In terms of attracting new investment to the Canton, there is little or no understanding of routes to securing available sources of DRR funding.

The Canton’s financial plan provides for some DRR activities and budgets are ringfenced but there is not enough funding for basic DRR (mitigation, prevention, response and recovery) and resilience activities.

There is little or no insurance cover in the Canton – for example, for domestic housing, contents and personal transport (e.g. car insurance), or commercial and public infrastructure.

There are some incentives for different sectors and segments of business and society to support resilience-building, but it is patchy and does not cover basic needs.

There are some training courses covering risk and resilience issues offered to all sectors including government, businesses, NGOs and communities, but overall coverage and content needs to be significantly improved.

In some cases, protective infrastructure (such as flood barriers) is in place but some strategic protective infrastructure is missing. Design and management may not be consistent with best practice.

The main public services such as water and sanitation management, energy supply, transport and communication are likely to experience some loss of services in the ‘most probable’ disaster scenarios such as flooding.

In the ‘most probable’ scenarios, 5%-10% of teaching facilities would be at risk.

There is insufficient first responder equipment without military or civilian back up in case of emergency. Assets meet basic needs under the most severe scenarios, but gaps exist.

The Canton has a standard operating procedure for acting on early warnings and forecasts. It is estimated that more than half of the population is covered by early warning systems, but there is no early warning system in some areas.

The responsible disaster management authorities do not have sufficient staffing capacity to support first responder duties in surge event scenarios.

There is no emergency operations centre with automated standard operating procedures specifically designed to deal with the ‘most probable’ and ‘most severe’ scenarios at the cantonal level.

There is no strategy or process in place for post-event recovery and reconstruction, including for economic reboot or social support.

There are no established post-event assessment processes that can incorporate failure analyses or that have the ability to capture lessons learned that then feed into the design and delivery of rebuilding projects. Some lessons are captured and disseminated but not in a thorough or systematic way.

4.1.2 Recommendations for improvement

An analysis of the Canton’s key documentation on DRR and resilience issues (relevant strategies and plans), as well as an analysis of the Preliminary Disaster Resilience Scorecard, point to several recommendations that Central Bosnia Canton executives, representatives and stakeholders could implement to improve resilience planning, organization, response and learning:

- Develop a fully integrated resilience strategy or disaster risk reduction plan for the Canton that complies with the Sendai Framework and that covers all of the ‘10 essentials for making cities resilient’, and their integration in all other key cantonal functions/portfolios and plans.
- Regularly update DRR and protection plans and other relevant documents, and ensure that all relevant authorities take preventative measures to mitigate disaster risks.
- Organize a forum of agencies to assess the risks to and resilience of the Canton's critical infrastructure.
- Organize a forum of agencies to assess the effectiveness of protective infrastructure, and identify any key protective infrastructure that may be lacking.
- Incorporate vulnerability and exposure scenarios in the Canton's DRR and protection plans as well as the potential cascading failures for different city and infrastructure systems, under different scenarios.
- Strengthen cooperation and access to disaster risk reduction funding at the cantonal level and define the allocation of funds more clearly through legal frameworks and separate budgets.
- Enhance incentives for different sectors to provide support for disaster risk reduction and resilience-building.
- Improve understanding/awareness of available funding sources/routes for DRR and resilience among key stakeholders.
- Improve the implementation and verification of zoning rules and building standards through legislation and better information sharing.
- Improve guidance and incentives to further encourage the integration of green and blue infrastructure in city policy and projects.
- Establish better cooperation and agreements with neighbouring administrations to support the protection and management of natural capital.
- Strengthen disaster resilience campaigns and public awareness of DRR and resilience.
- Improve the exchange of information between all actors involved in disaster resilience-building.
- Improve and expand the scope and content of training and capacity-building of local stakeholders and duty bearers in areas of DRR, DRM and resilience-building.
- Establish or join a network of cities cantons/regions facing similar DRR/resilience challenges in order to exchange experiences and lessons learned.
- Improve engagement and communication with citizens (which, currently, mainly takes place in times of natural disasters).
- Continuously equip and build the capacity of civil protection structures and keep records of available private sector funds that could be used in case of disasters.
- Strengthen the early warning system.
- Regularly and adequately update DRR and protection plans to improve efficiency in responding to emergencies.
- Regularly organize exercises for civil protection structures as well as joint exercises for all protection and rescue agencies.
- Develop a plan specifying post-disaster recovery and reconstruction activities.
- Establish clear monitoring and evaluation systems and processes for learning lessons after disasters.

4.1.3. Results of Public Health Scorecard Addendum

The health care system in Central Bosnia Canton is under the jurisdiction of the Canton's Ministry of Health and Social Policy, while guidelines, laws and other strategic policy are under the jurisdiction of the Federation of Bosnia and Herzegovina.

Primary, secondary and tertiary health care services are provided in the Canton. Primary health care is provided in the outpatient clinics of health centres and family medicine centres. Primary health care is also provided by both private and public pharmacies, which dispense prescription drugs; these have contracts with the Cantonal Health Insurance Institute. There are 11 health centres in the Canton, 137 regional clinics and 56 family medicine teams. Secondary health care in the Canton is delivered partially in health centres, which provide consultative/specialist, diagnostic, dental and laboratory services, in private specialist surgeries, and in five hospitals operating in the Canton. Hospitals provide secondary and partial tertiary health care including diagnostics, hospital treatment, consultative/specialist health care and other services.
In addition to the Ministry of Health and Social Policy, the Canton also has a Public Health Institute, which monitors, assesses and analyses the health status of the population, coordinates and manages health care institutions, promotes health and health education, implements hygienic and epidemiological protection measures, and participates in the implementation of measures for the prevention, early detection and control of chronic mass diseases, including infectious diseases. One of the main challenges in the health sector is the lack of medical staff such as doctors, specialists and other health support workers. Based on data from 2019, there were 376 doctors employed in the whole Canton, an approximate ratio of one doctor per 665 citizens.\textsuperscript{11}

The main findings from the public health scorecard are as follows:

- The overall score for the Public Health Scorecard Addendum is 64 out of a possible 115.
- Representatives of most public health services usually attend major cantonal disaster resilience meetings and contribute to major programmes, but they may not be involved in all relevant activities – their involvement tends to be ad hoc, when needed. They are members of the crisis headquarters which are mostly activated when disaster happens.
- Emergencies and disasters including outbreaks are considered along with their likely impacts, but these impacts are not fully modelled.
- A number of disaster health issues are addressed, sometimes in detail, but coverage is not comprehensive. Longer-term physical and mental health issues are likely to be omitted.
- Chronic health conditions are known but not included in scenario definition and planning.
- The funding identified and available to address public health risks and the impacts of disasters does not meet basic needs. The needs are not fully known, and where they are, some funding shortfalls have been identified.
- Public health data on health vulnerabilities and capacities, as well as risks and early warning of outbreaks and other critical systems is shared with other stakeholders who need it. Most data items and data feeds have been identified and distributed, but only to a limited subset of public health and other relevant stakeholders, and it may be of lower quality and reliability.
- 75 % of communities understand and are able to fulfil their roles in maintaining public health and wellbeing levels before, during and after a disaster and are able to execute key elements of their role.
- The mental health needs of only 50% to 75% of community are addressed.
- Monitoring and early warning systems exist for impending emergencies that have potential health effects. Monitoring exists for the most likely health care risks and is broadly effective, but one or more key risks are not covered.
- The needs of higher risk populations, such as citizens with pre-existing medical conditions, disabilities or loss of function that may mean that they require additional support is not considered at all. There is no provision to identify or provide additional support or specific measures for citizens requiring extra help.
- Supplies of items and equipment required to maintain public health during and after a disaster are very low, and predominantly basic.
- There are no comprehensive post-event public health plans at the cantonal level.
- There is no formalized mechanism to learn from the performance of public health systems before, during and after disasters. Ad hoc attempts at learning have been used in the past and may be expected in future disasters.

\textsuperscript{11} Development strategy of Central Bosnia Canton 2021-2027. April, 2021.
4.1.4. Recommendations for improvement

- Improve the representation and involvement of all public health representatives and stakeholders in major cantonal disaster resilience meetings and enhance their contribution to major programmes.

- Improve planning of mitigation and preparedness measures based on scenario definitions, with fully modelled impacts on the population, including for epidemics.

- Address and fully integrate disaster-related health issues in planning, mitigation and preparedness measures, including longer-term physical and mental health issues as well as chronic health conditions for the most vulnerable populations.

- Request greater funding allocations from cantonal authorities for identified public health risks, and for planning mitigation and preparedness measures.

- Improve public health data on health vulnerabilities and capacities, as well as risks and early warning of outbreaks, and ensure that it is shared with other stakeholders who need it.

- Improve monitoring and early warning systems for impending emergencies that have potential health effects, covering all major risks.

- Identify gaps and additional support and specific measures for citizens requiring extra help, such as those with pre-existing medical conditions, people with disabilities, children, the elderly and other vulnerable populations.

- Improve stocks of basic supplies and equipment required to maintain public health during and after a disaster at cantonal level.

- Initiate and establish comprehensive mechanisms for post-disaster monitoring and evaluation to enhance learning and improve protection systems.
4.2. City of Bihać

Bihać is the capital of Una-Sana Canton, located in the north-western part of BiH, with an area of 900 km². Bihać consists mostly of fields, hills and semi-mountainous terrain. The area has a moderate mountainous-type climate. Most of the Bihać region is rich in springs, streams and rivers; the stretch of the Una River that runs through the Bihać region is 80 km long.

The city of Bihać is located in the extreme northwest of Bosnia and Herzegovina and is one of the largest and most populous cities in this part of the country. Bihać is also the administrative centre of Una-Sana Canton, which has a population of about 290,000; the city itself has a population of 61,186. The city borders the Republic of Croatia and is on the southeastern border of the European Union. Although Bihać is relatively far from the capital, Sarajevo (330 km), it is still well connected to Central Bosnia and its surroundings by a network of modern highways.

The Civil Protection Service performs tasks related to the protection and rescue of people and property/goods in situations of natural or other types of disasters, taking preventative measures and acting to mitigate the consequences. The service is organized in two sections, the Protection and Rescue Department and the Fire Brigade. The most likely (probable) known disaster risk and forms of intervention relate to potential flooding – in part due to unmaintained stormwater drainage canals – and landslides, landmines, fires, storms and traffic accidents.¹²

4.2.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges

Bihać joined the MCR2030 initiative at the beginning of 2021. After expressing interest and creating a profile on the MCR2030 dashboard, representatives of the Bihać civil protection department initiated preparatory activities. After a number of online meetings and consultations, the civil protection department, with the support of the local DRR platform, completed the ‘Disaster Resilience Scorecard for Cities’ along with the ‘Public Health System Resilience Addendum’.

The main findings from the Disaster Resilience Scorecard are as follows:

- The overall score for the Preliminary Disaster Resilience Scorecard is 61 out of a possible 141.
- The city does not possess a master plan that complies with the Sendai Framework or that covers any of the ‘Ten Essentials’.

The city has a multisector mechanism but without the appropriate authority and convening power, they do not have proper inter-agency support and are under resourced.

- Resilience is not properly integrated with other key city functions/portfolios and is applied ad hoc or only occasionally.
- There is a lack of a shared understanding of the risks between the city and various utility providers and other regional and national agencies that have a role in managing infrastructure such as power, water, roads and trains. There is a limited understanding of the points of stress, even at the level of individual systems (e.g., power, water, transport).
- There is some disaster scenario information available setting out city-wide exposure and vulnerability for each hazard, or groups of hazards.
- There is some understanding of the potential for cascading impacts and failures between different city and infrastructure systems under different scenarios.
- In terms of attracting new investment, there is some awareness of available funding sources/routes, but the picture is incomplete and little is done to pursue these funds.
- There is little or no insurance cover in the city such as for domestic housing, contents and personal transport (e.g., car insurance), or for commercial and public infrastructure.
- Some incentives exist for different sectors and segments of business and society to support resilience-building but they are patchy.
- City zoning does not thoroughly or comprehensively consider the impact from key risk scenarios on, for example, economic activity, agricultural production and population centres, and is not reviewed regularly against hazards/risks.
- There is policy to promote resilience in the design and development of new urban developments but supporting guidance is inadequate.
- There are city building codes and standards covering some hazards, but there is no clear plan for updating the codes. The application of existing zones and building codes is partial and inconsistent.
- In terms of awareness and understanding of ecosystem services/functions, the city authorities and key stakeholders understand the majority of the functions provided by key local natural assets but these have not been fully economically valued.
- Green and blue infrastructure (e.g., greening streets, squares, roadsides, roofs, facades, and river corridors) is being promoted through policy, but there is little supporting guidance for practitioners.
- The city has some awareness of the ecosystem services being provided by natural capital beyond its administrative borders, but has taken no action to support the protection and management of these assets.
- To strengthen institutional capacity for resilience, the city can access most of the skills/experience and resources it needs to respond to identified disaster scenarios, but there are some gaps.
- In regards to public education and awareness, there are some useful programmes and channels that exist for disseminating hazard, risk and disaster information, but there is significant room for improvement in order to reach a greater proportion of the general public.
- The city has a track record of delivering resilience training to some sectors, but other sectors lack training and engagement.
- Any exchange of knowledge and learning with other cities facing similar challenges relies on individuals.
- There is very little involvement from grassroots organizations in risk reduction and post-event response in the city's neighbourhoods.
• There are no regular training programmes provided to the most vulnerable populations in the municipality, but mapping of socially vulnerable populations is available.

• 20%-40% of city businesses have a documented business continuity plan that has been reviewed within the last 18 months.

• In regards to increasing the resilience of the city’s critical infrastructure, risks are understood for some but not all of the major infrastructure types.

• In some cases, protective infrastructure (such as levees and flood barriers) is in place but some strategic protective infrastructure is missing. The design and management of these may not be consistent with best practices.

• Some loss of service for essential services such as water, energy and transport would be experienced in the ‘most severe’ scenario.

• The city has a comprehensive disaster management/preparedness/emergency response plan but it contains significant gaps in coverage for mitigation, preparedness and response to local emergencies.

• The responsible disaster management authority has not identified the surge capacity required to support first responder duties in a surge event scenario.

• The city does not have an emergency operations centre with automated standard operating procedures specifically designed to deal with the ‘most probable’ and ‘most severe’ scenarios.

• There are annual drills, validated by professionals, which involve both the public and professionals, but for limited test scenarios.

• There are some plans in place for post-event recovery and reconstruction, including for economic reboot and social support, but they are not comprehensive or joined up or understood by relevant stakeholders.

• There are no established post-event assessment processes that can incorporate failure analyses or that have the ability to capture lessons learned that then feed into the design and delivery of rebuilding projects. Some lessons are captured and disseminated but not in a thorough or systematic way.

4.2.2. Recommendations for improvement

An analysis of the main documents on DRR and resilience issues for the city of Bihać (relevant strategies and plans), as well as an analysis of the Preliminary Disaster Resilience Scorecard, point to a number of recommendations that city representatives, stakeholders and other relevant organizations could implement to improve resilience planning, organization, response and learning:

• Develop a city master plan (or relevant strategy/plan) that complies with the Sendai Framework and covers all or the majority of UNDRR’s ‘Ten Essentials for Making Cities Resilient’.

• Ensure proper representation, support and capacities for city multisector mechanisms, with appropriate authority and resources to address resilience and disaster risk reduction issues.

• Ensure the integration of and allocations for resilience within other key city functions/portfolios as part of ‘day-to-day’ decision-making.

• Address gaps in the understanding of risks among city authorities, utility providers and other regional and national agencies that have a role in managing infrastructure (such as power, water, roads and trains), especially in regards to points of stress.

• Improve disaster scenario information, setting out city-wide exposure and vulnerability for all or the majority of the main hazards or groups of hazards.

• Develop a shared understanding of cascading impacts and failures between the city and different infrastructure systems, under different scenarios.

• Enhance municipal financial capacity for resilience to secure additional funding.
• Promote and improve local-level insurance cover such as for domestic housing and contents, and commercial and public infrastructure.
• Provide incentives for different sectors, businesses and segments of society to support resilience-building.
• Implement thorough city zoning that considers the impact from key risk scenarios on economic activity, agricultural production and population centres, and review it regularly against major hazards/risks.
• Provide clear and adequate supporting guidance for policy that promotes resilience in the design of new urban developments.
• Ensure a clear plan for updating city building codes and standards covering the majority of hazards in a consistent and comprehensive manner.
• Enhance awareness and understanding of ecosystem services/functions and their benefits, including their economic value.
• Provide supporting policy guidance for practitioners for green and blue infrastructure (e.g. greening streets, squares, roadsides, roofs, facades and river corridors).
• Improve programmes and channels for disseminating hazard, risk and disaster information to the public.
• Improve the exchange of knowledge with and learning from other cities facing similar DRR and resilience challenges.
• Enhance the participation and capacity of grassroots organizations in risk reduction and post-event response for each neighbourhood in the city.
• Enhance the capacities of local businesses (small, micro and medium enterprises) for business continuity planning, and assessing risk and resilience for different hazards and disasters.
• Increase the resilience of the city's critical infrastructure, with a clear understanding of the risks for all of the major infrastructure types.
• Enhance the understanding of the risks to all of the city's major critical infrastructure.
• Improve the design and management of protective infrastructure for the majority of risks, in line with best practice
• Address the gaps in coverage for local emergencies in the city's comprehensive disaster management/preparedness/emergency response plan.
• Identify surge capacity at city level to ensure that the responsible disaster management authorities have sufficient staffing capacity to support first responder duties in surge event scenarios.
• Establish a multi-agency city emergency operations centre, with standard operating procedures specifically designed to deal with the 'most probable' and 'most severe' scenarios.
• Put in place comprehensive plans and strategies for post-event recovery and reconstruction, including for economic reboot and social support, ensuring that they are joined up and understood by relevant stakeholders.
• Establish clear monitoring and evaluation post-event assessment systems and processes that incorporate failure analyses and that have the ability to capture lessons learned that then feed into the design and delivery of rebuilding projects. Disseminate lessons learned in a thorough and systematic way.

4.2.3. Results of Public Health Scorecard Addendum

Primary, secondary and tertiary health care is provided through specialist services and regional clinics. Health care in the municipality of Bihać is under the jurisdiction of the Una-Sana Canton and is financed predominantly through the health care fund as well through additional monetary health insurance contributions from citizens.
Health care for the inhabitants of the municipality of Bihać is provided through a number of institutions:

- The Bihać Health Centre, ‘Dom zdravlja Bihać’ (primary and specialist-consultative health care)
- The ‘Dr. Irfan Ljubijankić’ Cantonal Hospital (secondary and tertiary health protection)
- The Gata Health Resort and Spa, Bihać
- The Una–Sana Canton Institute of Public Health, Bihać (secondary and tertiary health care)
- The ‘City Pharmacy’, Bihać
- Private health facilities

In 2012, a total of 868 people (including 638 women) were employed in health care institutions in Bihać municipality, of whom 180 were physicians and 668 were health care technicians. In addition, there were six health associates (psychologists, speech therapists, etc.) and 361 administrative and technical staff.

The main findings from the public health scorecard are as follows:

- Emergencies and disasters including disease outbreaks are addressed and included in disaster risk planning, but they tend to be considered in isolation from other risks, and thus the interaction with other risks may not be fully addressed.

- A number of disaster health issues are addressed in the city’s scenario planning but coverage is not comprehensive. Longer-term physical and mental health issues are likely to be omitted.

- Pre-existing chronic health conditions are known but not included in scenario definition and planning.

- Funding is identified and is available to address public health risks and the impacts of disasters but all needs are not fully known, and where they are, some shortfalls are identified.

- Some key public health facilities are not in locations or fail to conform to codes that will allow them to survive in the ‘most probable’ disaster scenario.

- Only rudimentary efforts are made to identify and protect ecosystem services that provide public health benefits.

- The identification of skills required to plan and maintain public health systems and services for disaster resilience is incomplete, and there are significant shortfalls in those that are known, both in terms of depth and numbers.

- Some of the public health data on health vulnerabilities and capacities as well as risks and early warning of outbreaks is distributed to one or two stakeholders only, and its quality and reliability is known to be an issue.

- Individuals’ health and prescription records are mostly safe from disasters but may not be accessible due to communications issues anticipated after a disaster.

- Half or less of communities understand their role in maintaining public health and wellbeing levels before, during and after a disaster, and are able to execute only part of it.

- There are plans to engage neighbourhoods in addressing mental health issues, but these have not been implemented except in maybe one or two initial cases.

- Public health infrastructure would be significantly disrupted in the ‘most probable’ scenario but some service would continue for 75 per cent of the population of the city, and certain services would be continued for 50 per cent of the population in the ‘most severe’ scenario.

- There would be widespread impacts under the ‘most probable’ scenario on the care of certain categories of patients. It is likely that relocating many patients would be problematic. There would be serious impacts under the ‘most severe’ scenario on the care of almost all existing patients, and their relocation would probably only be possible in emergencies.
Comprehensive monitoring exists for impending emergencies that have potential health effects but this may not be fully effective in all cases. Warnings exist but warning time maybe less than the technology currently permits. Warnings are seen as reliable and specific.

The public health sector and health professionals are integrated with the emergency management team but via remote input (phone, messaging). Engagement has been tested, but maybe more than 12 months ago.

Less than 50 per cent of citizens that are likely to require additional support or specific measures (such as those with pre-existing medical conditions or disabilities) are identified, and there are widespread gaps in provisions to help them.

The distribution capability for municipal supply items and equipment required to maintain public health during and after a disaster may reach 50 per cent of the population. There is no list, but stockpiles and supplies exist for some items.

Comprehensive post-event public health plans exist for the ‘most probable’ event but with significant shortfalls. There is a generalized inadequacy for the ‘most severe’ scenario.

There is no real defined or formalized mechanism to learn from the performance of the public health system before, during and after disasters, but ad hoc learning exercises have been used or may be expected in future disasters.

**4.2.4. Recommendations for improvement**

- Fully address all risks and hazards, including disease outbreaks, mental health issues and pre-existing chronic health conditions, in disaster risk planning and scenario definitions for the city.
- Identify needs and shortfalls in funding and allocations in order to address public health risks and impacts of disasters.
- Enhance efforts to identify and protect ecosystem services that provide public health benefits.
- Identify the size, skills and capacities of the workforce required to plan and maintain public health systems and services for disaster resilience.
- Improve the quality of data on health vulnerabilities and capacities, as well as the risks and early warning of outbreaks, and ensure it is reliably distributed to all relevant city stakeholders.
- Improve the safeguarding of and access to public health and prescription records within the main health institutions after a disaster.
- Improve communities’ understanding of their roles in maintaining public health and wellbeing levels before, during and after a disaster.
- Improve the care of certain categories of patients under the ‘most probable’ and ‘most severe’ scenario, ensuring measures are in place to relocate them to safer locations in emergencies, if required.
- Improve the effectiveness of monitoring and early warning systems for impending emergencies that have potential health effects.
- Identify the additional support and specific measures for citizens requiring extra help, such as those with pre-existing medical conditions, disabilities, children, the elderly and other vulnerable populations.
- Improve stocks of supplies and equipment required to maintain public health during and after a disaster, and enhance distribution capability in order reach a wider proportion of the population.
- Address shortfalls and inadequacies in post-disaster public health plans, covering needs under both the ‘most probable’ and ‘most severe’ scenarios.
- Establish and initiate comprehensive and formalized mechanisms for monitoring and evaluation during and after disasters, and disseminate lessons for future disasters.
4.3. City of Bijeljina

The City of Bijeljina is located in the northeastern part of the Republika Srpska (one of the two autonomous entities that make up BiH) and includes the lowland area of Semberija and the temperate hills of Majevica. The city covers an area of 734km$^2$, which predominantly consists of flat and hilly lowlands; the highest point is 90m above sea level. The climate is temperate-continental, with an average annual temperature of about 12°C and with 90 to 100 days of precipitation per year. In addition to the rivers Drina and Sava, the most significant water resources are the rivers Janja, Gnjica and Lukavac. In terms of area, the City of Bijeljina is the eighth largest of the 68 municipalities/cities in the Republic of Srpska, but has the second largest population.

According to preliminary data from the census in October 2013, the city has a population of 107,715 inhabitants and a population density of 157 inhabitants/km$^2$.

GDP per capita for the City of Bijeljina in 2010 was 6,916.53 BAM which is around 4,084.47 USD. Microenterprises (up to nine employees) make up 77 per cent of active companies, followed by small enterprises (from 10 to 49 employees; 16.7 per cent). There were 3,745 registered sole proprietors in 2011 (of which 34.7% were women entrepreneurs). Trade and manufacturing companies make up the largest share of active companies.

The city of Bijeljina is prone to flooding due to the extensive network of river watercourses, most of which are unregulated. An embankment 26.68 km long was built on the Sava River, and an embankment 8.23 km long was built next to the Drina River – a total of about 35km of landscaped bank that provides flood protection. The rest of the river watercourses, which are unregulated, regularly pose a risk of flooding, especially following heavy rainfall or snowmelt in the winter. The significant proportion of unregulated watercourses and the limited number of flood defence facilities means that about 50,000 inhabitants are at risk from flooding.\(^\text{13}\)

4.3.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges

Bijeljina joined the MCR2030 initiative at the beginning of 2021. After expressing interest and creating a profile on the MCR2030 dashboard, representatives of the Bijeljina Civil Protection Department began preparatory activities. After a number of online meetings and consultations, the civil protection department, with support from the local DRR platform, completed the ‘Disaster Resilience Scorecard for Cities’ along with the ‘Public Health System Resilience Addendum’.

The following is a summary of the findings from the Scorecard Assessment:

- The overall score for the Preliminary Disaster Resilience Scorecard is **65 out of a possible 141**.
- The most likely (probable) disaster is floods.
- The most severe disaster is also floods.
- City plans offer partial compliance with the Sendai Framework and cover some of the ‘Ten Essentials’.
- The city has a multisector mechanism but without the appropriate authority and convening power, they do not have proper inter-agency support and are under resourced.
- Resilience is relatively integrated with other key city functions/portfolios and is considered as part of ‘day-to-day’ decision-making and budgeting.
- The city has knowledge and an understanding of the main hazards that it faces, as well as their likelihood of occurrence, and data related to hazards is updated at agreed intervals.
- There is a shared understanding of risks between the city and various utility providers and other regional and national agencies that have a role in managing infrastructure such as power, water, roads and trains, as well as the points of stress on the system and city-scale risks. Individual system risks are known but there is no forum to share these or to understand cascading impacts.
- There are agreed scenarios setting out city-wide exposure and vulnerability for each hazard, or groups of hazards. A comprehensive suite of disaster scenarios is available but there is no background information or supporting notes to support the use of these scenarios.
- There is some understanding of cascading impacts under some disaster scenarios.
- Clear hazard maps and data on risk exist for some hazards but they are not regularly updated.
- The city is aware of numerous routes to secure funding for DRR activities and is actively pursuing a range of these.
- The city has specific ‘ring fenced’ (protected) budgets and allocations, the necessary resources, and contingency fund arrangements for local disaster risk reduction (mitigation, prevention, response and recovery) but these are in different agencies/organizations and are not well coordinated.
- The level of insurance for business and communities varies significantly by sector or by area. The city is not actively promoting greater uptake of insurance products.
- Some incentives exist for different sectors and segments of business and society to support resilience-building but they are patchy.
- Resilience approaches for the design and development of new urban developments are promoted, but not in a consistent manner, and are not underpinned by city policy.
- City building codes and standards exist covering some hazards, but there is no clear plan for updating the codes. Application of existing zones and building codes is partial and inconsistent.
- An awareness and understanding of the functions delivered by the city’s natural capital is incomplete.
- Some green and blue infrastructure is being promoted, but this is not universal and it is not supported by policy.
- The city has some awareness of the functions provided by natural capital beyond the city administrative borders, but has taken no action to protect or manage these assets.
- In regards to strengthening institutional capacity for resilience, the city can access most of the skills/experience and resources it needs to respond to identified disaster scenarios, but there are some gaps.
- In terms of public education and awareness, some useful programmes/channels exist for disseminating hazard, risk and disaster information, but there is significant room for improvement.
- Some training modules covering risk and resilience issues are offered to all sectors of the city including government, businesses, NGOs and communities, but coverage and content need to be significantly improved.
- There is awareness among key grassroots organizations of the importance of DRR. They support awareness-raising but are not actively involved in planning and response.
- Approximately 20%-40% of businesses have a documented business continuity plan that has been reviewed within the last 18 months.
- In terms of increasing the resilience of the city’s critical infrastructure, risks are understood for some but not all of the major infrastructure types.
- In some cases, protective infrastructure (such as levees and flood barriers) is in place but some strategic protective infrastructure is missing. The design and management may not be consistent with best practices.
- Under the ‘most probable’ scenario such as floods, some loss of service for essential services such as energy, transport and communications would be experienced.
- 5%-10 % of education structures would be at risk of damage under the ‘most probable’ scenarios.
- There is not sufficient first responder equipment, as well as military and civilian back up in case of emergency. Assets meet basic needs under the ‘most severe’ scenario, but gaps are known to exist.
- It is estimated that over 75% of the population is reachable by early warning system.
· The city has a comprehensive disaster management / preparedness / emergency response plan but it contains significant gaps in coverage for city mitigation, preparedness and response to local emergencies.

· The city does not have an emergency operations centre with automated standard operating procedures specifically designed to deal with the ‘most probable’ and ‘most severe’ scenarios.

· There are some plans in place for post-event recovery and reconstruction, including for economic reboot and social support, but they are not comprehensive or joined up or understood by relevant stakeholders.

· There are no established post-event assessment processes that can incorporate failure analyses or that have the ability to capture lessons learned that then feed into the design and delivery of rebuilding projects. Some lessons are captured and disseminated but not in a thorough or systematic way.

4.3.2. Recommendations for improvement

An analysis of the main documents on DRR and resilience issues (relevant strategies and plans) for the city of Bijeljina, as well as an analysis of the Preliminary Disaster Resilience Scorecard, point to a number of recommendations that city representatives, stakeholders and other relevant organizations could take to improve resilience planning, organization, response and learning:

· Ensure that city’s strategies and plans comply with the Sendai Framework and cover all or the majority of UNDRR’s ‘Ten Essentials for Making Cities Resilient’.

· Ensure proper representation, support and capacities for city multisector mechanisms, with appropriate authority and resources to address resilience and disaster risk reduction issues.

· Ensure budgeting and allocations for resilience are integrated with other key city functions/ portfolios as part of ‘day-to-day’ decision-making.

· Promote a better understanding of and agreement on city exposure and vulnerability, with background information or supporting notes to support the use of these scenarios.

· Improve understanding of city cascading impacts under some disaster scenarios.

· Regularly update hazard maps and data on risks and hazards.

· Explore, as needed, innovative financing mechanisms such as specialized bonds, specialized insurance, tax efficient finance, development impact bonds, etc.

· Ensure greater coordination of local disaster risk reduction (mitigation, prevention, response and recovery) between different budget holders and organizations.

· Actively promote greater uptake of insurance products among businesses and communities.

· Provide incentives for different sectors and segments of business and society to support resilience-building.

· Regularly (or periodically) update building regulations and standards and incorporate sustainable design principles into new developments, where appropriate.

· Develop a clear plan for updating city building codes and standards that cover the majority of hazards in a consistent and comprehensive manner.

· Enhance awareness and understanding of the ecosystem services/functions delivered by the city’s natural capital. Recognize the value and benefits from ecosystem services for disaster risk prevention, protecting and/or enhancing them as part of risk reduction strategies for cities (e.g., promotion of green and blue infrastructure).

· Address the gaps in institutional capacity for resilience.

· Improve education and awareness-raising on hazard, risk and disaster through training modules covering risk and resilience issues.
· Enhance societal capacities for resilience and promote the active participation and involvement of different grassroots organizations in planning and response.

· Strengthen the capacities of SME’s and their engagement with employees as a communications channel for disaster awareness, business continuity planning and resilience-building in the business sector.

· Enhance the understanding of the risks to all of the city’s major critical infrastructure.

· Improve the design and management of protective infrastructure for the majority of risks, in line with best practice.

· Enhance the capacities of first responders and ensure the supply of adequate equipment to enable them to respond effectively in the case of an emergency.

· Establish a multi-agency city emergency operations centre, with standard operating procedures specifically designed to deal with the ‘most probable’ and ‘most severe’ scenarios.

· Put in place plans and strategies for post-event recovery and reconstruction, including for economic reboot and social support.

· Establish clear monitoring and evaluation systems and processes for learning lessons after disasters.

4.3.3. Results of Public Health Scorecard Addendum

Public health, health care and social protection is coordinated by the Ministry of Health and Social Welfare of the Republic of Srpska, headed by the Minister. Primary, secondary and partial tertiary health care is organized and provided by the city of Bijeljina, as well as through private practices. Primary health care follows the family medicine model and is provided through 55 family medicine teams coordinated by the local health centre. By the end of 2013, about 90,000 inhabitants were covered by family medicine health care. The Bijeljina health centre coordinates 41 family medicine clinics at 25 different locations, which provides fairly good coverage of the population. The ambulance service works 24 hours a day and has 11 teams. The Bijeljina health centre employs about 400 workers, mostly professional staff – doctors of medicine and medical technicians – and about 80 non-medical staff. According to the data from 2017, the ‘Sveti Vračevi’ hospital in Bijeljina employs a total of 552 workers, mostly professional staff: doctors of medicine, medical specialists and medical technicians. According to data from 2011, the city of Bijeljina, has 35 private and 7 public health practices and 23 private pharmacies.14

The main findings from the public health scorecard are as follows:

· The overall score for the Public Health Scorecard Addendum is 64 out of a possible 115.

· Representatives of most public health functions usually attend major city disaster resilience meetings and contribute to major programmes, but they are not involved in all relevant activities for disaster planning and response.

· Emergencies and disasters, including disease outbreaks, are considered along with their likely impacts in risk scenarios, but these impacts are not fully modelled.

· Some immediate post-disaster health issues are considered and planned for in the city’s risk analysis and scenario development, but in outline treatment only.

· The most applicable chronic health conditions are included in scenario definitions or planning, but with some gaps.

· Funding has been identified and is available to address public health risks and the impacts of disasters, but all needs are not fully known, and where they are, some shortfalls are identified.

Some key public health facilities are not located and built in a manner that would allow them to continue to be operational after a disaster or fail to conform to codes that will allow them to survive in the ‘most probable’ disaster scenario.

Only rudimentary efforts are made to identify and protect relevant ecosystem services that provide public health benefits.

The workforce (doctors, nurses and other first responders), and the competencies and skills required to plan and maintain public health systems and services for disaster resilience have largely been identified and are available to the city, but significant shortfalls are known to exist, both in terms of depth and numbers.

Some of the public health data on health vulnerabilities and capacities, as well as risks and early warning of outbreaks is distributed to one or two stakeholders only, and its quality and reliability is known to be an issue.

Most of the data items and data feeds from other critical systems is shared and distributed with public health system stakeholders, but only to a limited subset of public health stakeholders, and it may be of lower quality and reliability.

Individuals’ health and prescription records are largely safe from disasters but may not be accessible due to communications issues anticipated after a disaster.

Half or less of communities understand their role in maintaining public health and wellbeing levels before, during and after a disaster, and are only able to execute part of it.

Some communities or other sub-groups may fail to receive, accept or be willing to act upon public health information.

The mental health needs of 50%-75% of communities are addressed.

Public health infrastructure would be significantly disrupted in the ‘most serious’ scenario, but certain services would continue for 75% of the city’s population. However, most of the disruptions would be mitigated in the ‘most likely’ scenario.

In the case of a sudden influx of patients, surge capacity exists but is known to have minor inadequacies under the ‘most probable’ scenario – it could be activated within 6 hours. Under the ‘most severe’ scenario, there would be more significant shortcomings in geographical coverage or the type of service available, and surge capacity could only be activated within 12 hours or longer.

There would be some impact on the care of certain categories of patients under the ‘most probable’ scenario. Relocating some patients is likely to be problematic. Under the ‘most serious’ scenario, there would be wider impacts on the care of certain categories of patients; it is likely that relocating many patients would be problematic.

Monitoring systems for impending emergencies that have potential health effects are rudimentary at best and may not deliver warnings. Warnings are seen as ad hoc and unreliable and likely to be ignored.

Comprehensive post-event public health plans exist for the ‘most probable’ event but with some shortfalls. There are more significant shortfalls in plans for the ‘most severe’ scenario.

Learning from the performance of the public health system before, during and after disasters takes place via a public health review mechanism, but lessons remain within public health structures, and there is no attempt to integrate public health learnings with other disciplines within the city. Likewise, public health fails to influence learnings in other services.
4.3.4. Recommendations for improvement

- Enhance the representation and involvement of all public health representatives and stakeholders in major city disaster resilience meetings, as well as their contribution to major programmes for disaster planning and response.

- Improve planning of mitigation and preparedness measures based on scenario definitions, with fully modelled impacts on the population, including for epidemics.

- Consider and address all immediate major post-disaster health issues in the city’s risk analysis, scenario development and planning.

- Identify needs and shortfalls in funding and allocations to address public health risks and the impacts of disasters.

- Enhance efforts to identify and protect relevant ecosystem services that provide public health benefits.

- Identify and assess the capacities and skills of the medical workforce (doctors, nurses and other first responders) as well as the numbers available in case of disaster.

- Improve the communication and sharing of data on health vulnerabilities and capacities, as well as the risks and early warning of outbreaks to all relevant city stakeholders.

- Improve the safeguarding of and access to individuals’ health and prescription records within the main health institutions after a disaster.

- Enhance the trust, acceptance and cooperation of communities in order to help them understand their role in disasters and enable them to execute their roles in maintaining public health and wellbeing levels before, during and after a disaster.

- Enhance the surge capacity and geographical coverage of different types of services in case of a sudden influx of patients under the ‘most severe’ scenario.

- Improve the care of certain categories of patients under the ‘most probable’ scenario, especially in cases where they need to be relocated to a safer location.

- Improve monitoring and early warning systems for impending emergencies that have potential health effects, covering all major risks.

- Develop comprehensive post-disaster public health plans that cover needs under the ‘most severe’ scenario.

- Establish and initiate comprehensive mechanisms for post-disaster monitoring and evaluation in order to disseminate lessons learned and improve health protection systems.
4.4. City of Gradačac

The city of Gradačac is located in the northeastern part of Bosnia and Herzegovina in Tuzla Canton. Following the delineation of the city set out in the Dayton Agreement, Gradačac now covers an area of 214.4 km², with a population of 39,340 – a population density of 182.9/km². Gradačac is 60 km from Tuzla, 180 km from Sarajevo and 241 km from Zagreb; Tuzla Airport is about 80 km away. The average altitude is 339 m above sea level (the lowest point is 90 m and the highest 589 m). The area is a mixture of lowlands (63.8%) and hilly terrain (35.7%). The municipality of Gradačac is part of the Sava River catchment area. The area has a relatively high density of river networks, with short uneven flows and small amounts of water. To protect against floods, two lateral canals were built: the eastern section is 3,500 m long and the western section 1,200 m. Agricultural production is predominantly carried out by the private sector (91.5%). The largest share consists of fruit production, farming and livestock rearing. The city of Gradačac is ranked as one the ‘medium-developed’ municipalities in BiH. In 2011, the registered unemployment rate for the city stood at 54.10%.

The Civil Protection Department and the Police Department are responsible for ensuring the safety and rescue of citizens and personal property in the city. Over 400 landslides were recorded in Gradačac between 1996 to 2014. During this period, it registered reactivation of several old landslides and activation of a smaller number of new landslides, mostly of smaller scale and lower intensity. Most landslides, large in scale and strong in intensity, are activated after heavy and prolonged rainfall and floods as well as after the sudden melting of snow. The length of watercourses in the Municipality of Gradačac is 122 km, all of which are categorized as at risk of flooding. The number of inhabitants living in flood-risk areas is estimated at 25,000.

When it comes to fire protection, the municipality of Gradačac currently only has one fire brigade, which covers the entire territory of the municipality. The unit employs a total of eight professional firefighters, with an average age of over 45 years-old. It faces a number of challenges including dilapidated vehicles and firefighting equipment, as well as poor working conditions in the fire station. One of the main problems is a lack of staff. There is therefore an urgent need to build a functional fire station, procure quality firefighting equipment and train and employ more professional firefighters.  

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According to the latest estimates, the city of Gradačac has one of the highest numbers of remaining unexploded ordinances and mines – both in Tuzla Canton and the Federation of BiH. The fact that the recent war was fought on the very edge of the city and in some suburban communities, means that many urban areas remain at risk from unexploded ordinances.

The most likely known disaster risks are landslides, floods and hail, and the most severe known disaster is floods.

4.4.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges

Gradačac is one of the five cities in BiH that joined the MCR2030 initiative at the beginning of 2021. After expressing interest, representatives of the Gradačac Civil Protection Department began preparatory activities. After a number of online meetings and consultations, the civil protection department, with the support of the local DRR platform, completed the ‘Disaster Resilience Scorecard for Cities’ along with the ‘Public Health System Resilience Addendum’.

The main findings from the Disaster Resilience Scorecard are as follows:

- The overall score for the Preliminary Disaster Resilience Scorecard is 69 out of a possible 141.
- The city’s master plan (or relevant strategies/plans) includes elements of disaster risk reduction approaches. It is in partial compliance with the Sendai Framework and covers some of the ‘Ten Essentials’.
- The city has a multisector mechanism but without the appropriate authority and convening power, they do not have proper inter-agency support and are under resourced.
- The city has knowledge of the key hazards that it faces, and their likelihood of occurrence, but there are no agreed plans for updating this information.
- There is some disaster scenario information available at city level.
- There is some understanding of cascading impacts under some disaster scenarios.
- Hazard maps exist for some hazards but there are no clear plans to update these.
- The level of insurance for businesses and communities varies significantly by sector or by area. The city is not actively promoting greater uptake of insurance products.
- Some incentives exist for different sectors and segments of business and society to support resilience-building, but they are patchy.
- The municipality is zoned according to land use, and this connects loosely with hazards and risk mapping. Plans for updating this zoning are not well understood.
- Policies to enhance resilience to one or multiple hazards in new urban developments exist, but supporting guidance is inadequate.
- Building codes and standards cover some hazards but there is no clear plan for updating these.
- The city and key stakeholders understand the majority of the functions/services provided by key local natural assets but these are not fully economically valued.
- Some green and blue infrastructure is being promoted, but this is not universal and it is not supported by policy.
- There are some useful programmes and channels for disseminating hazard, risk and disaster information to the public, but there is significant room for improvement in order to reach a greater proportion of the general public.
- Some, but not all, of the data on the resilience context are accessible and shared with other organizations involved with the city’s resilience, but the data is raw and requires interpretation.
Some training modules covering risk and resilience issues are offered to all sectors of the city including government, businesses, NGOs and communities. But coverage and content need to be significantly improved.

Some grassroots organizations are involved in some aspects of pre-event planning or post-event response, or in some locations, but it is not comprehensive.

There are no regular training programmes provided to the most vulnerable populations in the municipality, but mapping of socially vulnerable populations is available.

20%-40% of businesses have a documented business continuity plan that has been reviewed within the last 18 months.

There are some channels for citizen engagement and communication regarding DRR, but updates are semi-regular.

Some protective infrastructure is in place but some strategic protective infrastructure is missing. The design and management may not be consistent with best practice.

Some loss of service for essential services such as water and energy would be experienced from the most severe scenario. A loss of service for transport and communications would be experienced under the ‘most severe’ scenario.

In the ‘most probable’ scenarios, 5%-10% of teaching facilities would be at risk.

First responder assets would meet basic needs under the ‘most severe’ scenario, but gaps are known to exist.

Less than half of the population is reachable by early warning system. The equipment is old and outdated.

In the ‘most severe’ scenario, the supply of emergency food and basic relief items is less than the estimated need, by 2% or more.

There is a designated emergency operations centre, but communications are vulnerable and one or more relevant agencies do not participate.

There are annual drills validated by professionals that involve both the public and professionals but for limited test scenarios.

There are some plans for post-event recovery and reconstruction, including economic reboot and social support but they are not comprehensive or joined up or understood by relevant stakeholders.

There are no established post-event assessment processes that incorporate failure analyses or that have the ability to capture lessons learned that then feed into the design and delivery of rebuilding projects. Some lessons are captured and disseminated but not in a thorough or systematic way.

4.4.2. Recommendations for improvement

Ensure that all city strategies and master plans comply with the Sendai Framework and cover all or the majority of UNDRR’s ‘Ten Essentials for Making Cities Resilient’.

Ensure proper representation, support and capacities for city multisector mechanisms, with appropriate authority and resources to address resilience and disaster risk reduction issues.

Establish plans for updating information on the key hazards that the city faces, and their likelihood of occurrence.

Improve disaster scenario information, setting out city-wide exposure and vulnerability for all or the majority of the main hazards or groups of hazards.

Improve understanding of cascading impacts under some disaster scenarios.
Regularly update hazard maps and data on risks for all or the majority of the main hazards or groups of hazards.

Actively promote greater uptake of insurance products by businesses and communities.

Provide incentives for different sectors and segments of business and society to support resilience-building.

Improve the understanding, implementation and verification of municipal zoning rules, building codes and standards through legislation and better information sharing. Ensure that these connect with hazards and risk mapping, and that there is a clear plan for updating them.

Ensure clear and adequate supporting guidance for new developments that enhances resilience to one or multiple hazards.

Raise awareness and understanding of ecosystem services/functions and their benefits at the municipal level, including their economic value.

Improve guidance and incentives to further encourage the integration of green and blue infrastructure in city policy and projects.

Improve programmes and channels for disseminating hazard, risk and disaster information to the public in order to reach a wider audience.

Improve access, sharing and proper interpretation of the data on the resilience context with other organizations involved with the city's resilience.

Improve the coverage and content of training modules, covering risk and resilience issues for all sectors of the city including government, businesses, NGOs and communities.

Provide regular training programmes on DRR and resilience for the most vulnerable populations in the city to enhance their capacity to prepare for, respond to and recover from emergencies.

Enhance the capacities of local businesses (small, micro and medium enterprises) for business continuity planning, and assessing risk and resilience for different hazards and disasters.

Increase the understanding, design and management of the city’s critical and protective infrastructure for the majority of risks, in line with best practice.

Identify and address gaps in first responder assets to enhance their capacities for response in the ‘most severe’ scenario.

Improve early warning systems so that they can reach as much of the municipality’s population as possible.

Improve the supply of emergency food and basic relief items for the ‘most probable’ and ‘most severe’ scenarios.

Improve communication with and the participation of all relevant agencies in a designated city emergency operations centre.

Ensure the city’s annual emergency drills (which involve both the public and professionals) cover more test scenarios – both the ‘most probable’ and ‘most severe’ scenarios.

Put in place comprehensive plans and strategies for post-event recovery and reconstruction, including economic reboot and social support, ensuring that they are comprehensive, joined up and understood by relevant stakeholders.

Establish clear monitoring and evaluation post-event assessment systems and processes that incorporate failure analyses and that have the ability to capture lessons learned that then feed into the design and delivery of rebuilding projects. Ensure that lessons learned are disseminated in a thorough and systematic way.
4.4.3. Results of Public Health Scorecard Addendum

The Ministry of Health for Tuzla Canton is responsible for the operation and development of the public health sector in the city of Gradačac. Primary health care is provided by the ‘Gradačac Health Centre’ and by the Public Health Institution for Physical Medicine, Rehabilitation and Spa Treatment, ‘Iliđa-Gradačac’. The municipal health system organizes primary and secondary health care while tertiary health care is coordinated at the cantonal level and beyond. Work of Public Health Centre Gradačac is organized in four buildings with around 187 employees. The number of family medicine teams is 15.

When neighboring municipalities are also hit by natural or other disasters, contact is made with the health centres in Brčko, Doboj and Šamac. A team for emergency situations is formed, headed by a doctor specializing in emergency medicine. All employees are made available, and coordinated by the director of the institution in charge of the emergency team.17.

The main findings from the public health scorecard are as follows:

- The overall score for the Public Health Scorecard Addendum is **72 out of a possible 115**.
- Representatives of most public health functions usually attend major city disaster resilience meetings and contribute to major programmes, but they are not involved in all relevant planning and response activities.
- Emergencies and disasters, including disease outbreaks, are addressed and included in disaster risk planning, but they tend to be considered in isolation from other risks, and thus the interaction with other risks may not be fully addressed.
- A number of disaster health issues are addressed in the city’s scenario planning, but there is coverage comprehensive. Longer-term physical and mental health issues are likely to be omitted.
- The most applicable chronic and pre-existing health conditions and issues are included in scenario definition or planning, but with some gaps.
- Funding needs are known but some shortfalls exist. These are actively being addressed.
- There are widespread gaps in the identification and protection of relevant ecosystem services that provide public health benefits. There are also significant issues with the health of some of the ecosystem services that are monitored.
- The workforce (doctors, nurses and other first responders), and the competencies and skills required to plan and maintain public health systems and services for disaster resilience have been identified, but significant shortfalls are known to exist, both in terms of depth and numbers.
- Most of the data items and data feeds from other critical systems are shared and distributed with public health system stakeholders, but only with a limited subset of public health stakeholders, and it may be of lower quality and reliability.
- 75% of communities have a broad understanding and are able to execute key elements of their role in maintaining public health and wellbeing levels before, during and after a disaster.
- The mental health needs of 50%-75% of communities are addressed.
- Public health infrastructure would be significantly disrupted in the ‘most serious’ scenario, but certain services would continue for 75% of the city’s population. However, most of the disruptions would be mitigated in the ‘most likely’ scenario.
- There would be some impact under the ‘most probable’ scenario on the care of certain categories of patients. It is likely that relocating certain patients would be problematic. Under the ‘most serious’ scenario, there would be broader impacts on the care of certain categories of patients. It is likely that relocating many patients would be problematic.
- In terms of early warning systems for health-related emergencies, monitoring exists for the most likely health care risks and is broadly effective, but one or more key risks are not covered. Some hazards are excluded, and warning time may be less than the technology permits.

The public health sector and professionals are integrated with the emergency management team but via remote input (phone, messaging). Engagement has been tested, but possibly more than 12 months ago.

Less than 50% of citizens with pre-existing medical conditions that are likely to require additional support or specific measures have been identified, and there are widespread gaps in provisions to help them.

There are stocks of key city supply items and equipment required to maintain public health during and after a disaster, but there is no attempt to plan these, and the distribution mechanism is unlikely to be successful, if it exists at all.

There is no real defined or formalized mechanism to learn from the performance of the public health system before, during and after disasters. Only ad hoc learning exercises have been used or may be expected in future disasters.

4.4.4. Recommendations for improvement

- Improve the representation and involvement of all public health representatives and stakeholders in major city disaster resilience meetings and enhance their contribution to major disaster planning and response programmes.
- Ensure that disaster risk planning, including for disease outbreaks, addresses the interaction between different risks.
- Ensure full coverage of disaster health issues in the city's scenario planning as well as longer-term issues such as physical and mental health issues.
- Identify gaps for the most applicable pre-existing chronic health issues in scenario definition or planning.
- Identify needs and shortfalls in funding and allocations to address public health risks and the impacts of disasters.
- Identify gaps in the monitoring of relevant ecosystem services that provide public health benefits.
- Identify shortfalls in the workforce (doctors, nurses and other first responders) required to plan and maintain public health systems and services for disaster resilience – both in terms of numbers and depth of skills and competencies.
- Improve the quality and reliability of data items and data feeds from other critical systems, ensuring that these are shared and distributed with all public health system stakeholders who need it.
- Widen the coverage of efforts to address communities’ mental health needs.
- Ensure the plans/measure are in place to relocate specific categories of patients (those who are already sick or dependent) for the ‘most probable’ and ‘most serious’ scenarios.
- Improve monitoring and warning time for health-related emergencies covering all major health risks.
- Identify gaps in the provision of additional support and specific measures to citizens with pre-existing medical conditions, persons with disabilities, children, the elderly and other vulnerable populations.
- Improve planning and distribution mechanisms for key city supply items and equipment required to maintain public health during and after a disaster.
- Initiate and establish comprehensive and formalized mechanisms for monitoring and evaluation during and after disasters in order to disseminate lessons learned that can be applied in future disasters.
4.5. Municipality of Olovo

Administratively, the town of Olovo is part of Zenica-Doboj Canton. Olovo is located 50 km northeast of Sarajevo and 75 km from Tuzla. The municipality covers an area of 408 km² and has a population of about 10,000 – a population density of 27 people/km². Olovo (Latin name plumbum or lead) was first mentioned in 1382 after the mining resources exploited there at the time. Historically, lead has been the most important natural and economic resource for the area. More recently, it has also been known for its timber industry, which various development programmes have tried to renew and enhance. Over the last decade, the municipality has implemented a strategic shift towards tourism, primarily based on its thermal-mineral water resources in an effort to develop ‘spa’ tourism in the future. This activity has no adverse effects on the municipality’s environment.

The Municipality of Olovo is located in the inner Dinaric Alps and has a distinctly hilly and mountainous relief, with altitudes ranging from 380 m to 1,328 m above sea level. Olovo municipality is located in a temperate-continental climate zone characterized by cold winters, short springs and autumns, and warm and humid summers; the average annual temperature is 8.3 °C. The most important natural resources are forests, farmlands, water sources, especially medicinal mineral waters, and raw mineral materials. Forests cover around 80 per cent of the total land area.

Over the last 10 years, a state of emergency has been declared for landslides, floods, storms and heavy snow. Floods have caused the greatest material damage, both primary and secondary. Other hazards include fires, earthquakes, technical/technological accidents, epidemics/pandemics and unexploded ordinances.18

4.5.1. Results of Disaster Resilience Scorecard Assessment / main gaps and challenges

Olovo municipality joined the MCR2030 initiative in BiH at the beginning of the 2021. After expressing interest, representatives of the Olovo Civil Protection Department began preparatory activities. After a number of online meetings and consultations, the civil protection department in consultation with other relevant sectors within the municipal administration completed the ‘Disaster Resilience Scorecard for Cities’ along with the ‘Public Health System Resilience Addendum’.

The main findings from the Disaster Resilience Scorecard are as follows:

- The overall score for the Preliminary Disaster Resilience Scorecard is 65 out of a possible 141.
- The municipal master plan (or relevant strategy/plan) for implementing disaster risk reduction approaches partially complies with the Sendai Framework and covers some of the ‘Ten Essentials’.
- A municipal multisector mechanism consisting of all lead agencies is well established, properly resourced and with the authority to act, but there is inconsistency in resourcing across the key DRR stages.
- Resilience is not properly integrated with other key city functions/portfolios and it is applied ad hoc or occasionally.
- Some disaster scenario information is available, setting out city-wide exposure and vulnerability but only for some hazards, or groups of hazards.
- Clear hazard maps and data on risk exist but only for some hazards.
- In terms of attracting new investment, there is some awareness of potential funding routes/sources, but the picture is incomplete and little is done to pursue these funds.
- There are few or no incentives that exist at municipal level for different sectors and segments of business and society to support resilience-building.
- The municipality is zoned according to land use, and this connects loosely with hazards and risk mapping. However, plans for updating this zoning are not well understood.
· There is a policy to promote resilience to one or more hazards in new developments but supporting guidance is inadequate.

· There are some building codes and standards that cover some hazards but there is no clear plan for updating these.

· In terms of awareness and understanding of ecosystem services/functions, the city and key stakeholders understand the majority of the functions provided by key local natural assets but these have not been fully economically valued.

· In regards to institutional capacity for resilience, the municipality can access most of the skills, experiences and resources it needs to respond to identified disaster scenarios, but there are some gaps.

· Some useful programmes and channels exist for disseminating hazard, risk and disaster information to the public, but there is significant room for improvement to reach a greater proportion of the public.

· Some, but not all, of the data layers on the resilience context are accessible and shared with other organizations involved with the city’s resilience; the data is raw and requires interpretation.

· The municipality has a track record of delivering resilience training to some sectors, but other sectors lack training and engagement.

· There are no regular training programmes provided to the most vulnerable populations in the municipality, but mapping of socially vulnerable populations is available.

· Less than 20% of businesses have a documented business continuity plan that has been reviewed within the last 18 months.

· In terms of infrastructure resilience, some loss of service for essential services such as water, energy, transport and communication would be experienced under the ‘most severe’ scenario.

· In regards to health care capabilities, less than 90% of major injuries under the ‘most severe’ scenario could be treated within 36 hours.

· 5%-10% of education facilities would be at risk of damage or disruption under the ‘most probable’ scenario.

· First responder assets would meet basic needs under the ‘most severe’ scenario, but gaps are known to exist.

· It is estimated that more than half of the population is reachable by early warning system.

· A comprehensive disaster management / preparedness / emergency response plan exists at the municipal level, but it contains significant gaps in coverage for city mitigation, preparedness and response to local emergencies.

· Under the ‘most severe’ scenario, the supply of emergency food and basic relief items is less than the estimated need, by 2% or more.

· There is no multi-agency emergency operations centre with automated standard operating procedures specifically designed to deal with the ‘most probable’ and ‘most severe’ scenarios.

· There are no practices or drills that involve both the public and professionals to help prepare for emergencies.

· There is no strategy, plan or process in place at the municipal level for post-event recovery and reconstruction, including for economic reboot and social support.

· There are no established post-event assessment processes that can incorporate failure analyses or that have the ability to capture lessons learned that then feed into the design and delivery of rebuilding projects. Some lessons are captured and disseminated but not in a thorough or systematic way.
**4.5.2. Recommendations for Improvement**

An analysis of the main documents on DRR and resilience issues (relevant assessments, strategies and plans) for Olovo municipality, as well as an analysis of the Preliminary Disaster Resilience Scorecard, point to a number of recommendations that municipal representatives, stakeholders and other relevant organizations could take to improve resilience planning, organization, response and learning:

- Ensure that all city DRR strategies and plans comply with the Sendai Framework and cover all or the majority of UNDRR's 'Ten Essentials for Making Cities Resilient'.
- Ensure that allocations for resilience are integrated within other key city functions/portfolios as part of 'day-to-day' decision-making.
- Improve disaster scenario information, setting out city-wide exposure and vulnerability for all or the majority of the main hazards or groups of hazards.
- Regularly update hazard maps and data on risks for all or the majority of the main hazards or groups of hazards.
- Enhance municipal financial capacity for resilience in order to pursue more funds.
- Provide incentives for different sectors and segments of business and society to support resilience-building.
- Improve the understanding, implementation and verification of municipal zoning rules, building codes and standards through legislation and better information sharing, ensuring that they connect with hazards and risk mapping and that there is a clear plan for updating them.
- Enhance awareness and understanding of ecosystem services/functions and their benefits at the municipal level, including their economic value.
- Identify and address gaps in institutional capacity for resilience.
- Improve programmes and channels for disseminating hazard, risk and disaster information to reach a greater proportion of the public.
- Improve the content and coverage of training courses on risk and resilience issues, for all relevant sectors as well as for the most vulnerable populations in the municipality.
- Enhance the capacities of local businesses (small, micro and medium enterprises) for business continuity planning, and assessing risk and resilience for different hazards and disasters.
- Identify and address gaps in first responder assets to enhance their capacities for response in the 'most severe' scenario.
- Improve early warning systems so that they reach as much of the municipality's population as possible.
- Identify and address gaps in coverage for municipal mitigation, preparedness and response activities to local emergencies.
- Improve the supply of emergency food and basic relief items for the 'most probable' and 'most severe' scenarios.
- Establish a city emergency operations centre that engages all agencies and adopts standard operating procedures specifically designed to deal with the 'most probable' and 'most severe' scenarios.
- Develop and implement practices and simulation drills for emergencies that involve both the public and professionals.
- Put in place plans and strategies for post-event recovery and reconstruction, including for economic reboot and social support.
- Establish clear monitoring and evaluation systems and processes for learning lessons after disasters.
4.5.3. Results of Public Health Scorecard Addendum

The Municipality of Olovo only has one public health centre. It coordinates and implements primary health care for the population as well as certain types of specialist-consultative health care. Secondary and tertiary levels of health care are provided at the University Clinical Centre, Sarajevo (UKCS).

The public health centre in Olovo provides family medicine clinics, emergency medical services, specialist-consultative services, children’s health services, community nursing services, hygienic and epidemiological services, women’s reproductive health services, services for protection against lung diseases, community services for physical and mental rehabilitation, services for health protection of workers as part of occupational medicine, dental care, and primary-level laboratory and radiological diagnostics. The public health centre has six family medicine teams: four family clinics based in Olovo and two in remote parts of the municipality.

The main findings from the Disaster Resilience Scorecard are as follows:

- The overall score for the Public Health Scorecard Addendum is 64 out of a possible 115.
- Representatives of most public health functions usually attend major city disaster resilience meetings and contribute to major programmes, but they may not be involved in all relevant activities.
- Public health risks relating to the impacts of disasters are known but there are some shortfalls in funding. These are actively being addressed.
- All key public health facilities are in locations and conform to codes that will allow them to survive in the ‘most probable’ disaster scenario.
- Some, but not all, relevant ecosystem services that provide public health benefits are identified. In theory, most of these are protected but may not be thriving.
- All the relevant workforce competencies and skills required to plan and maintain public health systems and services for disaster resilience have been identified, and some minor shortfalls in numbers or certain skill sets are known to exist.
- 75% of communities have a broad understanding and are able to execute key elements of their role in maintaining public health and wellbeing levels before, during and after a disaster.
- Public health infrastructure would be significantly disrupted in the ‘most serious’ scenario, but certain services would continue for 75% of the city’s population. However, much of the disruption would be mitigated in the ‘most likely’ scenario.
- Surge capacity exists but is known or suspected to have minor inadequacies relative to the ‘most probable’ scenario, and could be activated within 6 hours. Under the ‘most severe’ scenario, there would be more significant shortcomings in geographical coverage or the types of service available, and could only be activated within 12 hours or longer.
- There would be some impact under the ‘most probable’ scenario on the care of specific categories of patients (those who are already sick or dependent). It is likely that the relocation of certain patients would be problematic. There would be a broader impact under the ‘most serious’ scenario on the care of specific categories of patients. It is likely that the relocation of many patients would be problematic.
- In regards to early warning systems for health-related emergencies, monitoring exists for the most likely health care risks and is broadly effective, but one or more key risks are not covered. Some hazards are excluded, and warning time may be less than the technology permits.
- Disaster management processes include consulting public health professionals, but in the follow-up to events, not as they happen. There is no testing of processes.
- The distribution capability for municipal supply items and equipment required to maintain public health during and after a disaster may reach 50% of the population. There is no list, but there are stockpiles and supplies of some items.
- Comprehensive post-event public health plans exist for the ‘most probable’ scenario but with some shortfalls. There are more significant shortfalls for the ‘most severe’ scenario.
Formalized learning from the performance of the public health system before, during and after disasters takes place via a public health review mechanism, but lessons remain within public health structures, and there is no attempt to integrate public health learnings with other disciplines within the city. Likewise, public health fails to influence learnings in other services.

4.5.4. Recommendations for Improvement

- Improve the representation and involvement of all public health representatives and stakeholders in major city disaster resilience meetings and enhance their contribution to major disaster planning and response programmes.
- Identify needs and shortfalls in funding and allocations to address public health risks and the impacts of disasters.
- Enhance efforts to identify and protect relevant ecosystem services that provide public health benefits (in both theory and practice).
- Identify and assess the capacities and skills of the medical workforce (doctors, nurses and other first responders) and the overall numbers available in case of a disaster.
- Increase community access to and trust in public health information so that communities properly receive, respect and act upon public health information, measures and orders of relevant ministries or crisis headquarters.
- Improve the ability to relocate specific categories of patients (those who are already sick or dependent) in the ‘most probable’ and ‘most serious’ scenarios.
- Encourage consultation of public health professionals in all phases of the disaster management process.
- Increase the reach of municipal supply items and equipment required to maintain public health during and after a disaster and make a list of all available supply items and equipment in the municipality.
- Develop a comprehensive post-disaster public health plan that covers needs in the ‘most severe’ scenario.
- Initiate and establish comprehensive mechanisms for post-disaster monitoring and evaluation to disseminate lessons learned and improve health protection systems.

5. REFERENCES

2. Bosnia and Herzegovina Floods, Recovery Needs Assessment, GFDRR 2014,
7. Vulnerability assessment of the city of Bijeljina from natural disasters and other accidents, February 2015 (updated September 2019.)
15. https://www.gradbijeljina.org/
17. https://olovo.gov.ba/