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European Regional Development Fund - Instrument for Pre-Accession II Fund

MUHA



D.T1.1.1. Report on National consultations on water supply safety mechanisms - *MONTENEGRO*

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Final Version

November, 2020

This project is supported by the Interreg ADRION Programme, funded under the European Regional Development Fund and IPA II fund.



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Contents

1. Introduction	4
2. Concept of water supply safety in Montenegro	6
2.1 Legislation related to water safety	6
2.2 Institutions related to water safety	9
2.3 Ongoing processes	10
2.4 Tools	12
2.5 Risks, bottlenecks, challenges	14
3. Specific hazards/risks addresses by the water safety procedures in Montenegro	15
4. Conclusions	19

List of figures and tables:

Figure 1 Organization of the water supply sector in Montenegro.....	5
Figure 2 Drinking water supply provision overview.....	5
Figure 3 Access to drinking water in Montenegro.....	6
Table 1 Captured and delivered quantities of water from the public water supply.....	6
Map 1 Drought vulnerability map of Montenegro.....	13
Table 2 SWOT analysis of the water supply sector from the point of view of water safety for Montenegro.....	14
Table 3 Criteria for water pollution endangerment.....	17
Figure 4 List of attendants.....	20
Figure 5 Questionnaire for national communication in Montenegro.....	21



1. Introduction

Montenegro currently has about 622,000 inhabitants. It is a parliamentary republic with 23 municipalities and no administrative regions. Montenegro is candidate for EU membership since 2010. The accession negotiations between the EU and Montenegro started on 29 June 2012. After eight years of accession negotiations all the 33 screened chapters have been opened, of which 3 are provisionally closed.

Montenegro is one of the world's richest countries in water resources in relation to the territory size. It has sufficient water resources, but they are unevenly distributed across the country. Ninety-five percent of Montenegrin watercourses are formed within the country (i.e., both the sources and a major part of the drainage basins occur within national boundaries). Rainfall in Montenegro is characterized by high variability in both time and space. The country has good quality groundwater and surface water, but these resources are unevenly distributed throughout the country. Karst areas in the central and western parts are arid, whereas the northern mountainous area is richer in raw water. About half the country belongs to the Danube catchment and the other half to the Adriatic catchment.

Public water utilities use groundwater to produce drinking water, 92% of which came from groundwater. Industrial facilities use raw water, approximately two-thirds of which comes from surface water and one-third from groundwater.

In the coastal part, the main natural negative factor of groundwater quality is the impact of salty seawater on low karst emissions in the coastal area. In the continental part the negative impact on groundwater is caused by anthropogenic activities, as well as the result of inadequate sanitary protection and inadequate sanitation of the catchment area.

There is not enough water at the time of the greatest consumption, which coincides with the crisis hydrological periods in the warmest period of the year and coincides with the months of the greatest demand for water, which is especially emphasized on the Montenegrin coast.

The state of water quality used for water supply is monitored regularly according to the annual Water quality control program for water supply at water intakes. In general, the majority of samples taken (96.5% of samples for microbiological parameters and 95.23 samples for physico-chemical parameters) meets the prescribed quality standards.

Water management is the responsibility of the state and all documents are issued at this level which provide a normative framework for the unity of the water system.

The most important legal acts and current legislation covering the area of water management are described in the next part of this report.

The organization of the sector is given in diagram no.3. The role of individual institutions is described in more detail in the next part of the report.

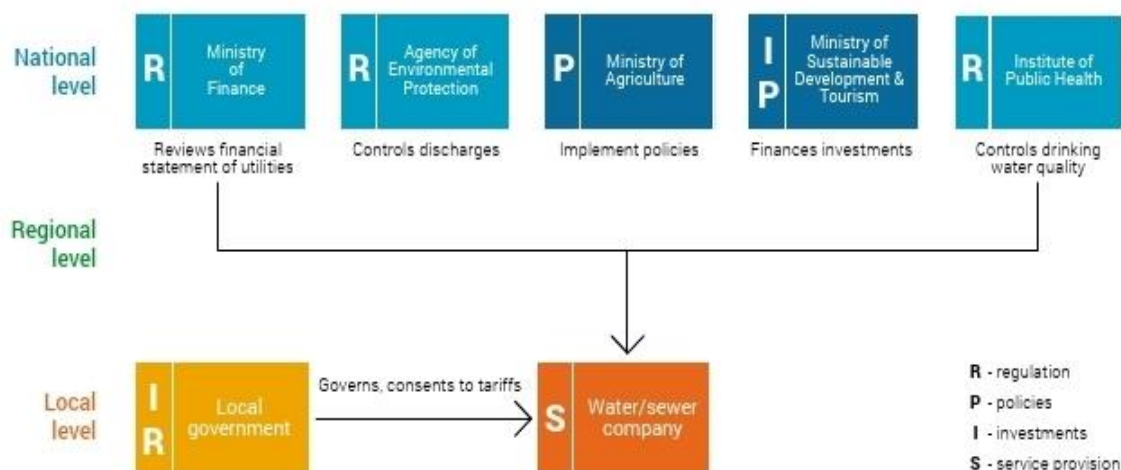


Figure 1 Organization of the water supply sector in Montenegro

In Montenegro local governments are responsible for water supplying services and provide them through 23 public utility companies (actually LLCs). Fifteen municipal utilities that provide only water and sanitation services cover urban areas representing 50% of the population. Six municipal multi-utility companies supply mostly small municipalities (18% of the population). One regional water company owned by the central state has been specifically created to supply water to coastal municipalities (8% of the population).

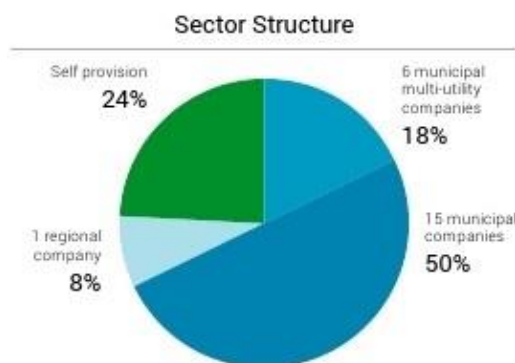


Figure 2 Drinking water supply provision overview

91% of the population has access to piped water in Montenegro. This percentage is significantly higher in urban than in rural areas. Access to the public network is lower and 76% of the population is connected to the public water supply system.

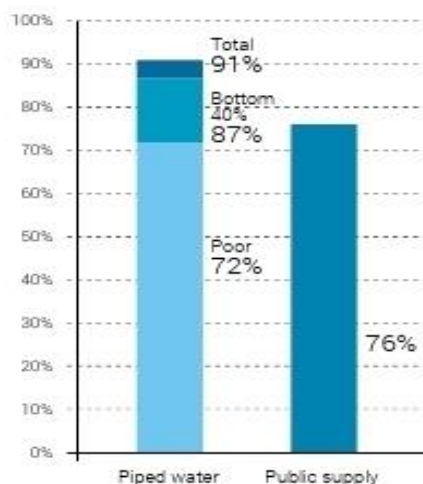


Figure 3 Access to drinking water in Montenegro

The total amount of captured water in 2011 was 109.5 million m³ / year and the amount of water delivered in the observed period was 50 million m³ / year (Figure 4). The amount of delivered water for households has stabilized in the range of 33.5 to 35 million m³ in recent years, while the economy sector has seen a decline from 13.2 to 9.5 million m³.

Crna Gora	1996	1999	2002	2005	2008	2011
Water Abstraction total	90,864	90,409	89,682	101,866	106,579	109,449
Water Distribution total	65,451	60,881	68,141	53,671	49,829	49,677
Households				33,460	34,614	34,993
Enterprisesa				13,165	10,327	9,591
To other consumers				7,046	4,888	5,093
Water losses	25,413	29,528	21,541	48,195	56,754	59,772
Water losses %	28	33	24	47	53	45

Table 1 Captured and delivered quantities of water from the public water supply

2. Concept of water supply safety in Montenegro

2.1 Legislation related to water safety

The legislation addressing water supply systems as well as water safety in Montenegro:

- **Water Law** (Official Gazette of MNE, No 27/07 , No 32/11 , No 47/11 , No 48/15 and No 52/16)

As the basic legal document for water issues, this Law regulates the legal status and all necessary standards and requirements for obtaining the integrated water management



regarding the waters and related issues on the territory of Montenegro. This law applies to:

- *Surface and groundwater and saline water of estuaries that flow into the sea;*
- *Mineral and thermal waters;*
- *Water resources;*
- *Sites of drinking water in the territorial sea;*
- *Coastal sea water against pollution from land.*

It does not apply to the use of mineral and thermal waters for obtaining mineral raw materials or geothermal energy. The Government of Montenegro, at the proposal of the ministry responsible for water management and with prior opinion given by the ministry responsible for maritime affairs, establishes the separation line between inland waters and coastal sea water.

- **Water Management Strategy** (Ministry of Agriculture and Rural Development, June 2017)
This strategy defines long-term directions of water management in Montenegro.
- **Water Pollution Protection Plan 2019-2024** (2018)
The key objectives defined by this Plan are the protection of water from pollution from all sources that negatively affect the quality and quantity of water, as well as the environment; prevention, control and reduction of water pollution impacts and creation of conditions for reasonable and fair use of water. It contains:
 - 1) *Required research and testing of water quality;*
 - 2) *Classification of water bodies;*
 - 3) *Water protection measures*
- **Law on Providing Safe Water for Human Consumption** (Official Gazette of MNE, No 80/17)
This law is a key legal framework that defines the rules and procedures for ensuring the health of drinking water in Montenegro.
- **Food Safety Law** (Official Gazette of MNE, No 57/15)
- **Law on Local Self-Government** (Official Gazette of MNE, No 2/18, 34/19, 38/20)
- **Law on communal activities** (Official Gazette of Montenegro, No 55/16, 74/16, 2/18 and 66/19)
Communal activities, governing principles, general conditions and manner of their performance are defined by this Law.
In terms of this law, communal activities include:
 - 1) *water supply,*
 - 2) *wastewater treatment and disposal,*
 - 3) *heat supply,*
 - 4) *public transport in cities and other settlements;*
 - 5) *maintenance of cleanliness in towns and other settlements,*
 - 6) *landscaping and maintenance of parks, public green and recreation areas,*
 - 7) *maintenance of streets, roads and other public areas in cities and other settlements and public lighting, as well as the construction, maintenance and use of local roads,*



8) construction, maintenance and use of landfills,

9) construction, maintenance and use of bridges, public buildings and regulation and maintenance of riverbeds,

10) maintenance of cemeteries and funeral services,

11) chimney services, maintenance of public toilets, maintenance of public baths, dog pounds, public parking lots, maintenance and providing services to markets.

- **Law on Regional Water Supply of the Montenegrin Coast** (Official Gazette of MNE, No 13/2007);
- **Rulebook on safety requirements for drinking water** (Official Gazette of MNE, No 24/12)
- **Rulebook on methods for determining and maintaining sanitary protection zones for drinking-water sources and restrictions in the related zones** (Official Gazette of MNE No. 66/2009);

This Regulation prescribes the manner of determining and maintenance of sanitary protection zones of sources that are used or can be used for drinking water supply and restrictions in these zones.

The provisions of this Regulation also apply to the facilities for drinking water supply.

Rulebook on the manner and procedure of measuring the amount of water in the water intake (Official Gazette of MNE, No 24/10);

- **Rulebook on the manner and deadlines for determining the status of groundwater** (Official Gazette of MNE, No 32/11, 47/15, 52/16 and 84/18)
- **Rulebook on detailed conditions to be met by legal entities performing water quality control** (Official Gazette of MNE, No 66/12);
- **Rulebook on the detailed content of the preliminary flood risk assessment and the flood risk management plan** (Official Gazette of MNE, No 69/15)
- **Rulebook on the manner and scope of water quality control** (Official Gazette of MNE, No 68/15 and No 17/16)
- **Decision of the local self-government unit on the conditions of use and maintenance of rural water supply systems, public fountains, public wells and rural gaps** (made by all municipalities in Montenegro);
- **Law on Hydrometeorological Affairs** (Official Gazette of MNE, No 026/10, No 040/11, No 030/12);
- **Protection and Rescue Law** (Official Gazette of MNE, No 13/07, No 32/11 and No 54/16);

It consists of provisions related to conducting preventive, operational and recovery activities as well as measures to mitigate and reduce risks of hazards.

- **National Strategy for Emergency Situations** (as a main strategic document for emergency management adopted by the Government on the proposal of the Ministry of Interior);



- **National and municipal plans for protection and rescue** (from fires, floods, earthquake etc.) all approved by Minister of the Interior;
- **The Strategy for Disaster Risk Reduction with Dynamic Plan of Activities for implementation of the Strategy for the period 2018-2023** (*Ministry of the Interior*)
This Strategy, among other issues, identified hazards addressed by MUHA project.
- **Environment Law** (Official Gazette of MNE, No 52/16).

There is no a unique website for downloading all the listed documents.

2.2 Institutions related to water safety

At the state level, **the Government**, as the holder of executive power, has numerous competencies determined by the relevant law. In that sense, the Government is in charge of adopting key planning documents, then the most important decisions and normative acts and the establishment of executive bodies and bodies of importance for the field of water.

Apart Government, competencies in the field of water management are divided between several ministries. Firstly, **The Ministry of Agriculture and Rural Development** performs activities related to development policy in water management; system solutions for the provision and use of water, water land and water sources for water supply, water protection from pollution, regulation of waters and watercourses and protection against the harmful effects of water; systemic and other incentive measures to improve these areas; keeping prescribed records; harmonization of domestic regulations within its own framework competencies with the legal order of the European Union. **The Water Administration**, as a body within the Ministry of Agriculture and Rural Development, from the point of view of water management, is the most important executive body in this area. It is very clear from the competencies determined by the Water Law that this body should play a key role in the execution of the same law and in addition be an expert service of the Government and the line ministry, and in certain segments to act with the attributes of the agency, ie regulatory and supervisory body. Given the scope of all these tasks, the Law also provides that this body may delegate the performance of professional tasks in planning and management to specialized organizations, in accordance with the Law.

The Ministry of Sustainable Development and Tourism, through the Directorate for the Environment and the Directorate for Communal Services, is responsible for reporting on the quality of environmental segments, including for water utilities, water supply and collection and treatment of urban wastewater (Directive 91/271 / EEC), as well as for the Marine Strategy Directive 2008/56 / EC.

The Ministry of Health performs administrative tasks which, among other things, refer to the health safety of drinking water. **Public Health Institute**, which performs physico-chemical analyzes of water and microbiological testing of drinking water, is responsible for controlling and monitoring the safety of drinking water (Directive 98/83 / EC). It is the only accredited and authorized institution for external control of drinking water quality and public water supply system in Montenegro.



The Ministry of the Interior through the Directorate for Emergency Situations, is in charge of emergency management and implementation of the National Strategy for Disaster Risk Reduction.

The Institute of Hydrometeorology and Seismology deals with monitoring the quality and quantity of surface and groundwater, flood forecasting and monitoring of the hydrological situation, giving warnings to the institutions responsible for flood risk management.

The Directorate for Inspection Affairs performs inspection supervision through water management inspection (monitoring and implementation of the Water Law) and sanitary inspection (water safety control), while the Bar and Kotor Navigation Safety Inspection, as part of the Maritime Transport Directorate of the Ministry of Maritime Affairs and Transport, is in charge of sea protection from pollution from vessels.

Environment protection Agency of Montenegro - EPA Montenegro performs tasks in the field of environmental protection, as follows:

- Environmental monitoring
- Produces analyzes and reports
- Issues permits
- Communicates with relevant domestic and international bodies and organizations, as well as with the public.

Performs other tasks determined by the Environment Law and special regulations.

The Institute for Geological Research conducts general hydrogeological research.

In accordance with the Law on Local Self-Government (Official Gazette of MNE, No 2/18, 34/19, 38/20), local self-government units (**municipalities**) regulate and ensure the performance and development of communal activities, maintenance of communal facilities and communal order. Municipalities have prescribed the conditions and manner in more detail in their acts providing water supply and wastewater management services and performing these tasks entrusted to the public companies they formed (**limited liability water supply companies**). **The Protection and Rescue Service** (each municipality has) performs the tasks of protection and rescue of citizens, material and cultural goods and environmental protection endangered by catastrophes, natural disasters, technical - technological and other accidents, in accordance with the Protection and Rescue Law.

Association for the Improvement of Water Supply, Treatment and Sewage of Montenegro is NGO aimed at improving and developing better cooperation among its members (Montenegrin water companies) as well as in relation to other national and international subjects.

2.3 Ongoing processes

When it comes to water safety issues, Montenegro is in the process of harmonizing its legislation with the *acquis communautaire* and its standards, through accession negotiations for EU membership. Certain rules and procedures have been applied (outlined above), but



the development of the WSP, as it is recommended by the World Health Organization, has not yet been initiated.

For the purposes of preparing this report, a questionnaire was prepared and distributed to 22 water supply companies in Montenegro and the Association of Waterworks of Montenegro. We have received answers from 8 of them and used that information to prepare certain parts of this report.

Communication with the competent institutions at the local and national level was conducted through telephone conversations, e-mail contacts and meetings with their representatives, when it was possible due to covid situation.

2.3.1 Existing practices aiming at the drinking water safety

So far, WSP has not been implemented in Montenegro. However, water safety has been addressed by other applicable procedures and documents.

Firstly, it is *Law on Providing Safe Water for Human Consumption*. It prescribes the parameters of health safety of water for human use, obligations of legal entities that perform the activity of public water supply, activities in case of deviation from the prescribed values of parameters, monitoring of health water safety for human use (monitoring), as well as other issues of importance for the provision of health water for human use, in order to protect human health. There is no provision that strictly prescribes the obligation to implement WSP. It also prescribes the following: “In order to monitor the water safety, the Ministry of Health shall establish a Water Commission, as an expert and advisory body. The Commission is formed for a period of five years and consists of one representative of each Ministries, laboratories that are responsible for the analysis of water samples, the administration in charge of the protection of the environment, the state administration in charge of water affairs, the administrative body in charge of Inspection Supervision, legal entities and two representatives of the Institute (hygiene specialist and epidemiology specialist)”.

Based on current legislation, all water companies in Montenegro are required to implement the HACCP quality system (*Food Safety Law, Law on Providing Safe Water for Human Consumption*) which provides an acceptable level of safety that is monitored at critical points characteristic of the water supply of the population (sources, distribution system, etc..Article 17 of *Law on Providing Safe Water for Human Consumption* prescribes that the legal entity is obliged to establish a system of self-control, based on the analysis of pollution risk; the system of self-control enables the identification of control points and critical control points in the entire system of water capture, additional treatment and distribution. According to HACCP, it is necessary to identify what dangers (“hazards”) might threaten the safety of water supply. So, critical points are defined, after which preventive measures and measures for their control are determined. That is the way to reduce the risk of hazards causing harm to water supply system.

In addition to this, sanitary protection zones are defined on the basis of the valid rulebook.

2.3.2 Level of implementation



In the previous section, we stated that water safety in Montenegro is not addressed by the WSP but through other applicable procedures.

In this regard, out of 23 water supply companies, HACCP is implemented with them 22.

Despite the existing legal provisions, according to the data of the Water Administration, only 49 of about 90 springs have defined sanitary protection zones. Protection of drinking water, more precisely, the implementation of protection measures within sanitary protection zones is difficult at all sources in karst and alluvium, especially where water supply sources are located near larger cities, because they are threatened by urbanization, industrialization, agriculture, unregulated landfills and wastewater. In addition, where the procedure for determining protection zones has been carried out, there are often problems with the lack of data that should help determine and establish protection zones, especially with the definition of a wider source protection zone, which coincides with the source basin.

By the Law on Providing Safe Water for Human Consumption, the water must be healthy and clean, at:

- 1) the source, if it is used directly from it;
- 2) place of use, ie on the faucet inside the room where it is usually used for use and if delivered via the water supply network.

2.4 Tools

The process of reporting on state of the environment began with the adoption of Agenda 21 at the UNCED conference in Rio in 1992. Chapter 40 of Agenda 21 specifically requires improved information on the environment for the purpose of making decisions. During two decades, reporting on state of the environment became common practice in many countries around the world. State of the environment reports (SoER) are based on the indicator approach to the issue of environmental protection in a concise, simple, understandable and comparable way that shows the current status and trends of changes in the environment.

The Law on Environment (“Official Gazette of Montenegro”, 48/08, 40/10, 40/11 article 19) stipulates mandatory drafting of a State of the Environment Report of Montenegro for a period of four years, based on the National List of Environmental Indicators. According to that, on the proposal of Environmental Protection Agency, National List of Environmental Indicators is adopted by Government of Montenegro at the meeting of 14 March 2013.

Consequently, the Environmental Protection Agency publishes **indicator-based State of the Environment Reports (2013,2017)** in order to present the conditions and information, in accordance with international practices and standards, to decision makers and the general public in Montenegro.

<https://epa.org.me/wp-content/uploads/2019/02/Indikatorski-SOER2017-dec-2018.pdf>

The report on the state of the environment in Montenegro, based on the indicator presentation, is based on the standard typology of indicators developed by the European Environment Agency (EEA), used by others international institutions as a standard in



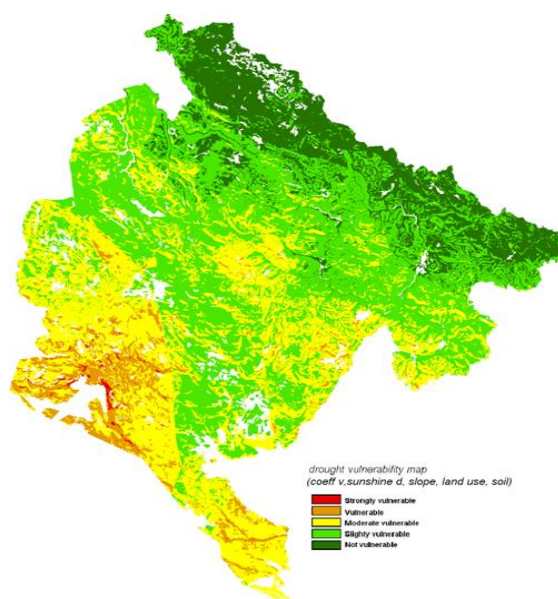
designing environmental reports. This report includes also indicators of quality of surface water and it is useful for water protection management in Montenegro generally. Beside this kind of report, EPA MNE produces **regular Report on state of environment in Montenegro (for each year)** and it covers all segments of the environment, including the issue of groundwater, surface water and drinking water quality.

To reduce the negative effects of existing drought risks, as well as the projected impacts of climate change, countries of Southeast Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Greece, Hungary, Montenegro, Moldova, Romania, Serbia, Slovenia and Turkey) have decided to establish Drought Management Center for Southeast Europe (DMCSEE).

The main goal of the center, realized through the IPA14 project DMCSEE, is to improve drought preparedness, through conducting a vulnerability and risk assessment, and establishing an early warning system to reduce the impact of drought. Within this Center, *Institute of hydrometeorology and seismology of MNE* has created the Drought Impact Archive since 2000.

Given that agriculture is the first to be affected by drought, the assessment of vulnerability to drought for the agricultural sector was made on the basis of observed climatological and geomorphological data. The vulnerability is classified into five categories: not vulnerable, weakly vulnerable, moderately vulnerable, vulnerable and very vulnerable.

The **vulnerability map** actually serves as an indicator of areas that require a more detailed drought risk assessment, which would help decision-makers in identifying appropriate mitigation measures before the next drought and mitigation of its consequences.



Map 1 Drought vulnerability map of Montenegro for observation period 1971.-2000. (Source: IPA DMCSEE, 2011.)



Apart previously mentioned and **drought monitoring using SPI MAPS**, there are no special drought monitoring tools by sectors in Montenegro.

<http://www.dmcsee.org/>

<http://www.meteo.co.me/misc.php?text=135&sektor=1>

2.5 Risks, bottlenecks, challenges

Some of the potential risks that may negatively affect the successful implementation of improved water safety procedures are identified according to our own experience and inputs achieved via questionnaire sent to all water companies in Montenegro.

1) Technical risks

- Inadequate capacity of water companies (technical and human resources) for the implementation of all procedures related to water safety
- Age of water supply system (system condition)
- Complexity of karst aquifers

2) Economic risks

- Limited funding can significantly slow down the implementation of procedures, covid 19

3) Political

- Implementation of procedures related to water safety is not a priority at the national level
- Implementation of water safety procedures is not a priority at the local level
- Ongoing political changes in country and establishment of the focus on issues of improved water safety procedures.

<p>■ STRENGTHS</p> <ul style="list-style-type: none"> - Defined sanitary protection zones; - Quality human resource with necessary modern knowledge; - Technical resources; 	<p>■ WEAKNESSES</p> <ul style="list-style-type: none"> - Age and low efficiency of water supply companies; - Lack of money on the local level; - Lack of competent staff in small water utilities - WSPs have not been implemented in water utilities
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■ OPPORTUNITIES	■ THREATS
<ul style="list-style-type: none"> - Improving the safety of drinking water; - Improving the level of service in water companies; - Access to EU projects and funds; 	<ul style="list-style-type: none"> - Hazard events; - Financial crisis; - Climate change; - Lack of political will to harmonize legislation with EU and to implement it in practice;

Table 2 SWOT analysis of the water supply sector from the point of view of water safety for Montenegro

3. Specific hazards/risks addresses by the water safety procedures in Montenegro

Risks which are addressed by the water safety procedures in Montenegro are as listed below.

Based on HACCP, water safety is conditioned by:

- Water quality at springs
- Disinfection efficiency and condition of the distribution system

The main identified hazards are:

- Microbiological (viruses, bacteria, etc.)
- Chemical (accidental pollution, pesticide spraying, septic tank leaks, etc.)
- Physical (turbidity, sand, silt, leaves, corrosion, etc.)

Risks:

- Water quality risks
- Risks related to monitoring the condition of facilities at water sources and sanitary protection zones
- Risks related to measuring chlorine levels and turbidity

Protection of water resources

Protection of water resources is regulated with water protection sanitary zones (Rulebook on methods for determining and maintaining sanitary protection zones for drinking-water sources and restrictions in the related zones (Official Gazette of MNE, No. 66/2009).



This Rulebook prescribes the manner of determining and maintenance of sanitary protection zones of sources that are used or can be used for drinking water supply and restrictions in these zones.

Sanitary protection zones of springs, in relation to the protection regime are:

1. zone of strict protection regime - I zone of protection (zone of immediate protection);
2. zone of limited protection regime - II protection zone (narrower protection zone);
3. surveillance zone - III protection zone (wider protection zone).

The most of water intakes in Montenegro have only an immediate protection zone established.

Measures against accidental pollution (surface waters, groundwater)

Pursuant to the Law on Waters, the Institute of Hydrometeorology and Seismology of MNE is responsible for monitoring the quality and quantity of surface and groundwater.

Measures against accidental pollution (surface waters, groundwater) are included in Water Pollution Protection Plan 2019-2024. This plan is adopted by the Government, at the proposal of the Ministry of the Agriculture and Rural Development, for a period of six years.

Water protection measures (in general, but including water supply too) include:

- a) objectives of the measures,
- b) administrative measures,
- c) measures to preserve water quality,
- d) measures to prevent and reduce water pollution,
- e) measures to prevent or limit the introduction into the water of dangerous and harmful substances,
- f) measures for the prevention and disposal of waste and other substances in areas where may affect the deterioration of water quality,
- g) measures to prevent the impact of bulk pollutants,
- h) measures to protect aquatic ecosystems and other ecosystems directly dependent on aquatic ecosystems,
- i) water pollution quality control measures with a combined approach for point and diffuse sources of pollution,
- j) measures for treatment of polluted waters, plan for construction of treatment facilities waste water, with accompanying devices, for at least 2000 equivalent inhabitants,



- k) bodies, companies, other legal entities, institutions and entrepreneurs who are obliged to carry out certain measures and works, as well as deadlines for reducing water pollution, responsibilities and authorities related to the implementation of water protection,
- l) other measures necessary for the protection and improvement of water quality.

In a case of sudden water pollution, the measures that will be taken depend on the degree of endangerment of water.

The degree of endangerment is declared by the water inspector according to the following criteria (table 3).

I degree of endangerment	Smaller quantities of hazardous substances or other substances that cause pollution entered the water environment, rapid implementation of the necessary measures can prevent the spread of pollution, not expected greater consequences for the ecological function of water and for its use.
II degree of endangerment	Larger quantities of hazardous substances or others substances that cause pollution have entered the water environment, rapid implementation of the necessary measures can prevent the spread of pollution, but drinking water sources or other sources intended for the various uses of inland waters and coastal sea are endangered ,the consequences for the ecological status of waters are significant and it is necessary to declare measures restricting the use of water.
III degree of endangerment	Quantities of hazardous substances or others substances that cause pollution have entered the water environment with possible transboundary consequences, rapid implementation of the necessary measures can prevent the spread of pollution, but drinking water sources or other sources intended for various uses of inland waters and the coastal sea are endangered ,the consequences for the ecological status of water are great and need to be declared measures prohibiting the use of water.

Table 3 Criteria for water pollution endangerment

a. Measures addressing floods

Extreme weather conditions are the primary factor for floods in Montenegro. Flood issue is regulated by National Plan for Protection from Floods as well municipal plans (example municipality of Niksic, Kotor, Herceg Novi, Pljevlja, Rožaje...). Flood events are expected to be both more frequent and more intense, as a result of climate change. Although a reduction in total annual precipitation is projected, short-term heavy rainfall, often combined with snowmelt and soil saturation, is expected to cause a higher risk of flash floods, a large amount of effluent and river floods in the future.

Flood risk maps for certain areas are defined and early warning system for floods is established.

Flood risk maps are made for: low probability floods; floods of medium probability; floods of high probability, as needed.



There are defined some adaptation measures in flood conditions at national level (an integral part of The third national report on climate changes in Montenegro) - strategic and institutional strengthening measures, technical measures (improvement and development of infrastructure including water supply infrastructure) and research and information needs.

b. Measures addressing droughts

Drought monitoring is established in Montenegro within the IPA project DMCSEE (Drought Management Centre for Southeastern Europe). Monitoring is based on a standardized precipitation index (SPI), remote reading data, the Drought Watch database and the national network of reporters. SPI index analyzes the start, duration and intensity of the drought. By participating in the DriDanube project - Drought Risk in the Danube Region (2017-2019), Montenegro has developed maps to monitor the impact of drought on vulnerable areas, including the impact on the water balance.

There are defined some adaptation measures that should be taken in droughts conditions at national level (an integral part of The third national report on climate changes in Montenegro) - strategic and institutional strengthening measures, technical measures (improvement and development of infrastructure including water supply infrastructure) and research and information needs.

c. Measures addressing earthquakes

There are not specified measures addressing earthquakes within the water safety procedures. In line with the National Plan for Protection and Rescue from earthquakes, some municipalities have developed local protection plans from earthquakes (example Plužine), but there is no research on the sensitivity of these systems to the effect of earthquakes, although their functionality is of great importance for the response in emergency conditions. So far, 7 municipal earthquake protection and rescue plans have been adopted in Montenegro.



4. Conclusions

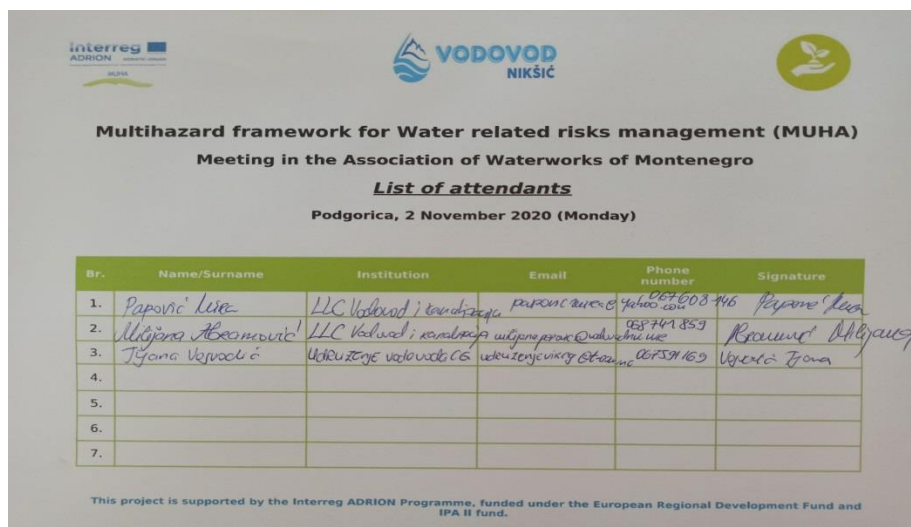
The water supply sector in Montenegro, especially the part related to drinking water safety, is currently in the phase of harmonization with EU Directives and recommendations of the World Health Organization (WHO). Recently, some strategies have been adopted and contingency plans drawn up in the event of hazards at both the national and local levels. Mechanisms are formed and procedures for monitoring hazards, risk assessment of their occurrence, preventive measures and measures to respond to the occurrence of hazard events are defined. But, in principle, systematic process for hazard risk analysis, especially regarding water safety, and mapping, is ongoing and still is missing a lot of relevant data and tools.

Observed from the level of water supply companies as described in this report, the issue of drinking water safety was addressed through the company's obligations to implement HACPP quality system, determination of sanitary protection zones of springs and regular control of drinking water quality by competent institutions. However, as the practice so far has shown, all this is not enough to build systems of preventive action and risk assessment in order to effectively manage risks in water supply systems. For this reason, the implementation of WSP through the work of water companies is a job that is yet to follow in order to improve the provision of quality and safety of drinking water in Montenegro at all stages.



Appendix 1:

The report was prepared in cooperation with several different institutions (national and local), namely the Directorate for Water Management (Director Momčilo Blagojević), the Water Administration (director Damir Gutić), Public Health Institute (Borko Bajić), Environment Protection Agency of Montenegro (EPA MNE), Institute of Hydrometeorology and Seismology of Montenegro (director Luka Mitrović and Milena Tomanović, master in geology, independent advisor), University of Montenegro, Faculty of Civil Engineering (associate professor Milan Radulović), the Association of Waterworks of Montenegro (director Tijana Vojvodić), the Municipality of Niksic, as well as all Montenegrin water companies. In communication with them, we have received certain strategic documents and regulations in the area that is the subject of this report and exchanged information about ongoing processes in Montenegro within different areas of interest of the report.



Multihazard framework for Water related risks management (MUHA)
Meeting in the Association of Waterworks of Montenegro
List of attendants
Podgorica, 2 November 2020 (Monday)

Br.	Name/Surname	Institution	Email	Phone number	Signature
1.	Papović Ljilja	LLC Vodovod i kanalizacija	person@voda.nikšić.me	067 608 416	Papović Ljilja
2.	Milijana Abramović	LLC Vodovod i kanalizacija	milijana@voda.nikšić.me	068 741 353	Milijana Abramović
3.	Tijana Vojvodić	Udruga za vodu i gas	vojvodict@voda.nikšić.me	067 571 163	Tijana Vojvodić
4.					
5.					
6.					
7.					

This project is supported by the Interreg ADRION Programme, funded under the European Regional Development Fund and IPA II fund.

Figure 4 List of attendants



UPITNIK ZA NACIONALNU KOMUNIKACIJU U CRNOJ GORI

(STATUS PLANA ZA SIGURNO SNABDIJEVANJE VODOM ZA PIĆE (WHO WATER SAFETY PLAN) U VODOVODNIM PREDUZEĆIMA U CRNOJ GORI)

1. Da li je u vašem preduzeću implementiran HACCAP? (Ako jeste od kada?)

DA/NE

Komentar: _____

2. Da li ste upoznati sa sadržajem i namjenom Plana za sigurno snabdijevanje vodom za piće (WHO Water Safety Plan)? U komentaru, pored ostalog, dodati vaše mišljenje koliko je jedan takav plan potreban.

DA/NE

Komentar: _____

3. Da li u vašem preduzeću postoji akcioni plan u slučaju vanrednih situacija, kao što su poplava, suša, zemljotres i akcidentno zagađenje?

DA/NE

Komentar: _____

4. Da li je saradnja sa Civilnom zaštitom u uslovima vandrednih situacija (poplava, suša, zemljotres i aksidentno zagađenje) definisana nekim od dokumenata u vašem vodovodnom preduzeću?

DA/NE

Komentar: _____

5. Molimo vas procijenite mogući uticaj navedenih hazarda na stabilno funkcionisanje vašeg sistema vodosnabdijevanja.

(1-nema uticaja, 2- malo, 3 – umereno, 3- značajno)

- Suša ____
- Poplave ____
- Zemljotresi ____





- Akcidentna zagađenja ____

Komentar: _____

6. Da li se u vašem preduzeću primjenjuju mjere za smanjenje rizika od predhodno pomenutih hazarda?

DA/NE

Ukoliko DA molimo vas da navedete te mjere:

Komentar: _____

7. Molimo vas da identifikujete ključne rizike koji mogu uticati na uspješnu implementaciju unapređenja procedura za sigurno snabdijevanje vodom za piće.

- Tehnički
- Ekonomski
- Politički
- Drugi

Komentar: _____

Institucija/preduzeće:

Datum i mjesto:

Upitnik popunio/la:



Figure 5 Questionnaire for national communication in Montenegro