



EASTERN PARTNERSHIP
CIVIL SOCIETY FORUM



Funded by
the European Union

Project: "Facilitating exchanges of experiences and best practices between Armenia, Georgia and the Republic of Moldova on equitable access to safe drinking water in frame of WHO/UNECE Protocol on Water and Health"

Case study: "Analysis of the situation after the ratification of the Protocol, including the development and implementation of the National Programme for the implementation of the Protocol on Water and Health in the Republic of Moldova with the Action Plan for the years 2016-2025 and public participation in decision-making"

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This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of the consultant Mr. Ion Salaru, MSc / Eco-Tiras, and do not necessarily reflect the views of the European Union'

The project benefits from support through the EaP Civil Society Forum Re-granting Scheme (FSTP) to Members and is funded by the European Union as part of its support to civil society in the region. Within its Re-granting Scheme, the Eastern Partnership Civil Society Forum (EaP CSF) supports projects of its members that contribute to achieving the mission and objectives of the Forum.

Grants are available for CSOs from the Eastern Partnership and EU countries. Key areas of support are democracy and human rights, economic integration, environment and energy, contacts between people, social and labour policies.

Abbreviations

Abbreviation	What it means
GD	Governmental Decision
ECEH	WHO European Centre for Environment and Health
JMP	Joint Monitoring Programme
MICS	Multiple Indicator Cluster Survey of UNICEF
NGO	Non-governmental organisation
SDC	Swiss Development and Cooperation Agency
UNECE	United Nations Economic Commission for Europe
WHO	World Health Organization
WSP	Water Safety Plan
WSS	Water Supply and Sanitation

Summary

18 years ago Republic of Moldova ratified the UNECE/WHO Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, and actively started its implementation (Protocol ..., 1999; Law ..., 2005). The Protocol was estimated by the Moldovan governance and the society as an important tool to solve numerous problems dealing with access to good quality potable water and sanitation of the population, especially the rural one. The active cooperation with international organizations like the Secretariat of the Water Convention (Geneva) and donors, like the Swiss Development and Cooperation Agency – SDC – permitted to improve substantially the legal framework, developed institutions, and took practical steps to reach the established targets and target dates. The report describes the progress achieved by the country and makes recommendations for future activities in this direction. The current study is based on 17 years experience of the Protocol implementation and elaboration and application of the national legislation within the scope to develop and reach the targets and the target dates taking into consideration the national needs and priorities of the Republic of Moldova as a Party of the Protocol.

I. Progress achieved in the Implementation of the Protocol on Water and Health in the Republic of Moldova

1) Establishing national targets and target dates

The Protocol on Water and Health is the first binding international act in the field of water and sanitation. It was adopted in 1999, entered into force in 2005. The Republic of Moldova ratified the Protocol through Law 207 of July 29, 2005 and became a Party to the Protocol on December 15, 2005. Through this Law, the Ministries of Environment and Health were designated as the authorities responsible for implementation.

According to the attributions, the Ministry of Health is responsible for developing a regulatory framework for the quality of drinking water, surface and groundwater used as sources of drinking water, monitoring its quality, as well as developing the regulatory framework for safe drinking water safety plans and, also to assess the risks and influence of water on health, monitor public access to improved water systems, sanitation and hygiene systems, inform the public about water quality and promote a healthy lifestyle.

For its part, the Ministry of the Environment is responsible for the development and application of the normative framework and policies in the field of surface and underground water management.

The objective of the Protocol is to promote at all appropriate national levels, as well as in a cross-border and international context, the protection of human health and well-being, both individual and collective, within a sustainable development, by improving water management, including the protection of aquatic ecosystems and by preventing, control and reduction of water-related diseases.

As a Party to the Protocol, the Republic of Moldova has a series of obligations:

- To take all appropriate measures to prevent, control and reduce water-related diseases within integrated water management systems aimed at the sustainable use of water resources, water quality, which is not dangerous for human health and to ensure the protection of ecosystems aquatic;
- To undertake all the necessary actions to create a stable legal, administrative and economic framework in which the public, private and voluntary sectors can each contribute to the improvement of water management activities in order to prevent, control and reduce the incidence of water-related diseases.

In order to achieve the goals of the Protocol, the Parties aim to ensure each person's access to drinking water and sanitation.

In accordance with the art. 6 of the Protocol, each Party must develop and adopt national targets to ensure the implementation of the Protocol for 20 relevant areas. These are:

1. Ensuring the quality of drinking water,
2. Reducing the number of epidemic outbreaks and diseases caused by water,
3. Increasing the population's access rate to improved drinking water supply systems,
4. Increasing the access rate of the population to improved sanitation systems,
5. The efficiency levels that collective and other drinking water supply systems must ensure,
6. The efficiency levels that the collective and other sanitation systems must ensure,
7. Application of recognized good practices in the management of collective and other drinking water supply systems.
8. Application of recognized good practices in the management of collective and other sanitation systems,
9. The frequency of discharges of untreated wastewater from domestic sewage systems into waters covered by the Protocol,
10. The frequency of discharges of untreated meteoric waters
11. The quality of treated wastewater from domestic sewage systems discharged into waters covered by the Protocol,
12. Removal or reuse of sludge from sewerage and wastewater treatment systems or from other sanitation systems,

13. Quality of wastewater used for irrigation in compliance with WHO recommendations.
14. The quality of water used as sources of drinking water,
15. Bathing water quality,
16. Quality of waters used for aquaculture and fish farming,
17. Application of recognized good practices in the field of closed water management used for bathing,
18. Detection and remediation of intensely polluted places that can negatively affect aquatic resources falling under the scope of the Protocol and can be sources of disease,
19. The efficiency of the systems of rational exploitation, design, protection and use of aquatic resources, including the application of recognized good practices for reducing pollution,
20. Periodicity of the publication of information on the quality of drinking water and other waters included as target indicators.

In order to achieve these obligations, the development of national targets was initiated in the Republic of Moldova between September 2009 and October 2010 with the support of the United Nations Economic Commission for Europe and Switzerland (SDC). For this purpose, a Coordination Council was established by the joint order of the ministers of health and environment no. 17/115 of 19 September, 2010, which had in its composition 17 representatives of various public authorities, institutions, as well as representatives of civil society. In the drafting process, multilateral consultations took place with the participation of specialists in the field of public health, environmental protection, water management, operators of water supply and sanitation systems, and civil society.

The analysis of the situation in the field was carried out, with the identification of gaps, being distributed to 3 national and 3 regional workshops with the participation of civil society. At these Workshops, the experience of other countries in developing targets, such as Hungary and Ukraine, was presented. At the same time, the WHO Guide for establishing target indicators was taken into account in the development process. At the final Workshop in September 2010, the final draft for 35 national target indicators for all 20 areas of the Protocol was presented and agreed.

After consultations with all the members of the Coordinating Council, by the joint order of the ministers of health and environment 91/704 of 20th October, 2010, the List of national targets and the terms of their achievement was approved. Through this order, the mandate of the Coordinating Council was extended, and the need to develop actions to achieve the targets was also emphasized.

2) Approval of the National Action Programme for the implementation of the Protocol on Water and Health in the Republic of Moldova for the years 2016-2025

In the period following the approval of the targets, the need to improve communication and inform the population and the authorities regarding the importance of achieving the Protocol targets was realized. One of the most promising measures was the creation of the Water and Health Protocol Information Center "Clearing House" at the end of 2013 within the National Public Health Center (currently the National Public Health Agency), which was included as one of target indicators to achieve. A decisive contribution to the creation of this Center was the support provided by NGO "Eco-Tiras" (Setting targets and target dates ... , 2011).

In order to improve the population's access to water supply and sanitation systems, the Government established that there is a need for a substantial modernization of the water supply and sewage systems in the localities of the Republic of Moldova. For this purpose, the Water Supply and Sanitation Strategy for 2014-2030 was adopted, approved by Government Decision No. 199 of March 20, 2014 (it was amended by GD 442/2020 and extended until 2030, originally it included the period of 2014 -2028). The purpose of this strategy is the development of the water supply and sanitation sector, the creation of the necessary framework for the gradual assurance, until 2030, of access to safe water and adequate sanitation for all localities and the population of the Republic of Moldova, thus contributing to the improvement of health, dignity and quality of life and to the economic development of the country.

At the same time, life has shown that in order to realize the commitments and obligations of the Republic of Moldova as a Party to the Protocol, it is necessary to have a policy document, dedicated to the Protocol, which includes not only the established targets, but also concrete actions to achieve them, the designation of those responsible for implementation and the required budget. Thus, on November 21, 2012, the Ministry of the Environment and the Ministry of Health signed a joint Order (94/1166) regarding the creation of the Supervisory Committee for the realization of the UNECE and SDC project "Implementation of the target indicators of the Protocol on Water and Health in the Republic of Moldova".

This started a new process - to develop a policy document that would include all these aspects, which was carried out with the coordination of the ministries of health and environment with the assistance of UNECE and SDC.

The process of developing the Programme respected the national procedures, with expert groups being created to support the basic working group. The targets approved in a. 20210 were revised, the implementation risks were analyzed. In several workshops with the participation of civil society, the actions to achieve the targets, as well as the necessary budget, were discussed. The draft of the Programme was completed in 2016, being subject to public hearings, including being discussed separately on the platform of environmental NGOs.

The purpose of developing the National Programme for the implementation of the Protocol on Water and Health was to integrate the management priorities of the Protocol on Water and Health domains in the Republic of Moldova with the national processes for planning actions in the sectors of water supply, sanitation, health and other tangential areas of the Protocol. The process of developing the Programme found that it is necessary to strengthen the national capacities regarding the sustainable management of the sectors related to the Protocol, in order to achieve the execution of the indicators of the Protocol. The National Programme for the implementation of the Protocol on Water and Health in the Republic of Moldova for the years 2016-2025 was adopted by GD 1063 of September 16, 2016, published in the Official Gazette of September 20, 2016, art.1141) (GD, 2016).

The Programme includes 3 annexes:

Annex 1 - The target indicators for the implementation of the Protocol on Water and Health and the terms of their achievement

Annex 2 - Action plan for the National Programme regarding the implementation of the Protocol on Water and Health in the Republic of Moldova for the years 2016-2025

Annex 3 - Funding of specific objectives for the implementation of the Protocol on Water and Health in the Republic of Moldova for the years 2016-2025. The purpose and objectives of the Programme:

The general purpose of the Programme is to improve the quality of life of the population and access to safe drinking water and improved sanitation by planning the necessary measures to ensure the achievement of the target indicators of the Protocol on Water and Health.

The objectives of the Programme are oriented towards the integration of the water and health priorities of the Protocol in the Republic of Moldova with the national processes of planning actions in the sectors of water supply, sanitation, health and other areas with reference to the Protocol in order to achieve the target indicators of the Protocol.

The general objective of the Programme is to achieve the target indicators of the Protocol for the 20 fields by 2025, resulting from the competences and responsibilities provided for in the national legislation and international conventions and agreements, ratified by the Republic of Moldova.

The Programme constitutes the basic document for planning strategic actions in the medium and long term for the achievement of target indicators in accordance with the commitments of the Republic of Moldova to the Protocol until 2025.

The specific objectives of the Programme:

- ensuring by the year 2025 the distribution of safe drinking water in 100% institutions for children and the reduction of up to 20% of non-compliant drinking water samples with basic chemical parameters and 5% with microbiological parameters;
- reducing by 20% by 2025 the number of epidemic outbreaks of infectious diseases and the incidence of waterborne diseases;
- ensuring access to sustainable drinking water systems in 100% of children's institutions and access of the general population to aqueduct systems up to 75% by 2025;
- ensuring 100% population access to improved sanitation systems by 2025, including up to 50% to sewage systems;
- increasing the performance levels of the collective water supply, sanitation and other systems;
- increasing the degree of application of recognized good practices in the field of integrated water management and water supply and sanitation;
- the 50% reduction of untreated wastewater discharges, as well as the reduction of untreated rainwater discharges into natural receivers;
- improving sludge management and the quality of treated wastewater from centralized sewage systems or other sanitation systems;
- ensuring adequate management to improve the quality of waters used as sources of drinking water;
- improving the management of closed waters generally available for bathing;
- increasing the degree of identification and remediation of particularly contaminated lands;
- increasing to 80% the share of the population that possesses relevant knowledge regarding the safety of drinking water, hygiene and health.

In order to achieve these objectives, the Action Plan provides 77 actions to improve the situation, such as strengthening the legal framework, creating information and disease surveillance systems, developing the infrastructure for water supply and sewage systems, building water treatment stations for the improvement of drinking water supplied to consumers, the creation of regional operators of AAC systems, the improvement of water quality monitoring, public information on water and health issues.

The national Programme adopted 33 target indicators and their values for the intermediate term - y.2020 and the final term - y. 2025 for their achievement.

Financing actions for the implementation of the Protocol.

A budget of 11,139.4 million lei (1 euro is about 20 lei) for 10 years was approved for the implementation of the actions. Most of the actions provided in the Action Plan have identified funding sources, with clear implementation prospects. The distribution of financial resources for carrying out the actions in the Programme is shown in Fig.1.

Of the total amount estimated for 10 years, about 1983.0 million lei or 17.8% are planned in the state budget (including 60.7 million lei through the Ecological Fund). The remaining amount of

9156.3 million lei (or 82.2%) is planned to be negotiated with international partners, for the realization of concrete projects, for example,

- Modernization/construction of raw water treatment plants -720 million lei,
- Realization of AA projects in about 400 rural localities - 7,127 million lei,
- Implementation of the "Water North Moldova" - 642 million lei project,
- Ensuring the population's access to improved sanitation systems, including sewage systems - 965.9 million lei.

Progress in the realization of the National Action Programme for the implementation of the Protocol on Water and Health in the Republic of Moldova for the years 2016-2025

Both the National Programme of Actions for the implementation of the Protocol on Water and Health in the Republic of Moldova for the years 2016-2025, as well as the Water Supply and Sanitation Strategy for 2014-2030 gave an impetus to the application of the provisions of the Protocol and contributed to the improvement of hygienic conditions and the state of population health.

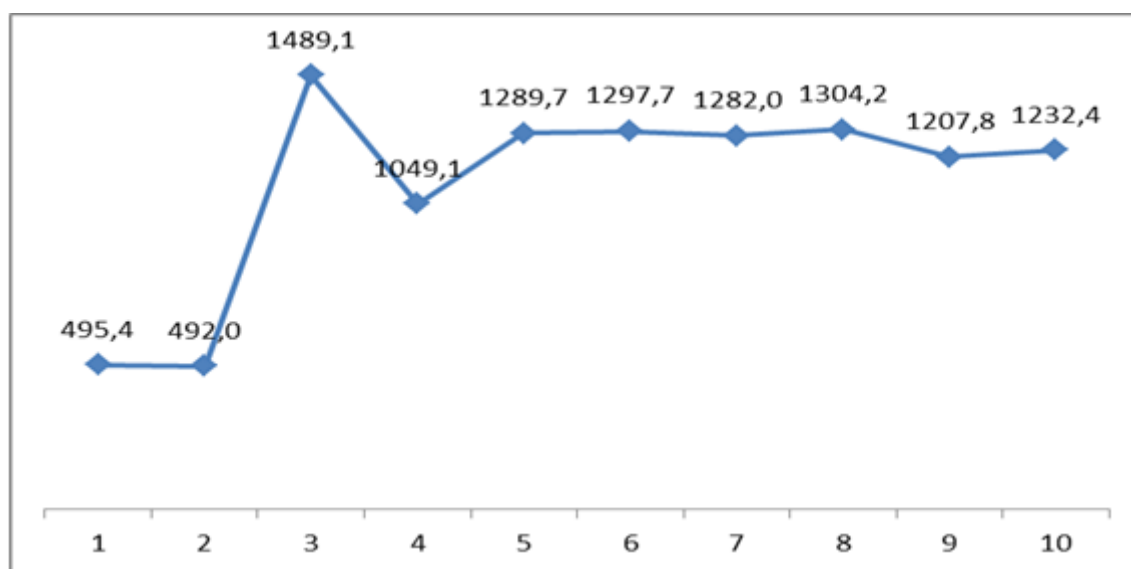


Figure 1. Distribution of the budget by year of implementation of the actions of the National Programme (mil.lei, 1 euro is appr. 20 lei) /Distribution of budget by year of implementation of the National Programme.

The efficiency of the Programme is analyzed for 4 priority areas:

- Drinking water quality,
- Reducing the frequency of water-related outbreaks,
- The population's access to drinking water, and
- Population's access to sanitation.

a) Drinking water quality

In the field of drinking water quality, the following were established as target indicators:

1. Reducing the share of non-compliant drinking water samples by microbiological parameters (E.coli, enterococci) for the consumer, in the following time intervals: - 5% of the annual number of samples until 2020 and 3% until 2025 in urban areas; -10% of the annual number of samples until 2020 and 8% until 2025 in rural areas.

2. Reducing the share of drinking water samples that do not meet sanitary standards in 5 main chemical parameters (F, NO₃/NO₂, As, Fe, Pb) in the following time intervals - 25% of annual samples until 2020 and up to 20% until 2025.

3. Achieving compliance with drinking water quality in schools for all regulated microbiological and chemical parameters in the following periods: - 100% of schools by 2025;

In order to achieve this objective, the Government of the Republic of Moldova is developing a National Master Plan for Drinking Water Supply, which provides for the modernization and rehabilitation of existing water treatment plants, the construction of 300 small water treatment plants and the connection to WSS from surface waters after treatment, regionalization of services. In the last 3 years, 3 new treatment stations were built, improving the quality of drinking water for over 50,000 inhabitants.

In order to improve water quality monitoring capabilities, the Ministry of Health took measures to strengthen the material and technical base of the National Agency of Public Health laboratories, and 10 regional Public Health Centers.

The main water quality problems in artesian groundwater wells across the country are high levels of fluoride (2-14 mg/l), sodium (200-560 mg/l) and ammonium (2-10 mg/l) in almost all geographical areas, but most often in the Central and Northern regions; hydrogen sulfide (3-6 mg/l); iron (0.3 - 2.5 mg/l), boron (2.4-3.5 mg/l) and for groundwater – high level of nitrates and microbial contamination.

The share of drinking water non-compliance with microbiological parameters in the period 2005-2021, annual samples, is shown in tab.1.

Table 1. The proportion of drinking water samples that do not comply with sanitary standards in the period 2005-2021 to some microbiological parameters, %

Parameters	2005	2015	2018	2021
<i>E. coli</i>	12,6%	14,5%	12,4%	10,4%
<i>Enterococci</i>	9,6%	15,1%	12,0%	10,0%

According to the data, there is a slight improvement compared to the initial values in the microbiological parameters studied in all drinking water sources and systems, which constituted for *E. coli* - 10.4% in 2021 compared to 12.4% in 2018, at *Enterococci* - there is also a -10% improvement compared to 12% in 2018. At the same time, it should be noted that approximately 60% of the samples not complying with the quality standards were taken from underground water wells.

According to the provisions of Law 182/2019 on the quality of drinking water, the water must be suitable for the consumer. In many cases, the water quality is influenced by both the water from the source and the management and maintenance of the system, the disinfection, the application of water treatment measures. Data on the quality of water for human consumption in terms of microbiological parameters for the last 12 years, distributed by different types of water supply systems, depending on the source of water supply and location, are presented in tab.2.

Table 2. Share of non-compliant water samples non-compliant with sanitary standards in the period 2010-2021 to microbiological parameters, %

System type name/year	Share of non-compliant samples (%)										
	2010	2011	2012	2013	2014	2016	2017	2018	2019	2020	2021
Urban aqueducts from underground sources	12,7	9,9	10,8	8,2	9,2	10,7	8,2	17,4	15,1%	14,8	15%

Urban aqueducts from surface sources	6,9	3,3	0,8	1,9	3,4	5,0	1,8	4,6	2,6	3,9	3,6
Rural aqueducts	16,7	14,1	14,2	14,6	17,6	19,6	14,5	26,1	15,3	20	24%
Wells	41,2	38,3	39,8	36,2	36,3	47,7	38,0	49,9	47	46,6	49

The data in the table show that the lowest level of non-compliance with microbiological parameters is recorded in urban aqueducts from surface sources, and the highest – in wells and rural aqueducts.

Data on the quality of water for human consumption in terms of chemical parameters for the last 12 years, distributed by different types of water supply systems, depending on the source of water supply and location, are presented in tab.3 and fig.2.

Table 3. Share of non-compliant water samples non-compliant with sanitary standards in the period 2010-2021 to chemical parameters, %

System type name/year	Share of non-compliant samples (%)											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Urban aqueducts from underground sources	41,4	43,7	44,5	39,4	37,7	40	38,7	39,6	49,4	49	49,3	49
Urban aqueducts from surface sources	13,5	10,4	8,27	5,89	12,2	21	13,1	6,67	13,4	13	13,2	10
Rural aqueducts	49,3	51,6	61,5	51,3	54,9	53	56,9	51,3	59,7	46	47,4	48
Wells	84,2	82,9	84	79,6	76,5	82	76,7	79,4	73,6	68	68,7	70

As in the case of microbiological parameters, and for chemical parameters, the lowest level of non-compliance of microbiological parameters is recorded in urban aqueducts from surface sources, and the highest - in wells, rural aqueducts and urban aqueducts from surface sources.

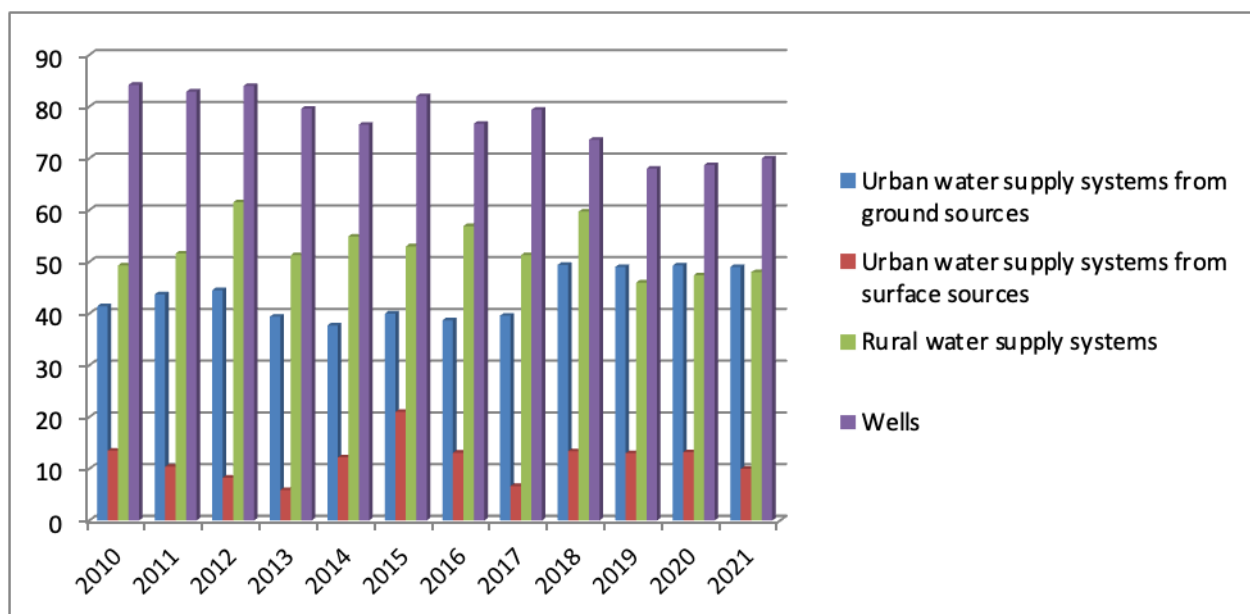


Fig.2 The proportion of non-compliance samples of drinking water for chemical parameters, annual samples, for various types of water supply systems and sources.

The chemical quality of drinking water according to 5 basic and 5 additional chemical parameters from the moment the Protocol came into force until now is indicated in table 4.

Table 4. The dynamics of the evolution of the share of non-compliant samples to the basic and additional chemical parameters of drinking water quality, established according to WHO recommendations

Investigated parameters	2005, %	2015, %	2022, %
Fluorine	11,1	15,8	22
Nitrates and nitrites	53	39,9	21
Arsenic	0	0	0
Lead	0	0	0
Iron	6,5	9,3	6,5
Additional chemical parameters::			
Boron	3	37,8	12,4
Manganese	1,7	4,3	4,1
Turbidity	4	3,9	2,8
Ammonium	6,5	44	45
Dry residue	29,5	27	25

The reported data show a relevant decrease in the share of non-compliant water samples in terms of nitrate content, dry residue and an increase in the content of fluorine and ammonium. Greater attention is also paid to the aqueducts of educational institutions, in case they are supplied with water from a system separate from that of the locality. The quality of drinking water in terms of chemical and microbiological parameters in educational institutions since the entry into force of the National Programme for the Implementation of the Protocol on Water and Health for the years 2016–2025 and until now is presented in Tables 5 and 6.

Table 5. Share of non-conformity of water samples in educational institutions to some microbiological parameters, annual samples, %

	2005	2015	2018	2021
<i>E.coli</i>	-	12,8%	20,4%	18%
<i>Enterococci</i>	-	15,1%	17,7%	16,2%

Table 6. Share of non-conformity of water samples in educational institutions from different sources to chemical parameters, annual samples, %

Name of system type/year	Share of non-compliant samples, (%)		
	2015	2018	2021
Aqueducts fed from all types of sources	60,0	39,8	37
Aqueducts fed from wells	64,7	61,7	50

The data presented in the tables above indicate a small decrease in the percentage of water samples that are non-compliant with microbiological parameters and a more significant decrease in the share of non-compliant samples with chemical parameters.

One of the biggest achievements during this period that contributed to the improvement of drinking water quality was the construction of the Drinking Water Treatment Station from the Prut River at Nisporeni, the district centre, which supplies over 20 thousand inhabitants. Also, grants from the National Ecological Fund were allocated and 2 smaller water treatment plants were built and put into operation.

In accordance with the provisions of the National Programme for the Implementation of the Protocol on Water and Health for the years 2016–2025, the regulatory framework was also strengthened, including the development of regulations and norms regarding the quality of drinking water such as:

- Law on drinking water quality no. 182/2019, whose provisions are adjusted in accordance with European Parliament Directive 98/83/EC, which was recently replaced and incorporated with EC Directive 2184/2020,
- Sanitary regulation on the supervision and monitoring of drinking water quality, recently approved by GD No 651 of 6 September 2023;
- Sanitary regulation for small water supply systems approved by the GD no. 1466 of December 30, 2016;
- Order No. 609/65 of 21st September 2017 for the approval of the National Guide regarding the Water Safety Plan for drinking water supply systems.

b) Reducing the frequency of water-related outbreaks

The National Programme for the Implementation of the Protocol on Water and Health 2016–2025 envisages a 20% reduction by 2025 in the number of epidemic outbreaks of infectious diseases and the incidence of water-related diseases.

In the Republic of Moldova, in the period 2005–2022, there were no outbreaks of infectious diseases related to water, such as cholera and typhoid fever, viral hepatitis A, ECEH.

As shown in Table 7, in the Republic of Moldova there is a tendency to decrease some potentially water-related infectious diseases per 100 thousand inhabitants, including a decrease in the number of rotaviral infection cases by more than 10 times (especially, after the introduction of the mandatory rotavirus vaccine for children), except for cases of hepatitis A, where the level of disease is higher than in 2012, but lower than the initial value since the Protocol began to be implemented, and morbidity has a cyclical pattern. In addition, the incidence of Giardiasis and Cryptosporidiosis decreased. In the last 5 years there has been only one case of legionellosis. It

should be noted that data collection is carried out both by the number of cases and by the number of outbreaks.

In order to prepare for public health emergencies, the Government created the National Public Health **Extraordinary** Commission, which decides on the introduction, suspension and abolition of isolation and/or quarantine measures at national and district level with the consultation of the Ministry of Health.

Within the National Public Health Agency, a Public Health Emergency Management **Department** has been created to monitor cases of public health hazards and reports of illness, which operates 24/7 and ensures the coordination of all health sectors in the event of an emergency. In the case of three or more cases of water-related diseases, it is necessary to report them within 24 hours, by order of the Minister of Health.

The level of incidence of water-related infectious diseases is presented in tab.7.

Table 7. Level of waterborne infectious morbidity, years 2005-2021

	Morbidity per 100,000 population					No. Epidemic outbreaks		
	2005	2009	2015	2018	2021	2005	2018	2021
Cholera	0	0	0	0	0	0	0	0
Bacterial dysentery	54,19	13,0	3,12	14,34	0.06	0	0	0
EHEC (hemorrhagic enterocolitis)	0	5,52	4,53	8,06	2.65	0	0	0
Viral Hepatitis A	30,7	0,22	7,82	18,03	0.51	0	0	0
Typhoid fever	0,06	0	0	0	0	0	0	0
Legionellosis	0	0	0	0.03	0	0	0	0
Rotaviral infection		21,97	5,09	2,90	0,82	0	0	0
Cryptosporidiosis		1,74	0,2	0,20	0	0	0	0
Giardiasis		6,07	3,26	2,48	1,16	0	0	0

Source: National Report on State supervision of public health, ANSP, 2022

In the Republic of Moldova, incidence-based surveillance of infectious diseases is applied, the data are generated by the Communicable Diseases Information System. As can be seen from the evolution of the incidence in table 7, the incidence decreases for almost all diseases by more than 10 times. The most plausible explanation is that this reduction is a result of the implementation of anti-Covid-19 prevention measures during the pandemic, which includes hand disinfection and hygiene.

With the support of the Norwegian Institute of Public Health, the Guidance on Investigation and Response to Outbreaks Caused by of Unsafe Food and Water for epidemiological surveillance of food and water-borne diseases were developed and adopted, which are used by specialists of the National Public Health Agency and National Food Safety Agency.

c) Access to drinking water.

If we analyze the evolution of the access of the population of the Republic of Moldova to drinking water supply and sanitation systems, significant progress has been made in recent years, but insufficient to ensure access for 100% of the population.

- 1) In 2021, 98% of the urban population and 48% of the rural population had access to an improved water supply system and increased from the previous reporting period.
- 2) 88% of kindergartens and schools have access to a safely managed water supply system.
- 3) According to the data of the National Bureau of Statistics, the number of localities with access to water supply systems in 2020 compared to 2017 increased by 58 units. 82% of localities are connected to water supply systems, approximately 18% of rural localities do not have access to water supply systems.

The data on the evolution over time of the population's access to improved (basic) drinking water supply systems from the moment of access to the Protocol are presented in tab. 8.

Table 8. Share of population access to improved drinking water supply systems

	2005	2009	2015	2018	2021
Urban	92	93	96	97,3	98
Rural	17	27	39	45,1	48
Total	45	55	63	68,4	70

The evolution of the population's access to water supply services is also reflected in the diagram below (Fig.3):

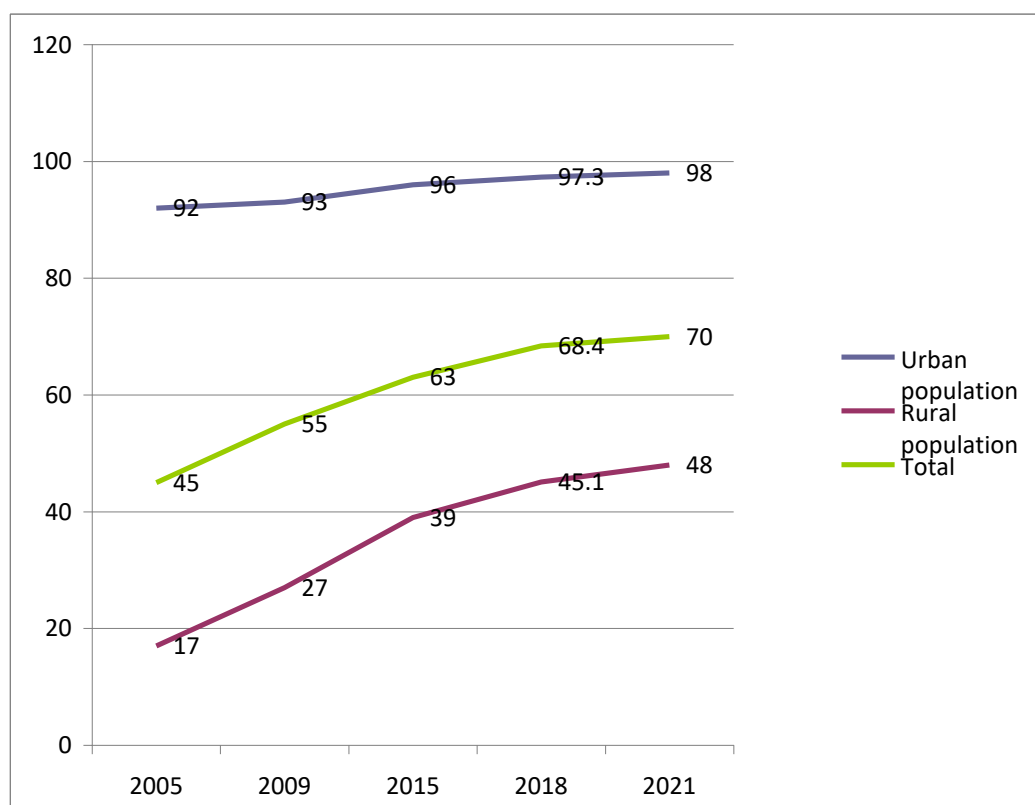


Fig. 3. The proportion of public access to safely managed water supply systems in the Republic of Moldova

The data in the table and diagram show that almost a third of the population (30%) still does not have access to improved drinking water supply systems and continues to draw from unprotected sources (mainly groundwater wells). Also, there is an obvious gap between the access of the urban and the rural population - the access of the rural population is twice as low. Consequently, the need for safe drinking water supply services, especially for the rural areas of the Republic of Moldova, remains a pressing one.

d) Access to sanitation

Regarding ensuring the population's access to improved sanitation systems, the situation is unfavorable, progress being much slower than in the case of drinking water supply. And if in the case of drinking water supply, the difference between the share of access in rural and urban areas is twice, in the case of sanitation, access to improved systems is 6 times lower in rural areas compared to urban localities. The evolution of access to these systems in the years 2005-2021 is reflected in table 9 below.

Table 9. Share of population access to improved (basic) sanitation systems*, %

	Total sanitation systems including sewers	including sewers	Total sanitation systems	including sewers	Total sanitation systems	including sewers
	2005		2012		2022	
Urban	82.4	70.3	85	75	96	79
Rural	45	3,8	61	9	89	13
Total	60	30,4	70	34	92	44

**The United Nations JMP Water and Sanitation Monitoring Programme operates with the following definitions in the area of access to sanitation:*

- *Safely managed sanitation services - use of improved facilities where excrement is safely disposed of and treated off-site,*
- *Improved systems - are those facilities designed to hygienically separate excreta from human contact and include: flush toilets, connected to sewage systems, septic tanks or pit latrines; tile pit latrines (including ventilated latrines) and composting toilets,*
- *Basic services – use of improved systems that are not shared with other households,*
- *Limited Services - Use of enhanced facilities shared between two or more households,*
- *Unimproved systems - use of pit latrines without a slab or platform, suspended latrines or bucket latrines.*

The data in the table shows that if in terms of general access to improved sanitation systems in the last 17 years the difference between urban and rural areas has been reduced, including in rural areas access has doubled in this period, in terms of access to sewage systems, the disparities are significant. Although progress is evident, it is insufficient to achieve public health and environmental protection goals. Sanitation is important both for observing personal hygiene, preventing infectious diseases, as well as for ensuring comfort in the home and for environmental protection.

The causes of this situation are multiple, but the most important are:

- 1) The much higher costs of sanitation projects (sewage systems, sewage treatment plants, EcoSan dry toilets, constructed wetlands, small sanitation systems),
- 2) Public interest and lower political support for sanitation than for drinking water supply,
- 3) Reduced technical capacity to build and service sanitation systems.

Another important aspect to ensure the necessary hygiene conditions of the population is the existence of facilities with water and soap for hand hygiene and disease prevention. According to the data of the MICS Study (2012), and the World Bank (2016), the share of the population with access to these facilities was 95% and 96%, respectively.

It should be noted that with the support of the World Bank, in 2020 the "Water supply and sanitation in the Republic of Moldova" project was launched, which aims to increase access to water supply and sewage services in a number of rural areas and selected cities and institutional capacity building. for providing these services. Project activities will include the construction and rehabilitation of sewage networks, sewage treatment plants, including sludge treatment and disposal, connections to centralized sewage, construction of septic tanks, etc. The project also includes the "Water, Sanitation and Hygiene (WASH)" component, which provides for the improvement of water supply, sanitation and hygiene conditions, with facilities for observing personal hygiene in several public educational and medical-sanitary institutions.

II. Specific aspects of drinking water supply and sanitation in rural areas

Most people in rural areas continue to rely on individual wells that exploit shallow aquifers. These aquifers are often polluted with pathogenic microorganisms from latrines, unsealed toilets, accumulations of animal waste or from sewage infiltration. In addition, wells often drastically reduce their flow in the summer, and people have to carry water from long distances.

About a fifth of the villages (18% - mostly small towns) do not have aqueduct systems for water supply. Water extracted from artesian wells that exploit aquifers is often contaminated with fluoride of geological origin or other pollutants. Local rural water supply systems do not include advanced treatment facilities, and water from local sources is often not recommended for human consumption and is mainly used for domestic and hygiene purposes.

Almost half of the rural population is connected to aqueduct systems, the rest use traditional wells with the depth 5-30 m, which, as shown above, in 50% of cases are polluted by microbes due to being poorly maintained and in over 70% of cases are chemically polluted, the biggest problem being the nitrate content. Another aspect is the management of aqueducts - the share of non-compliance of water samples with microbiological parameters in rural aqueducts was 24% in 2022 and is up to 10% higher annually than in the case of urban aqueducts. Only half of the 825 rural aqueducts are served by specialized enterprises, the rest directly by the municipalities, a fact that also leaves its mark on the quality of the system's management and implicitly on the water quality.

In the last 5 years several local public administration authorities (mayors) have agreed to formally delegate the provision of water services to urban service providers (Apa-Canal), and this is an important step towards the regionalization of water supply services and sewage.

The evolution of water quality in phreatic wells for the years 2016-2022 is reflected in fig. 4. The diagram shows a decrease in the share of water non-conformity in chemical parameters and an increase in microbiological parameters, which once again confirms that the wells cannot be considered as a sustainable source of drinking water supply.

In terms of sanitation, only one-eighth of all villages have some type of sewage system, and where such a system exists, only a small proportion of households are connected. Most people rely on simple dry pit latrines in their backyards, which in many cases are in poor condition or in unsanitary conditions.

In order to improve the management of sanitation systems in educational institutions in rural localities, the Ministry of Health in coordination with the Ministries of Education and Research, elaborated and adopted Guide on school sanitation, with recommendations for directors of schools and kindergartens on sanitation issues.

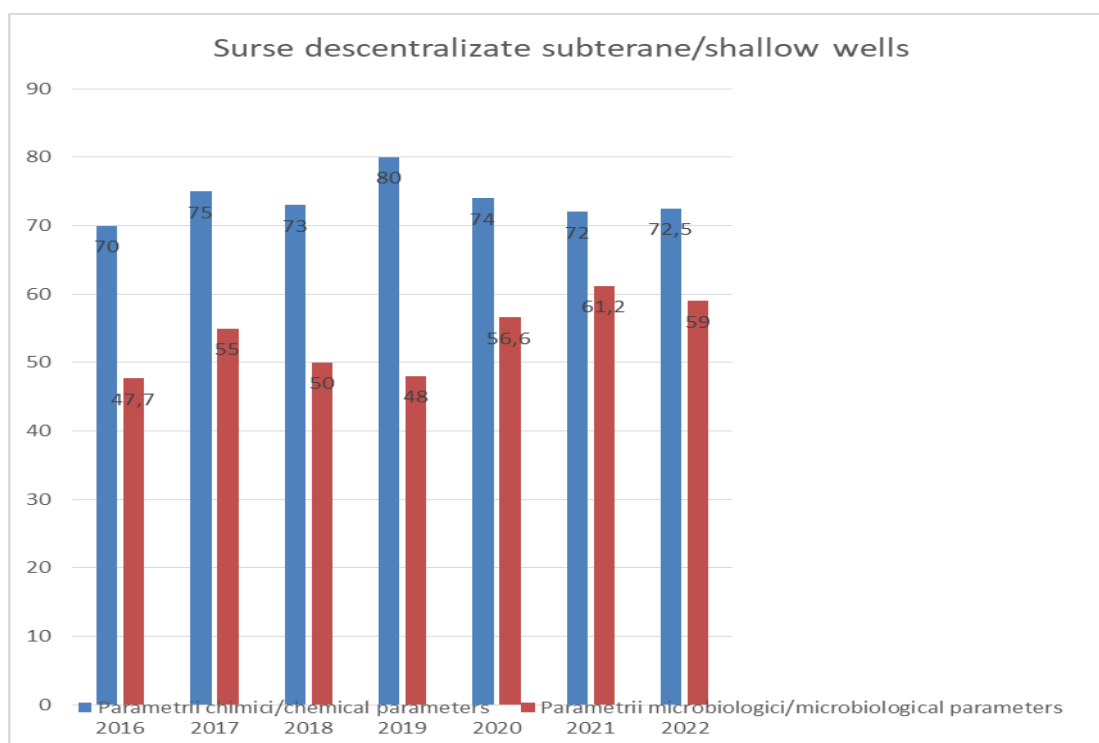


Fig. 4. The level of proportion of non-compliance water samples from shallow wells for chemical and microbiological parameters/The level of proportion of non-compliance water samples from shallow wells for chemical and microbiological parameters.

The water supply and sewage service delivery models have been tested, improved, consolidated, documented and repeated in all regions of Moldova, including Gagauzia and Transnistria. An important step in the promotion of decentralized sanitation systems in rural localities was the implementation of the ApaSan projects by the Austrian Skat Foundation, completed in 2020. As a result, 68 schools, 5 public buildings and 156 households (26,000 users) have comfortable and clean toilets (EcoSan dry toilets).

Wastewater treatment in villages was piloted through 7 localities, with the use of natural wastewater treatment systems through constructed Wetlands.

It should be mentioned that the specific feature of the Republic of Moldova compared to the countries in the region is the higher share of the rural population (around 53%) on the one hand and on the other hand the big difference between urban and rural areas regarding access to services. The differences between rural and urban areas are also amplified by the income level of the population, considering that according to the HBS Study (Household Budgetary Survey, 2015), 84% of the poor population of Moldova live in rural areas. In this context, it is worth mentioning that only 34% of people in the lower welfare quintile in Moldova have access to drinking water from a public service in their home, while this share is 78% for people in the upper quintile. Access to toilets with water shows 16% access in the lower quintile and 68% in the upper quintile. Regional disparities can also be noted, with access to running water services from a public network (inside or outside the home) varying from 39% in the North region, to 55% in the Central region and 81% in the South region.

These statistics reveal the fact that sewerage services in Moldova represent a critical problem in urban areas and especially in rural areas, and water supply services - in rural areas. These are essential to protect the public health and welfare, as well as the economic development of these areas.

Thus, we can state that the income of the population is the most significant factor of inequality in the access to water and sewerage of the rural population. Data from the Office for National Statistics, as well as data from national opinion polls, show that the most significant inequalities in access to water and sanitation relate to income inequalities (income inequalities would be smaller but still significant if access to services of poor households were compared with the middle income household).

While inequalities in access to water are decreasing, inequalities in sanitation are more persistent. Access to public water supply systems has steadily improved over the past decade. This is largely a driver of continued investment in rural communities. Since most households are located in rural areas, access inequality for rural areas has been reduced to income inequality. Inequalities in access to public health were more persistent, mainly due to less investment in rural areas.

Another characteristic of inequality in access to services is intra-community inequality. This is the difference between the share of households that mention that certain services exist in their community (for example, the centralized water supply system) and the share of households that have and use this service. Intra-community inequality allows us to better understand the level of inequality, because the first condition for a household to benefit from a service or another is the presence of this service in the community. The fact that a household does not benefit from a service for the benefit of the community, even if that service is present in the community, indicates factors other than lack of investment, factors such as marginalization or discrimination.

Another challenge for Moldova is the increasingly pronounced impact of climate change, especially the increase in the frequency of heat waves and the reduction in the amount of precipitation, our country being one of the most vulnerable areas in the region to climate change. Water resources are already polluted and limited, and without adaptation measures, the impact of climate change will increase water consumption and exacerbate pressures on existing resources.

In this context, where the need to expand water supply and sanitation services in rural areas is high and water resources and financial resources are limited, good strategic planning is essential to increase rural population access to services and improve drinking water quality.

III. Implementation of the approach to the safety of water supply and sanitation systems

According to the WHO, WSPs are based on a comprehensive risk assessment and risk management approach to the actions required within a drinking water supply system, from the water intake to the consumer's tap.

In accordance with Article 13, paragraph (1) of Law 182/2019 on the quality of drinking water, it is established that the local public administration authorities will coordinate the development of drinking water safety plans, including the schedule and cost of the measures established in the plan to ensure the compliance of producers of drinking water and of the operators to the requirements provided by this law. Drinking water safety plans will be developed by drinking water producers and operators within 3 years from the date of entry into force of the law (a.2024) and approved by the local public authority after their mandatory coordination with the National Agency for Public health.

In order to establish the national framework, the National Guide for the development of Drinking Water Safety Plans (WSPs) was approved, by joint order no. 609/65 of July 21, 2017 of the Ministers of Health and Environment. The PSA is based on the identification of hazards to the quality of drinking water that may come from the water source, from the treatment plant, from the external and internal distribution system, ensuring that the appropriate management measures or procedures are effective to reduce the identified risks and works properly at all times. The measures should be designed in such a way as to reduce the contamination that can occur at the water source, during treatment or in the distribution network, including the one inside the buildings. Every water supply system is different, and the PSA must be customized to take into account the specific requirements of the system, regardless of its size or complexity.

PSA is essentially a framework for hazard identification, risk assessment and risk management, together with control measures, monitoring, incident and emergency plans. Due to the complexity, the related documentation for each phase of the PSA must be appropriate and reflect the characteristics of the water supply system. For each water supply system, an individualized PSA should be drawn up, which may vary in complexity, depending on the characteristics and size of the system.

To date PSAs have been developed in over 50 locations (4%). During the years 2015-2019, several training workshops were conducted with the operators in order to explain the methodology of developing and the content of a PSA, in order to increase the expertise of the

operators. At the same time, the development and implementation of the PSA requires expertise and financial resources that most operators do not have. Bearing in mind that PSAs were of different quality and content, it was decided to develop Model Plans. With the support of the ApaSan Project of the Swiss Agency for Development and Cooperation, two PSA models were developed in 2018 - the first in a location with a water treatment plant (s. Șerpeni, rl Anenii - Noi) and the second - in the largest rural community from the Republic of Moldova (Carpineni village, Hincești district) with various water sources, to cover different situations. The experience gained was shared with all interested operators. Also, the development at the Technical University of Moldova was initiated, jointly with ANSP, of the curriculum for the training of operators in order to know and apply the PSA development methodology.

The implementation of the Sanitary Regulation on the supervision and monitoring of the quality of drinking water, approved by HG 651 of 06.09.2023, will allow the implementation of risk-based supervision of the quality of drinking water, which includes 3 components:

- a) Risk assessment for the hydrographic basin/groundwater intake;
- b) Risk assessment for the water supply system;
- c) Risk assessment for the household distribution system.

At the same time, according to the national normative framework, in the Republic of Moldova the integrated approach to the safety of drinking water and sanitation is still not applied, in accordance with the latest recommendations of the World Health Organization.

IV. Importance of ratification of the Protocol to achieve progress in implementation

As mentioned above, the Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes is the first international legally binding instrument in the field of water and health. Currently 28 countries from the European Region are Parties to the Protocol. Although it is currently open to European countries, the Caucasus and Central Asia, more countries from other regions want to join the Protocol. The basic objective of the Protocol – reducing the incidence of water-borne diseases through better water management is a desire for most countries around the world. What would be the advantages of a country being a Party to the Protocol though?

On the example of the Republic of Moldova, which already for 18 years has assumed the implementation of the Protocol's objectives, we can mention the advantages and benefits of the in-time ratification of the Protocol. They are multiple benefits to be a Party of the Protocol, and we mention the main ones:

- 1) The clear establishment of the institutions responsible for the implementation of the Protocol and the mobilization of institutional resources for the development of the normative framework in the field of water and health during this time, 3 Laws, a Strategy and a National Programme dedicated to this subject, 14 Regulations, numerous guides were developed and approved and technical standards, operational procedures, which regulate the activity of public health authorities, environmental protection, water management and water supply and sanitation systems;
- 2) Strengthening the institutional capacities in the field of water and health within the Ministry of Health and the National Agency for Public Health, within the Ministry of the Environment, the "Apele Moldovei" Water Agency, and the Environment Agency, and within the Ministry of Infrastructure and Regional Development, and the associations representing water operators, water supply and sanitation systems;
- 3) Development of intersectoral coordination and collaboration mechanisms to achieve the Protocol's objectives. Since 2010, a National Coordinating Council on the Protocol has been established, which is still active in different formats;
- 4) Assumption of responsibilities and mobilization of responsible actors - the Republic of Moldova is one of the first European countries to set its national targets for the achievement of the objectives in all areas of competence of the Protocol.
- 5) Improving strategic planning and clearly establishing priorities, the Republic of Moldova is the first European country to approve and implement a National Programme dedicated exclusively to the Protocol;

- 6) Improving international and bilateral collaboration - the Republic of Moldova has designated focal points for the protocol from the ministries of health and the environment, is represented in the Protocol Office, is a co-leader country in the field of "Water, sanitation and institutional hygiene", fact which allows it to have increased visibility at the regional level, but also to collaborate horizontally on different topics with other countries;
- 7) As a Party to the Protocol, the Republic of Moldova was able to benefit from technical support from several international institutions for the development of the policy and normative framework, from the support of the national policy dialogue in the field of water management, from the possibility of participating in various expert groups for the elaboration guidelines and recommendations at regional level;
- 8) It has become aware of the importance and actively involves the non-governmental sector, of non-commercial organizations in the development of policies, the realization of communication actions and the involvement of communities in the implementation of the Protocol,
- 9) The presence of a National Programme for the implementation of the Protocol on Water and Health allowed the attraction of investments in the water and sewage sector, a fact that allowed the modernization and development of the infrastructure, the improvement of the quality of drinking water, the increase of the quality of the services provided and the access to supply systems with water and sanitation managed safely,
- 10) Being a Party to the Protocol, the Republic of Moldova was able to actively promote the importance of applying hygiene practices at the individual, institutional and community level and achieved success in reducing the incidence of water-related diseases.

V. Conclusions and recommendations for improving the situation.

In the context of the content of the report we can conclude the following:

1. The National Programme regarding the implementation of the Protocol on Water and Health in the Republic of Moldova for the years 2016-2025 is a basic document for planning medium and long-term strategic actions for the achievement of target indicators in accordance with the commitments of the Republic of Moldova to the Protocol until 2025.
2. The implementation of the Programme constitutes a national priority with an effect on increasing the level of quality of life and implicitly the state of health of the population, and the Republic of Moldova as a Party to the Protocol enjoys a high international authority.
3. In the implementation process of the National Programme, the national normative framework was substantially developed, including regulations, guidelines and policy documents.
4. In the previous process of setting and revising the Protocol's targets, the NGO community was extensively involved in the process, participating in stakeholder meetings and providing comments and proposals. Also, the NGO "Eco-Contact" acts as a secretariat for the Community of Practitioners in Water and Sanitation, which meets quarterly and includes specialists from the water sector, environmental protection and public health, and is a solid voice in the implementation of the Protocol.
5. As risks in the implementation of the Programme were identified the insufficiency of the institutional capacities in the territories for the implementation of the measures, the insufficient involvement of some actors responsible for the implementation, the identification of financial resources in the areas not covered, the dependence of aquatic resources on climate changes.
6. A priority problem identified is the high level of non-conformity of drinking water quality from underground sources and rural aqueducts, which presents risks for the health of the population.
7. Of the problems identified, the slow progress and the large discrepancy between urban and rural populations regarding access to safely managed water supply and sanitation systems are the most significant.

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