



Protocol on Water and Health – Improving health in Armenia through target setting to ensure sustainable water management, access to safe water and adequate sanitation

**Technical report containing:
The baseline analysis of legal, institutional and substantive aspects related to target-setting process under the Protocol on Water and Health in Armenia**

Yerevan, May 2014

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List of Acronyms

AAWI	Akhuryan-Araks Water Intake
AMD	Armenian Dram
ASHMS	Armenian State Hydrometeorological and Monitoring Service
AWHHE	Armenian Women for Health and Healthy Environment
AWSC	Armenian Water and Sewerage Company
CDCP	Center for Disease Control and Prevention
CJSC	Closed Joint Stock Company
DRC	Dispute Resolution Commission
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EIMC	Environmental Impact Monitoring Centre
EU	European Union
EUWI	European Water Initiative
GEF	Global Environment Facility
GIS	Geographic Information Systems
HMC	Hydro-geological Monitoring Centre
JMP	Joint Monitoring Program
LWS	Lori Water and Sewerage
MA	Ministry of Agriculture
MDGs	Millennium Development Goals
MENR	Ministry of Energy and Natural Resources
MES	Ministry of Emergency Situations
MF	Ministry of Finance
MoH	Ministry of Health
MNP	Ministry of Nature Protection
MTA	Ministry of Territorial Administration
NA	Nor Akunq
NGO	Non-Governmental Organization
NPD	National Policy Dialogue
NSS	National Statistical Service
NWC	National Water Council
OECD	Organization for Economic Cooperation and Development
OSCE	Organization for Security and Co-operation in Europe
PSRC	Public Service Regulatory Commission
RA	Republic of Armenia
RSA	Rescue Service of Armenia
SCWE	State Committee on Water Economy

SEI	State Environmental Inspectorate
SHI	State Health Inspectorate
SHWI	Sevan-Hrazdan Water Intake
SNCO	State Non-Commercial Organization
SWC	State Water Cadastre
SWCIS	State Water Cadastre Information System
SWS	Shirak Water and Sewerage
TBMD	Territorial Basin Management Division
UN	United Nations
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WBMA	Water Basin Management Authorities
WFD	Water Framework Directive
WHO	World Health Organization
WRMA	Water Resources Management Agency
WRPD	Water Resources Policy Division
WUA	Water Users' Association
YD	Yerevan Djur

I. Introduction

In September 2012, the United Nations Economic Commission for Europe (UNECE) and the Government of Finland signed an agreement under the UNECE-FinWaterWei¹ project “Protocol on Water and Health – Improving health in Armenia through target setting to ensure sustainable water management, access to safe water and adequate sanitation”, to support the target-setting process under the Protocol on Water and Health in Armenia. This project has emerged from the National Policy Dialogue on Integrated Water Resources Management and Water Supply and Sanitation (NPD) process under the European Union Water Initiative (EUWI), with UNECE as a key partner of Armenia on integrated water resources management. One of the main objectives of the project is to facilitate the ratification of the Protocol on Water and Health by the Republic of Armenia, by providing a forum for policy dialogue and decision-making on the issues covered by the Protocol.

The project has been implemented in close cooperation with the Ministries of Nature Protection and Health of Armenia and with the participation of the Ministry of Territorial Administration. Non-governmental organization (NGO) Armenian Women for Health and Healthy Environment (AWHHE) has been responsible for the NGO coordination process to collect inputs from the NGO community at all stages of the target-setting process through consultation meetings.

The project has been guided by regular meetings of the Steering Committee of EUWI NPD in Armenia, which is chaired by the Head of the Water Resources Management Agency (WRMA) under the Ministry of Nature Protection, and whose other members are representatives of key Armenian entities covering issues of water resources management, water supply and sanitation, including health issues, with the involvement of NGOs. Various independent experts and representatives of donors and international partners working on water resources management issues are also invited to participate. The project kick-off meeting was held as part of the 9th meeting of the Steering Committee on 12 December 2012.

Following that meeting, UNECE and the main national stakeholders constituted a Project Working Group, consisting of national consultants with expertise and experience in the main fields covered by the Protocol on Water and Health, including a representative of the NGO AWHHE, and supported by an international consultant appointed by the UNECE and a UNECE staff member. This group compiled the information needed and produced the drafts of the baseline analysis and other documents which were then considered by the Steering Committee.

As of May 2014, the working group of national experts and the international consultant completed the work on the baseline analysis, and finalized work on the draft targets and target dates under the Protocol. The present technical report is based on the baseline

¹ FinWaterWei is the programme for Finland’s water sector support to the EECCA countries under the Wider Europe Initiative. The FinWaterWEI programme is managed on behalf of the Finnish Ministry for Foreign Affairs by SYKE (<http://www.environment.fi/default.asp?contentid=405313&lan=EN>)

analysis of legal, institutional and substantive aspects related to all twenty target areas under the Protocol on Water and Health prepared by the working group and adopted at the 10th EUWI NPD Steering Committee meeting held on 26 September 2013.

II. Baseline situation analysis

A. Methodology

The baseline analysis is the first substantive technical step under the target setting process and includes an analysis of the existing legal framework (national and international) and the environmental and health situation in Armenia with relevance to all twenty areas of target-setting under the Protocol. The methodology for the setting of targets under the present project was based on *the Guidelines on the Setting of Targets, Evaluation of Progress and Reporting*, developed by the UNECE and the Regional Office for Europe of the World Health Organization (WHO/Europe). Main elements of this methodology include (see Figure 1 below):

- Identification of key stakeholders and setting up of a coordination mechanism;
- Baseline analysis, including an assessment of current normative legal base, water infrastructure, the environment and health condition;
- Identification and prioritisation of problems;
- Agreement on draft targets, programme of measures and indicators;
- Broad consultation with state structures and NGOs on the proposed targets, target dates and relevant programme of measures;
- Agreement on targets and their publication and communication to all stakeholders;
- Agreement on programme of measures and indicators.

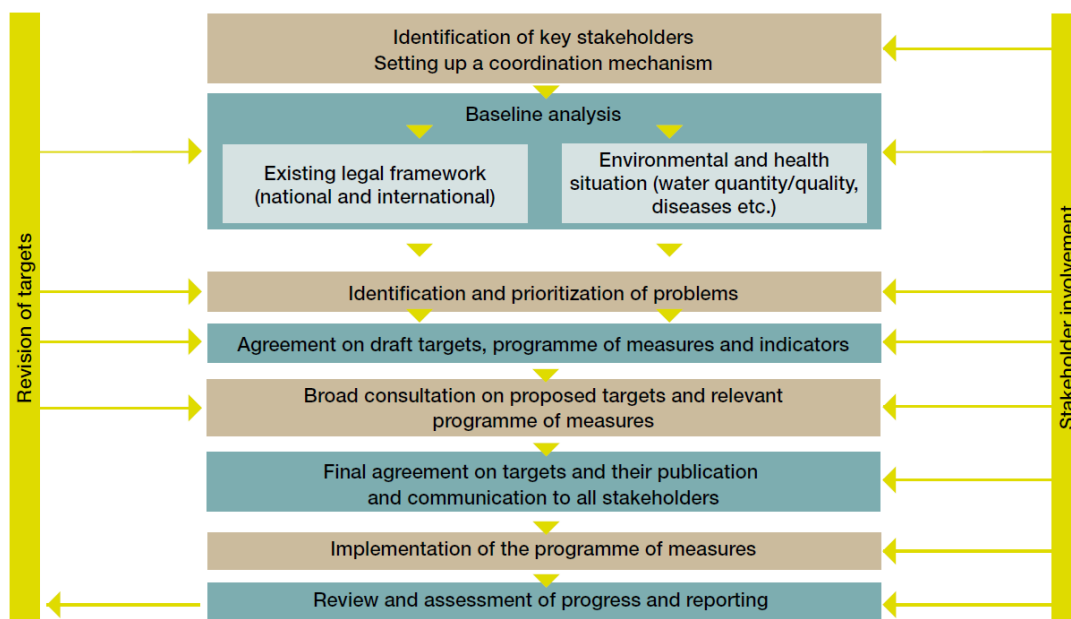


Figure 1. Logical framework of the process of target setting

The current technical report covers the results of the baseline analysis, which serves as a key step in the elaboration of all other elements of the target setting process.

The Working Group experts have collected baseline data in the following format:

TEMPLATE FOR BASELINE ANALYSIS AND EXPERT EVALUATION
Target area: ²
I. EXISTING FRAMEWORKS
A. Strategies, legal/regulatory framework, and international commitments
<ul style="list-style-type: none">• <i>National strategies (title, date of submission/adoption)</i>• <i>Main legal/regulatory act(s) concerning the subject area (title, date of enactment)</i>• <i>Main applicable international commitments (other than obligations under UNECE Conventions and Protocols)</i> ³
B. Institutional frameworks
<ul style="list-style-type: none">• <i>Authorities responsible for enforcement and implementation</i>• <i>Involvement of private sector organization(s)</i>• <i>Involvement of NGOs and civil society</i>
C. Financial frameworks
<ul style="list-style-type: none">• <i>Main relevant financial instruments</i>
II. ENVIRONMENTAL AND/OR HEALTH SITUATION – THE CURRENT STATUS AND PROSPECTS
A. Monitoring programmes and indicators
<ul style="list-style-type: none">• <i>Data availability, their completeness and reliability, data providers</i>
B. Main issues related to the subject area
<ul style="list-style-type: none">• <i>Impacts on human health and/or the environment (measured and/or estimated)</i>• <i>Causes of the problems (e.g. improper protection of wells, missing water management plans, missing water safety plans, insufficient wastewater treatment capacity, improper infrastructure)</i>

² For example: Quality of the drinking water supplied (art. 6, paragraph 2 (a))

³ For example: WHO Drinking Water Guidelines, EU Water Framework Directive, EU Wastewater Treatment Directive, EU Nitrates Directive

III. RELEVANT ONGOING AND PLANNED ACTIVITIES TO ADDRESS THE MAIN ISSUES

- *Main purpose of the activity⁴, assessment of its results and lessons learned*

IV. EXPERT EVALUATION

- *Overall assessment of the situation in the subject area*
- *Prioritization (ranking) of the problems*
- *Suggestions for improvement (e.g. the possible way forward)*
- *Suggestions for possible targets that can be set in this subject area*

B. Legal framework

Currently, much attention is paid in the Republic of Armenia (RA) to the efficient management, development and use of water resources. With the aim of regulating this sector numerous laws, statutes, decisions, etc. have been adopted in recent years by the legislative and executive bodies of Armenia, on the basis of which a number of reforms have been implemented.

The main legal acts regulating the field are:

Constitution of Armenia adopted on July 5, 1995 (Target areas I-XX)

According to Article 33.2 “Everyone shall have the right to live in an environment favourable to his or her health and welfare, and shall be obliged to preserve and improve the environment individually and in cooperation with others.

Officials shall be liable to prosecution for concealing or refusing to provide environmental information.”

Article 31.1 The state shall protect the interests of consumers, and take measures prescribed by the law to exercise quality control over goods, services and works.

Article 38. Everyone shall have the right to benefit from medical treatment under the conditions prescribed by the law.

Everyone shall have the right to benefit from basic medical aid and services free of charge. The list of services, and the procedures for obtaining them, shall be prescribed by the law.

Land Code adopted on May 2, 2001 (Target area I)

Article 26. Water-related land

⁴ This may also include research and capacity building/development

1. Water-related lands include all areas occupied by water bodies⁵ – rivers, natural and artificial reservoirs and lakes, areas set apart for hydrotechnical, water system and other bodies necessary for the use and protection of water bodies.
2. Water-related lands can be used for the needs of drinking, domestic, recreational and other needs, as well as for the construction and use of facilities necessary for water management, agriculture, nature protection, industry, fishing, energy generation and other needs of the State and the community.
3. According to the legislation, sanitary protection zones will be established to protect natural and artificial water bodies that require special sanitary protection and to prevent any impact from other sources on the health of the population. The sanitary protection zones will incorporate special restrictions on land-use in civil engineering projects.
4. The Land Code and the Water Code define the procedures for determining water-related lands use.

Water Code adopted on 04 June 2002 (Target areas I-XX)

The Code contains an integrated basin management concept, stimulates the decisions related to supply, rather than demand-driven water distribution, compels giving of water use permits based on the information, offers possibilities for the use of economic levers during the water resources management and cost recovery.

The objectives of the Water Code of Armenia are to:

1. Establish appropriate water resources management mechanisms;
2. Conserve and protect water resources, including mitigation of pollution, maintenance and supervision of water standards, and maintenance of the level of the national water reserve;
3. Prevent any harmful impact of water;
4. Ensure the assessment of water resources;
5. Ensure the supply of water to the population and for all productive purposes in the necessary quantity and of the necessary quality in accordance with officially-regulated tariffs;
6. Ensure the safe and smooth working of the water supply and wastewater systems; ensure proper conditions for their operation, maintenance and supervision;
7. Organize the management, protection and development of water systems.

Article 1. General Concepts Used in the Code

Maximum Allowable Concentration: the level of harmful substances, whose presence causes no harm to human health and results in no unfavorable consequences.

⁵ Water bodies - according to the Water Code water resources

Sanitary Protection Zone: a protection zone for water resources used for the needs of the population for drinking, healthcare, municipal and household services, medical and health resort needs, and for recreational purposes.

Water resources consist of: Armenia's rivers, ground water, surface waters, which accumulate in natural or artificial reservoirs, and drainage waters of a drainage system.

Article 20 of the law provides for public participation.

The following items are subject to public notice by the authorized bodies of the State:

1. Draft National Water Policy: General Concepts;
2. Draft National Water Programme;
3. Draft Water Basin Management Plans;
4. Pending Water Use Permits;
5. Pending Water System Use Permits;
6. Draft Water Standards;
7. Draft Water Tariff Strategy.

Should any person be aware of or become aware of a situation where water resource quality or water use poses a potential threat to human health or security, or cause the pollution of water resources, that person shall notify the Water Resources Management and Protection Body of the occurrence and location. The water resources polluter has the duty to notify the Water Resources Management and Protection Body of the pollution. The Water Resources Management and Protection Body shall immediately disclose this information to the public in a manner ensuring that all persons at risk have a proper opportunity to learn about the level of risk and the potential consequences.

In order to get information in the water sector any person is entitled to apply to the appropriate body and to obtain the information within 30 days, except for the cases established by law. The procedures for providing the information shall be established by the Government.

Article 22. Free Water Use

The following shall be considered as free water use:

1. Any use, which does not seek to make a profit;
2. Recreation, swimming and water sports (including non-motorized water sports);
3. Fishing with a fishing rod and sport hunting;
4. The use of precipitation on privately held lands;
5. The use of water for fire prevention purposes;
6. The abstraction of water for environmental flows to maintain ecological balances for sanitary flows.

If any free water use infringes or potentially infringes the water standards, the Water Resources Management and Protection Body shall regulate the activity by implementing

water use permit procedures according to this Code, and provide for other mitigation requirements as necessary to safeguard the water resources.

The Water Resources Management and Protection Body, according to procedures established by the Government, may determine to exempt a water use or class of water users from the requirements for permits if:

1. Such water use is negligible;
2. The activity does not rise to a level that violates or threatens to violate the water standards.

Article 70. Drinking Water Standards

Water supplied for drinking, healthcare, and municipal and household services must comply with drinking water quality standards.

Entities supplying drinking water must ensure its compliance with drinking water standards. The established national public health body monitors the compliance of drinking water quality with these standards according to the established legal provisions. Drinking water supply systems are the most important life-supporting water systems.

Water resources that meet the drinking water standards can be used for drinking, health, municipal and household public needs, if it is possible to ensure sanitary protection zones and special maintenance areas according to the established legal provisions.

Before its supply, drinking water may be treated and processed only with methods developed and adopted in accordance with the order established by the government.

The irrigation of agricultural land with untreated wastewater is limited as follows by the Water Code:

“Certain types of activities (including irrigation of land with wastewater; operation of industrial or commercial enterprises producing, using or storing solvents or chemicals; installation of refuse heaps for raw materials, waste and other products, and matter accumulated during the production process) may be restricted or prohibited in ground water protection zones” (Article 99, paragraph 9);

“Irrigation of agricultural lands with wastewater shall be permitted only in accordance with procedures enacted by the Government” (Article 101); and

“Commission and operation of lands irrigated with wastewater is prohibited without a system for monitoring the ground water regime” (last paragraph of Article 103).

Article 120. Specific aspects of the operation of drinking water supply and sanitation systems.

Prior to the adoption of the Law on Drinking Water, the following shall be carried out: in the sector of drinking water supply and sanitation.

- The use of water resources that meet the quality standards for water used for drinking, municipal, household and health needs shall be considered a top priority;
- The drinking, municipal and household water supply systems shall be classified as highly important life-supporting facilities;
- The control of the drinking water quality shall be carried out in accordance with established legal provisions.

The Water Code is the main legal instrument for defining the concepts and relations in the water sector. The Water Code regulates the conservation, use and distribution of water resources and water systems, and defines the principles and forms of involvement of the private sector.

To ensure the implementation of the new Water Code of Armenia since 2002 the Government has already approved more than 120 normative acts related to the procedures for granting water use permits, water basin management, transparency of decision-making processes and public participation, access to information, creation of a State Water Cadastre (SWC), development of monitoring of water resources and management of transboundary water resources, etc.

RA Law “On Provision of Sanitary-Epidemiological Security of the Population of the Republic of Armenia” adopted on 16 November 1992 (Target areas I-II)

This law defines the legal, economic and organizational aspects of the sanitary-epidemiological security of the population of Armenia, as well as the safeguards envisaged by the State to prevent the impact of environmentally harmful and hazardous factors on the human organism and to ensure favorable conditions for the well-being of the population and of future generations.

Article 4. Sanitary regulations and hygienic standards (excerpt)

The sanitary regulations and hygienic standards (hereinafter referred to as “hygiene regulations”) define the requirements for ensuring the environmental security and conditions favorable for the well-being of the population.

The implementation of sanitary regulations is mandatory for all government bodies, enterprises, institutions, organizations, as well for officials and citizens.

The main requirements for the water supply and water use sector are set out in Article 16 of the Law.

Article 16. General requirements for ensuring the sanitary-epidemiological security of the population of Armenia concerning public water supply and consumption

According to hygienic statutory acts, the residents of cities and other human settlements are provided with the necessary amount of drinking water for satisfying their physiological and economic needs.

The quality of water used for drinking, economic, industrial and technical needs shall comply with the sanitary regulations.

Governmental bodies must undertake measures for providing high quality water for the population through maintenance and development of the water supply systems.

The quality of water of centralized and non-centralized supply systems, swimming pools, sports, leisure and medical facilities and reservoirs located in the vicinities of human settlements must correspond to the sanitary regulations.

In order to prevent and eliminate the pollution of water sources intended for public consumption, the executive committees of local councils of deputies define sanitary protection zones with a special regime in compliance with the legislation of Armenia.

If the quality of the water does not correspond to sanitary regulations, its consumption by businesses, institutions, organizations and citizens will be terminated, as decided by the Hygiene and Anti-epidemic Service of Armenia.

Article 24. State Hygiene and Anti-epidemic Inspection

The state hygiene and anti-epidemic inspection covers the work of public health institutions and bodies aimed at preventing diseases by detecting and preventing violations of the public health legislation of Armenia.

The state hygiene and anti-epidemic inspection includes:

- assessing, forecasting and evaluating the state of health of the population in accordance with the state of the environment;
- detecting the causes and circumstances of the occurrence and spread of infectious and mass non-infectious diseases and toxic exposures;
- developing suggestions to ensure the public health security of the population;
- monitoring the implementation of the public health regulations and measures by businesses, institutions, organizations and citizens;
- imposing appropriate sanctions against officials and citizens in cases of violation of the public health legislation of Armenia;
- compilation of national statistics of cases of infectious and mass non-infectious diseases and toxic exposures .

Law About Medical Care, Population Servicing adopted on 04 March 1996, (Target area II)

Article 11. The rights of a person suffering from an infectious disease

A person suffering from an infectious disease is entitled to receive free medical care guaranteed by the state and to be treated in the relevant specialised health care institutions

The list of infectious diseases shall be established by the Government of Armenia.

Law “On Population Protection in Emergency Situations” (adopted on 12 February 1998) (Target XVIII)

This law defines the basic concepts and the arrangements for the protection of the population in emergency situations, the rights and responsibilities of state and local authorities, enterprises, institutions, organizations, irrespective of their organizational and legal types, (henceforth enterprises, institutions and organizations) as well as officials and the citizens in this sphere.

The law defines the “emergency situation” and “disaster zone” concepts;

Emergency situation - major accidents, dangerous natural phenomenon, technical, natural or ecological (natural protection) disasters, epidemics, animal diseases epidemics, widely spread infectious diseases of plants and crops in a certain area, or situations created as a result of the use of weapons which can lead to human losses, to significant harm to the health and environment, to major material losses and to the breakdown of normal living conditions;

Disaster zone - area (residence, building) or part of the area affected as a result of emergency situations.

Law “On Freedom of Information” (adopted on 23 September 2003) (Targets XVIII, XX)

Ensuring access to information and public awareness is carried out in accordance with Article 7 of this law.

1. The holder of information develops and makes public the procedures according to which it provides access to this information, as defined by legislation, which it places conspicuously in its office space, easily visible for everyone.
2. The holder of information urgently makes public, and by other publicly accessible means informs the public about information whose publication could prevent dangers facing national and public security, public order, public health and morals, others rights and freedoms, the environment, or people's property.
3. If not otherwise foreseen by the Constitution and/or the Law, the holder of information at least once a year shall publicize the following information related to its activity and/or changes to it:
 - 1) activities and services provided (or to be provided) to the public;
 - 2) budget;
 - 3) forms for written enquiries and the instructions for filling those in;
 - 4) lists of personnel, including the names and surnames, education, profession, position, salary rate, business phone numbers and e-mails of officers;
 - 5) recruitment procedures and vacancies;
 - 6) influence on the environment;
 - 7) public events programmes;
 - 8) the procedures, day, time and place for receiving citizens;

- 9) the basis for setting charges, and the current charges for work and services provided;
 - 10) list of information available and the procedures of providing it;
 - 11) statistical summary and complete data on inquiries received, including grounds for refusal to provide information;
 - 12) sources of elaboration or obtaining the information mentioned in this clause;
 - 13) information on the persons entitled to clarify the information defined in this clause.
4. Changes to the information in the third point of the present Article are to be made public within 10 days.
 5. The information mentioned in the second and third parts of the present Article is made public via publicly-accessible means and in cases when the holder of information has an internet page, also via that page.
 6. Organizations of public importance, as well as organizations financed from the state budget, can decline to make public the information mentioned in second, fourth and fifth points of the third part of the preceding Article or changes to that information.

Article 9 of this law defines the deadlines for the provision of information.

Article 12

As defined by the law, the holders of information are required to:

- a) ensure access to information and public awareness;
- b) record, catalogue and maintain the information possessed;
- c) provide truthful and complete information (as possessed by them) to any person seeking information;
- d) define their procedures for providing oral and/or written information;
- e) appoint an official responsible for the freedom of information.

Article 13 paragraph 1 designates the person responsible for ensuring the freedom of information.

1. Official person responsible for the freedom of information can be the head of the holder of information or an official appointed by the head.
2. The person responsible for the freedom of information according to the law:
 - 1) ensures that the responsibilities of the holder of information in the field of freedom of information are exercised;
 - 2) explains thoroughly the procedures, conditions and forms for providing information to a person seeking information; compiles summary and complete data on inquiries received.

Law "On National Water Policy" (the National Water Policy) adopted on 03 May 2005 (Target XIX)

The Law is the concept for prospective development of the strategic use and maintenance of water resources. This law is aimed at ensuring the access to water resources of the required quantity and quality to provide for human well-being, socio-economic development, and economic and ecological needs at present and in the future.

The objectives of the law are to: (a) ensure the assessment of the availability of water resources, describe the national aquatic resources, define the process of determining water resources supply and demand, (b) set priorities for the use of water resources and (c) apply the principles of basin management, draw up basin management plans and prepare the grounds for the National Water Programme. Thus, since 2005 water basin management has been applied in the water resources management sector.

Law "National Water Programme" adopted 27 November 2006 (Targets III, V, VII, IX, X, XI, XII, XVI, XVIII and XIX)

The Law "On National Water Programme" is the main instrument for the development of water resources and water systems through which the objectives of the Water Code are implemented.

The subject of the Law "On National Water Programme"

This law regulates the relations associated with establishment and implementation of the National Water Programme of Armenia, including the assessment of national water resources, the strategic water reserve, usable water resources, and the demand for water supply, and the main issues and prospects of water sector maintenance and development.

Activities under the Law of Armenia "On National Water Programme" are based on the scarcity of water, the consideration of water as one of the main means supporting human life and health, fauna and flora, and on the requirements for ensuring access to water.

The National Water Programme Legislation

The definition and implementation of the National Water Programme is regulated by the Constitution of the Republic of Armenia, the Water Code of Armenia, the Law on "National Water Policy Provisions" of Armenia, this Law, and other legal acts and international treaties.

If international treaties to which the Republic of Armenia is a Party establish norms other than those stipulated in this Law, the provisions of the international treaties shall be applied.

The goal of the Law

The overall goal of this Law is to establish measures aimed at solving the issues concerning the satisfaction of the needs of the population and economy, ensuring environmental sustainability, the creation and use of the strategic water reserve, the protection of the national water reserve, as well as the issues of the Law "On the Provisions of the National Water Policy" and the Water Code of Armenia through the efficient management of water resources.

The objectives of the Law

The objectives of the Law are:

1. to define the maximum and minimum rates for water use fee, including the definition of water resources production, refunds and rates of environmental fees;
2. to assess water supply and demand;
3. to define a strategy of water resources storage, distribution and use;
4. to define measures to develop water norms and values for environmental flows,
5. to adjust the minimum volumes of irreversible water intake,
6. to develop the list of protected basin areas and their constituent parts, and of the emergency environmental situation in water basins and environmental disaster zones,
7. to define measures to prevent harmful effects on aquatic ecosystems and water resources, and to improve monitoring and pollution prevention.

The priority issues in the water supply sector are:

- 1) ensure the sustainable operation of drinking water systems and improve management mechanisms;
- 2) ensure the financial sustainability of water supply companies;
- 3) ensure a continuous and reliable water supply;
- 4) increase access to public water supply services;
- 5) provide access to water services for poor consumers;
- 6) involve the private sector in the operation of water supply systems and services, and in developing participatory management systems;
- 7) monitor the activities of water supply companies;
- 8) monitor the quality and management of the drinking water supply;
- 9) improve the monitoring of water supplies by water users to protect water resources from pollution;
- 10) introduce a water accounting system;
- 11) reduce water losses in the water supply system;
- 12) ensure the necessary level of investments to improve water supply services;
- 13) use modern technologies in the rehabilitation, construction and operation of water supply systems.

Article 26 of the law defines the zones of emergency environmental situations and environmental disasters.

1. Zones of emergency environmental situation and environmental disasters are areas where adverse changes occurred in the environment as a result of natural phenomena, economic or other activities that threaten public health, the balance of natural ecosystems, flora and fauna. In areas of emergency environmental situation and environmental disaster certain types of economic activities associated with the use of natural resources and have a negative impact on human life, health and the environment shall be restricted or suspended, and measures shall be taken for the restoration and reproduction of natural resources.

2. Emergency environmental situations and environmental disaster zones in water basins are established by the Government of Armenia on the basis of the duration, stability, resource regeneration ability of the situation.

To implement the National Water Programme objectives short-term (up to 2010), medium term (2010-2015) and long-term (2015-2021) programmes have been defined.

Government Decision No 1286 of 27 December 2001 “On Approval of the List of Diseases Dangerous for the Surroundings” (Target II)

The list includes all kinds of infectious diseases transmitted by water: intestinal infectious diseases (all forms), viral hepatitises, tularemia, etc. The number of people treated is included in the national standards approved for each year with regard to infectious diseases.

Government Decision No.26 of 14 January 2002 (Target I)

According to this decision, the national agency in charge of restricting the use of sanitary protection zones and establishing the norms is the Ministry of Health.

By the **Government Decision No. 218-N of 7 March 2003 “Approving the Model Water Use Form and Water Use Permit Forms”**, in case the water is to be used for municipal, household, medicinal and health purposes, a special document (conclusion) is mandatory to be given by the State Sanitary and Anti-Epidemiological Inspectorate of the Ministry of Health of Armenia.

Government Decision No. 756 – N of May 8, 2003 "Approval of the Procedures for the Use of Water Resources for Tourism, Sports and Recreational Needs"

2. People using the water resources for tourism, sports and recreational needs who have been considered as free water users in compliance with Articles 22 and 23 of the Water Code of Armenia shall use the water as required by this decision.
3. The use of water resources for tourism, sports and recreational needs is carried out in accordance with the rules for the protection of human life based on the requirements, places and terms imposed by the appropriate state bodies of Armenia and the local authorities depending on the ownership of the water resources.
6. The use of water resources and their surrounding areas defined for tourism, sports and recreational needs should not lead to the violation of standards for water resources, nor limit the rights of citizens using these areas, and the rights of other water users to water resources.
7. The users of the water resources and their surrounding areas for tourism, sports and recreational needs shall provide public information about the water quality indicators of the water designated for their activity, as well as the availability of this information.
8. The use of water resources in protected areas for tourism, sport and recreational needs is permissible if it is not contrary to the norms established for the area, otherwise the water user shall obtain a water use permit as defined by this decision.

9. The use of water resources for tourism, sports and recreational needs which violates or threatens to violate water standards, can only be carried out if a water use permit has been granted.

Government Decision No. 816-N of 5 June 2003 “Approval of the Procedures for the Free Use of Water”

1. This procedure regulates the legal relationships related to the free use of water, (except for the legal relationships regarding the use of water resources for tourism, sports and recreational needs), the use of groundwater on privatized land, and the use of water for fire-fighting purposes, which are regulated by separate procedures established by the Government of Armenia.

6. The Ministry of Nature Protection based on information presented by the relevant public health body about hazards for human health affecting a particular water resource, can restrict or prevent the free water use, in either the whole or parts of the water resource if:
 - a) epidemic cases are reported in the region, and there is a danger of spread of water-related diseases;
 - b) the water resource is contaminated to the extent that it can cause damage to human life and health.

Government Decision No. 1228-N of 28 August 2003 “On Defining the Rules for the Use of Sanitation Systems and Wastewater Treatment” (Target areas IV, VI, VIII, IX, X, XI, and XII)

This Decision determines the organization of the use of sanitation and water treatment systems; issues involved in the operation of the drainage network and monitoring of its maintenance; the facilities for water treatment systems and mechanisms for their laboratory, manufacturing and technological monitoring; the types of mechanical and biological wastewater treatment facilities; and wastewater sludge treatment facilities, operating procedures and monitoring mechanisms.

Thus, in accordance with paragraph 109 of this decision the tasks of the operational staff of facilities of wastewater treatment systems are:

- a) ensuring the cleaning, sludge treatment, disinfection and disposal from a wastewater treatment plant, complying with sanitary rules and hygienic standards, ensuring the Maximum Allowable Concentration values are not exceeded in effluents and meeting other requirements of the Ministry of Nature Protection and the State Sanitary and Anti-Epidemic Inspectorate;
- b) ensuring the wastewater and sludge treatment is carried out as required for technical, irrigation water and other productive purposes
- c) organization of the effective and uninterrupted functioning of the wastewater and sludge treatment facilities, reduction of the basic cost of wastewater and sludge treatment; the saving of water to be used for reagents, energy and own needs.

According to paragraph 119:

"The production units of the treatment facilities include the treatment facilities themselves (mechanical and biological treatment, sludge processing, disinfection, drying and irrigation fields) and the laboratories (chemical and microbiological)."

In Chapter XXVI of the Decision the types and forms of wastewater sediment treatment facilities are defined, such as: sludge areas, methane tanks, sludge thickeners, sludge aerobic stabilizers, vacuumdryers, centrifuges and sludge thermal drying, as well as their operating rules and conditions.

It should be noted that in order for the relevant national bodies to monitor fish farming operations, the **Government Decision No. 47 - N 2003 of November 7, 2003 on the "Approval of the "Fishing and Fish Farming" Form No. 1- (monthly) state fish statistical report form and procedures for its completion"** - defines the procedures for completing the statistical report form by fish farming companies. (Target area XVI)

Government Decision No. N130-N of 22 January 2004 "On approval of the procedures for defining the rules for drinking water supply and sanitation, of model forms of contracts for water supply and sanitation, and of the technical requirements for connection to water supply and sanitation systems" (Targets III - XII)

The "Drinking water supply and sanitation" rules contained in the above-mentioned Decision and the Appendix thereto define the procedures for drinking water supply and sanitation, water accounting and payment for the water supplied and the wastewater treated, the technical regulations for connections to drinking water supply and sanitation systems, and the rights and liabilities of the parties involved in these relationships

In accordance with the requirements set forth in Article 121, part 5, paragraph 12 of the Water Code, the Government adopted **Decision No. H64-N of 20 January 2005 "Establishment of zones for water ecosystem protection, sanitary maintenance, water flow formation ground water protection, water protection, ecotones and inalienable areas"**, according to which:

1. The Government of Armenia approves these standards except for the standards for the sanitary protection zones of water resources used for drinking and public health needs. These latter standards are defined by the relevant public health body according to the procedures established by law.
2. The actual areas and boundaries of sanitary protection zones of aquatic ecosystems, flow formation, groundwater protection, water protection, ecotones and inalienable zones, based on the specific characteristics of each water resource, shall be defined through field works within the framework of the National Water Programme.

3. The standards for definition of sanitary protection areas of aquatic ecosystems shall be:
 - a) Areas that are preserved for the protection of biological, hydrological and recreational values of water resources;
 - b) Areas that provide surface and ground waters of a quality and quantity of suitable for human health and well-being, including drinking water, and waters that are used for medicinal purposes and to protect the integrity of specific ecosystems.
 - c) The sanitary protection areas of aquatic ecosystems may include parts of a lake or river, wetlands and ponds and lakes, as well as the surrounding areas, which are subject to protection in their natural condition as functioning healthy ecological systems, and areas where human activity may be needed for the rehabilitation of the environment or for monitoring pollution, erosion and other negative impacts on water quality and quantity caused by flooding.
 - d) The sanitary protection areas of aquatic ecosystems shall be of a radius of up to 90 meters.

4. The standards for flow formation definition are:
 - a) areas that provide surface and ground water of a quality and quantity suitable for human health and well-being,
 - b) flow formation regions include the source of the river, outflows of groundwater and natural springs, as well as the surrounding areas, which are subject to protection in their natural condition as healthy and working ecological systems,
 - c) flow formation areas shall be of a radius of up to 4000 meters.

5. The standards for definition of groundwater protection areas are:
 - a) areas with suitable hydro-geological, hydrological, and climatic conditions and aquifers, without violating the integrity of the ecosystem,
 - b) the groundwater protection areas may also include community restricted catchment areas,
 - c) the ground water protection areas are defined as areas with a radius of up to 150 meters.

6. The standards for definition of water protection zones are:
 - a) areas where littering, pollution, and depletion of water resources are prevented and which have a favorable water regime,
 - b) water protection areas include all the areas designated for the protection of water resources,
 - c) the water protection zones are defined as strips of land up to 32 meters long.

7. The standards for the definition of the ecotone areas are:
 - a) areas along the banks and shores of water bodies which are conserved because of their vulnerability to damage as a result of human activities,
 - b) the ecotone areas include the vulnerable banks and shores of rivers, lakes, ponds, and other natural water bodies,

- c) the ecotone areas are defined as areas with a radius of up to 150 meters.
8. The standards for the definition of inalienable areas are:
- a) areas of special importance for the operation, restoration and maintenance of water supply and drainage systems and water management facilities,
 - b) they include areas immediately adjacent to water supply, sanitation and other water management facilities,
 - c) inalienable areas are defined as strips up to 10 meters long.

Government Decision No. 76 N of 25 January 2005 “On establishing norms and instructions for the use and protection of water resources in emergency situations, and on the minimum quantity of water to be supplied to the population, as well as compensation for damages that the water system operator may suffer”. (Targets XIV, XVIII)

According to paragraph 10 of this decision:

The instructions for the use and protection of water resources in the disaster zone are defined by the government on the basis of the findings of the relevant national body for emergency situations, as well as on

- a) findings of the relevant national body for water resources management and protection, of the water system management body and the local authorities in case of natural hazards or natural or ecological disasters;
- b) findings of the water resources management and protection body and the local authorities;
- c) findings of the water resources management and protection body and the relevant public health body during epidemics;
- d) findings of the relevant national body in the agricultural sector, the water system management body, and the water resources management and protection body, during animal disease epidemic, or widespread outbreaks of plant and crops diseases;
- e) findings of the relevant national bodies in the sectors of defence and public health, the water system management body, and the water resources management and protection body, in the case of emergency situations created by the use of weapons, which cause or may cause human casualties, damage to health disruptions to the stability of ecosystems, or the breakdown of water supplies.

According to paragraph 11:

If the water source located in a disaster area is a source of drinking water, or is used for recreational purposes, the definition of the instructions specified in paragraph 10 of this section should be based on the findings of the relevant national body of the health sector.

Government Decision No 1147 - N of 28 July 2005 “On regulations for establishing water standards” (Target I)

I. General provisions

4. Water standards for drinking, productive, cultural and municipal needs are developed by the public health authority, taking into consideration the recommendations of the statutory entities of the water sector.

II. Regulations for defining water standards used for drinking, household, cultural and municipal purposes

7. The water used for drinking and productive purposes shall comply with the parameters defined by the hygiene standards and regulations, and by the provisions of Article 70 of the Water Code of the Republic of Armenia for bacteriological, radiological, organoleptic, and hazardous substances which could affect the health of present and future generations, irrespective of their age and sex.
8. The water standards used for cultural and municipal purposes shall comply with drinking water and other standards for all recreational purposes (recreation, swimming, bathing, sports, tourism, etc.) and shall be safe for the health of present and future generations in terms of hygiene standards and regulations for microbial, organoleptic and hazardous materials, and shall comply with the provisions of Article 70 of the Water Code.

Government Decision No. 75-N of 27 January 2011"On defining the standards for water quality of each water basin management area depending on local characteristics" (Target areas X, X, XI, XII, XIII, XVI, XVIII and XIX)

According to this decision five classes of water quality are defined: excellent, good, fair, unsatisfactory and poor. The quality standards are set for a total of 117 indicators, whose distribution is given below in Table 1. It should be noted that three out of the five classes (excellent, good and fair are considered as suitable for breeding and conservation of salmonoids and cyprinid fishes.

Table 1. Indicators used for defining water quality standards

Group of indicators	Number of indicators
Oxygen regime	4
Thermal regime	1
Mineralization	5
Nutrients	9
Acidity	2
Other indicators	5
Metals	28
WFD primary pollutants (organic micro pollutants)	33
WFD other specific pollutants	9
Microbiological and biological indicators	12
Radioactivity	2
Other specific pollutants	7
Total	117

Based on the monitoring results water bodies are classified into one of five classes of surface water quality. This classification is then taken into consideration together with the purpose for which the water is to be used, resulting in Table 2 below:

Table 2. Allowable water usage based on purpose and water quality

Significance/function/activity	Category according to quality	I category excellent	II category good	III category fair	IV category unsatisfactory	V category poor
National water reserve		√ ¹	√	√	√	√
Conservation of watercourses		√	√	- ²	-	-
Ecosystems activity, fish breeding/conservation	Salmonoids	√	√	-	-	-
	Carp species	√	√	√	-	-
Irrigation ³		√	√	√	√	
Industrial water use		√	√	√	√	√
Energy generation		√	√	√	√	√

¹) Applicable

²) Not applicable

³) Applicable for irrigation purposes if the pH value does not exceed 8.5, and the electric conductivity value is less than 1000 μS/cm.

In case the various indicators show different quality classes in a particular surface water body, then the worst indicator determines the final classification. For example, if one of the indicators shows insufficient (IV class) status, and the other indicators show a better status, then the water body is classified as of unsatisfactory (IV class) status.

The background concentration is used for many indicators. In such cases different background concentrations are used based on the characteristics of the water basin. Another important aspect of the Government Decision "On defining standards for ensuring the water quality of each water basin management area depending on the local characteristics" is that surface water quality standards must be updated every six years along with new information and knowledge.

Decision No. 4 of the minutes of the Government discussion held on February 3, 2011 entitled "On Approval of the Content of Model Basin Management Plans"

The decision is the basis for developing technical specifications and drawing up plans for the management of six water basins.

However, this legislative base does not fully regulate the target areas examined in this document.

Government Resolution No. 1913 –N of 29 December 2011“On Approval of the Strategic Plan and the List of Measures for 2012 -2016 on Preventing and Combating Infectious Diseases in Armenia” (Target area II)

The plan aims at reducing the burden of infectious diseases in Armenia. As an instrument of national significance, this strategic plan is a tool which will assist in maintaining the health of the population of Armenia, strengthening achievements in terms of infectious diseases, solving problems as far as possible through the prevention and control of infectious diseases, and ensuring long-term progress in the field of epidemiological surveillance and response to infectious diseases, in collaboration with other ongoing programmes.

By the **Government Decision No. 1285-N of 10 October 2012 “On making amendments and changes to the Government Decision No. 46-N of 14 January 2010”** a new national vaccination calendar was approved, according to which vaccination against rotavirus was introduced from November 2012. The coverage of the vaccinated children was 90% as of 20 December 2012. (Target area II)

“Drinking water. Requirements imposed on water quality for centralized systems. Quality control Sanitary Rules No. N2-III-A2-1” (registered on 28 December 2002), approved by Order No. 803 of 29 November 2002 of the Minister of Health defines the hygienic requirements for drinking water quality, as well for drinking water produced and supplied to human settlements through water supply systems. (Target area I)

“Sanitary protection zones for household drinking-water supply and water supply sources. Sanitary Rules and Regulations No. 2-III-A2-2” (registered on 28 December 2002), approved by Order No. 876 of 25 December 2002 of the Minister of Health, which defines the public health requirements for the organization and operation of sanitary protection zones for household drinking water supply and water supply sources. (Target area I)

Sanitary and anti-epidemic norms and regulations N 2-III-2.2.4 ”On hygiene requirements for the design, operation and quality control of swimming pools”, approved by Order No. 534 N of 17 May 2006 of the Minister of Health

- 1.1 The present national public health rules and norms (hereinafter referred to as sanitary rules) apply to all newly-constructed or reconstructed swimming pools, including those for sports and those in outdoor swimming pool facilities, schools and pre-schools , and health and bathing facilities (such as saunas).

INTERNATIONAL COMMITMENTS OF THE REPUBLIC OF ARMENIA

The Republic of Armenia ratified the Aarhus Convention on “Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters” on 14 May 2001.

The objective of the Convention is described in Article 1: “In order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate his or her health and well-being, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters.”

The Republic of Armenia signed the *Protocol on Water and Health* to the 1992 Convention on the Protection and Use of Transboundary. Watercourses and International Lakes on 17 June 1999 but has not yet ratified it. Public participation and support for the development and implementation of the Protocol's targets has a vital role. It is stated in Article 5 (i). i.e. “Access to information and public participation in decision-making concerning water and health are needed, inter alia, in order to enhance the quality and the implementation of the decisions, to build public awareness of issues, to give the public the opportunity to express its concerns and to enable public authorities to take due account of such concerns. Such access and participation should be supplemented by appropriate access to judicial and administrative review of relevant decisions”. According to the Protocol, Articles 6, 7, 9 and 15 also touch on public participation and publication of information.

The participation of Armenia in international environmental agreements is presented in Annex 1.

Towards the implementation of International Health Regulations:

Government Decision No. 1138-N of 26 August 2010 "On approval of mechanisms for cooperation of the national coordinating body on International Health Regulations and other interested agencies and approval of coordination procedures" regulates the information exchange and cooperation issues related to public health emergencies, including water-related infectious diseases.

Order No. 26-N of 29 November 2010 of the Minister of Health “On approval of standard procedures for notifying the body responsible for the implementation of the public health rules (health care) when reporting a public health emergency related to biological, chemical and radiological factors”

Joint Order of the Minister of Health and the Chairman of State Committee of Water Economy of the Ministry of Territorial Administration of Armenia (MoH Order No. 24-N of 6 December 2011 and MTA SCWE Order No. 163-N of 12 December 2011) “The standard procedures for cooperation between the Ministry of Health and the State Committee of Water Economy of the Ministry of Territorial Administration in case of emerging public health problems related to reported waterborne infectious diseases in a community”

Towards the implementation of the European Union Water Framework Directive

Government Decision No. 75-N of 27 January 2011 "On defining the standards for water quality of each water basin management area depending on the local characteristics"

The obligations of Armenia under the Association Agreement

Harmonization with the EU Water Framework Directive (WFD) principles and the adoption of the EU WFD methodologies are essential elements of the "second generation" reforms in water sector in Armenia. The EU - Armenia Association Agreement draft and the regional programme implemented by the EU are the key driving forces of this process.

Water Framework Directive

The Water Framework Directive (officially Directive 2000/60/EC of the European Parliament and the Council of the European Community on establishment of an activity framework in the field of water policy sector) was adopted in October of 2000 and entered into force in December, 2000.

In accordance with the Armenia-EU Association Draft Agreement the following provisions shall apply for Armenia in the EU WFD context within five years after coming into effect:

- adoption of national legislation and designation of the statutory body / bodies; identification of the watershed areas and appropriate coordination of protection/conservation of international rivers, lakes and coastal waters (Articles 3.1 - 3.7);
- analysis of the characteristics of watershed areas (Article 5);
- establishment of water quality monitoring programmes (Article 8);
- development of river basin management plans, consultations with the public and publishing of plans (Articles 13 and 14).

Flood Directive

The Flood Directive (officially, Directive 2007/60/EC of the European Parliament and the Council on the assessment and management of flood risks) was adopted in October 2007 and came into effect in November 2007. It is aimed at reducing and managing flood risks that affect the human health, the environment, cultural heritage and economic activities.

In accordance with the Armenia-EU Association Draft Agreement, the following provisions shall apply for Armenia in the context of the Flood Directive within four years after coming into effect:

- adoption of national legislation and designation of the statutory body / bodies;
- implementation of flood initial evaluation (articles 4 and 5);
- preparation of flood hazard maps and flood risk maps (Article 6);
- development of flood risk management plans (Article 7).

Urban Wastewater Treatment Directive

The Urban Wastewater Treatment Directive (officially, Directive 91/271/EEC on Urban Wastewater Treatment revised by the Directive 98/15/EEC and the European Commission 1882/2003 Regulation) was adopted and came into effect in May of 1991. The Directive aims to protect the environment from the adverse effects of discharges of urban wastewater and from certain industrial effluents. It regulates the municipal water collection, treatment and discharges, as well as the wastewater treatment and effluents from certain industrial areas.

In accordance with the Armenia-EU Association Draft the following provisions shall apply for Armenia in the context of the Urban Wastewater Treatment Directive:

- adoption of national legislation and designation of the statutory body / bodies
- assessment of the status of municipal wastewater collection and treatment
- identification of vulnerable areas and agglomerations (Article 5.1 and Annex II);
- preparation of a technical and investment programme on implementation of municipal wastewater treatment requirements (Article 17.1)

Drinking Water Directive

The Drinking Water Directive (officially, the Directive 98/83/EC of the European Commission revised as 1882/2003 Regulation on quality of water intended for human consumption) refers to the quality of water intended for human consumption and is part of the European Union water supply and sanitation regulations.

In accordance with the Armenia-EU Association Draft Agreement, the following provisions shall apply for Armenia in the context of the Drinking Water Directive within four years after entering into force:

- adoption of national legislation and designation of the statutory body / bodies;
- establishment of drinking water standards (Articles 4 and 5);
- establishment of a monitoring system (Articles 6 and 7);
- establishment of a mechanism to provide information for consumers (Article 13).

Nitrates Directive

The Nitrates Directive (officially the Nitrates Directive (91/676/EEC on protection of waters against pollution by nitrates from agricultural sources, revised as the European Commission Regulation 1882/2003) was adopted and entered into force in December, 1991. It aims to protect water quality throughout Europe by preventing water pollution by nitrates from agricultural sources of groundwater and surface water, as well as promoting exemplary methods of farm' maintenance.

In accordance with the Armenia-EU Association Draft Agreement, the following provisions shall apply for Armenia in the context of the Nitrates Directive within four years after entering into force:

- adoption of national legislation and designation of the statutory body / bodies;
- establishment of monitoring programmes (Article 6);
- identification of polluted waters or waters at risk and determination of zones vulnerable to nitrates (Article 3);

- development of an action plan and exemplary farming methods for nitrate vulnerable zones (Articles 4 and 5).

C. Institutional frameworks

With the adoption of the new Water Code a new institutional system was introduced, in accordance with which the management of the sector is implemented by the following authorities:

The National Water Council, chaired by the Prime Minister, is the highest inter-sectoral consultative body for the water sector that is responsible for making recommendations relating to the National Water Policy, National Water Programme and other issues set forth in legislation.

The Disputes Resolution Commission may resolve disputes related to water use permits.

Water Resources Management and Protection Body

- 1) Coordinate the preparation of the draft National Water Policy and National Water Programme of Armenia;
- 2) Implement water resources management and protection within the framework of the National Water Policy and National Water Programme;
- 3) Develop the principles and norms for the environmental and economic bases for the assessment of the impact on water resources as a result of economic activity;
- 4) Classify water resources by use, function and status;
- 5) Participate in development of water standards and oversee implementation thereof;
- 6) Establish maximum allowable concentrations and minimum ecological flows according to the National Water Programme, and approve allowed limiting qualitative and quantitative criteria for wastewater discharge;
- 7) Approve allowed quantities of surface and ground water extraction;
- 8) Provide for development of water basin management plans and implementation thereof;
- 9) In accordance with its internal regulations, receive water use permit applications through the statutory bodies;
- 10) Issue water use permits;
- 11) Participate in the development of standards for losses in water use, wastewater disposal and water systems;
- 12) Facilitate water resources monitoring and incorporate water resources monitoring results in the planning and management process;
- 13) Provide for implementation of a joint scientific and technical national policy in the field of water resources management and protection, organize the process of implementation of basic and applied scientific investigations in the field and incorporation of their results;

- 14) Coordinate the development and implementation of projects related to water resources management and protection;
- 15) Identify threats to water catchments depletion and develop measures to prevent harmful impacts on water ecosystems;
- 16) Provide for publication and public awareness of the documents it has developed, according to the procedures established by the Government;
- 17) Establish the permitted quantity of water extraction needed for getting a privileged ground water use right for the cases established by the Water Code;
- 18) Ensure the development of maps of the protection zones of aquatic ecosystems;
- 19) According to the requirements of the National Water Programme oversee the norms established in the area of water resources use and management, including fulfillment of established quotas and limitations.

The Water Resources Management Agency of the Ministry of Nature Protection of the Republic of Armenia is responsible for the protection and management of water resources;

To promote the more efficient, effective and decentralized management of water resources six regional authorities were established within the Water Resources Management Agency: Northern, Akhurian, Araratyan, Sevan, Hrazdan, and Southern (Figure 1).

The Water Basin Management Authorities (WBMA) are responsible for the development of basin-level water management plans, the registration of water use permits, the protection of water resources, the enforcement of the terms and conditions set forth in the water use permits, and the development of water resources distribution plans for the five water basin management areas.

The Environmental Impact Monitoring Center (EIMC) of the Ministry of Nature Protection monitors surface water quality;

The water resource quality monitoring system was founded in Armenia in 1964, but after 1992 the water quality-related activities have decreased considerably. Since 2007 the EIMC has been operating at full capacity and tests 1,000-2,000 samples yearly taken from 131 observation points (6-12 samples per year from each observation point).

The Hydrogeological Monitoring Center (HMC) of the Ministry of Nature Protection assesses the trends affecting the water resources of Armenia, their quantitative and qualitative characteristics, as well as the regional changes.

Periodic monitoring of groundwater sources and wells has been carried out since the 1950s, however since 1990 groundwater monitoring ceased for nearly 15 years, although about 96% of the drinking water of Armenia is groundwater. The Hydrogeological Monitoring Center was established in 2005. Due to inadequate funding groundwater monitoring was carried out by the HMC only partially during 2006-2008, but since 2009 it has been carried out completely. The hydrogeological monitoring is carried out through measurements of water sources, consumption, level (pressure) and temperature. The

measurements are taken from 70 observation wells and water sources of the main network of the six water basin areas.

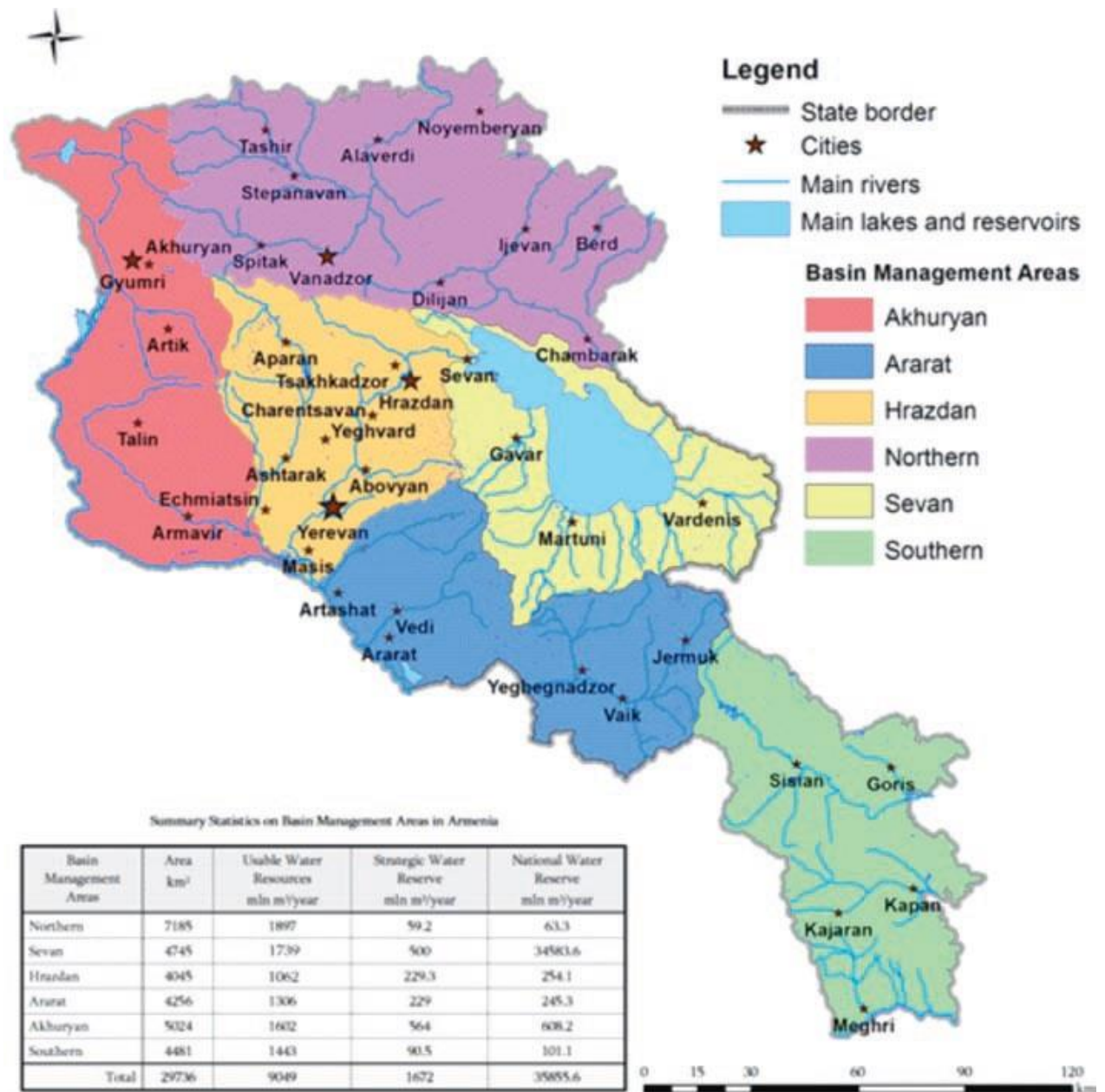


Figure 2. Waterbasin Management Regional Authorities in Armenia⁶

⁶ Ministry of Nature Protection of Armenia 2012. Ten years of Experience in reforming water management sector in Armenia: towards the EU Water Framework Directive.

The State Environmental Inspectorate (SEI) of the Ministry of Nature Protection monitors compliance with the rules and requirements for the use and protection of water resources, including the allowed water abstraction and the amount of wastewater effluents (except for radioactive substances). The SEI is also responsible for keeping the data obtained from water users on water abstraction, water return and quality. The monitoring of water use and polluting effluents is carried out at 198 localities. The hydrological and water quality monitoring network of surface water and groundwater in Armenia is summarized below in Table 3.

Table 3. Monitoring network of surface and underground waters

Watershed	Area (km ²)	Hydrological observation points		Surface water sampling points for quality analysis		Underground water sources and wells		Water use and pollutant discharge	
		Quantity	km ² per one observation point	Quantity	km ² per one observation point	Quantity	km ² per one observation	Quantity	km ² per one observation point
Akhuryan	5,044	17	297	14	360	8	631	47	107
Araratyan	4,460	13	319	16	279	9	496	22	203
Northern	7,068	23	307	25	283	6	1178	34	208
Sevan	4,806	14	339	22	216	11	437	26	185
Hrazdan	3,881	16	243	33	118	27	144	36	108
Southern	4,484	9	498	21	213	9	498	33	136
Total	29,743	92	323	131	227	70	425	198	150

The **Bioresources Management Agency of the Ministry of Nature Protection** implements the management and conservation of the biological resources of Armenia.

The **State Committee of Water Economy of the Ministry of Territorial Administration** implements the management of state-owned and non-competitive water supply systems and ensures their safe use

The State Committee of Water Economy of the Ministry of Territorial Administration:

- 1) participates in the preparation of the national water policy and the draft national water programme
- 2) ensures the development and implementation of the water systems investment policy, as well as the organization of the review of investment programmes;
- 3) ensures the initial review of proposals for construction and reconstruction of facilities affecting water systems, and makes recommendations;
- 4) participates in the development of standards for losses in water supply and sanitation systems, as well as in other water systems;

- 5) provides the definition of restrictions and norms for the use of water lands and the protection zones of aquatic ecosystems;
- 6) participates in the calculation of annual and long-term demand of usable water resources;
- 7) carries out the compliance monitoring of the state property management-related functions of organizations carrying out commercial activities in this field, including the signing of contracts for management of state-owned water systems and non-competitive water supply systems, and compliance with the requirements prescribed by the water system use permit;
- 8) within its jurisdiction supports the implementation of international cooperation on issues related to this field.

The state- and community-owned water supply and sanitation systems have been transferred to the following enterprises for management, based on concessional contracts.

"Yerevan Djur" Closed Joint Stock Company (CJSC): In 2006 the management of the water systems ("Djur" means "water" in Armenian) of Yerevan and a number of adjacent villages was leased to the French company "Veolia" for a 10 years term.

In 2004 the **"Armenian Water and Sewerage" CJSC** was transferred to the French water company "Saur" based on a competitive procedure. This company works through three local branches.

In 2004 through reorganization, the **"Shirak Water and Sewerage" CJS**, the **"Lori Water and Sewerage" CJS** and the **"Nor Akunq" CJS** Companies were separated from the "Armenian Water and Sewerage" CJS Company. 51% of the stock of the new companies belongs to the State and 49% belongs to the communities in the service areas. The management of these companies is carried out jointly by a consortium of AEG LLC and the German "MVV" company for a three-year term (with possibility of renewal for one further year).

Table 4. Specialized companies supplying water and sanitation services and the number of settlements in each service area

N	Name of company	Settlements in the service area
1	"Yerevan Djur" CJSC	Yerevan, Eghvard, and 31 rural settlements
2	"Armenian Water and Sewerage" CJSC	37 towns, 268 rural communities
3	"Lori Water and Sewerage" CJSC	Vanadzor, and 16 rural communities
4	"Shirak Water and Sewerage" CJSC	Gyumry, Maralik, and 34 rural communities

5	“Nor Akunq” CJSC	Armavir, Metsamor, and 10 rural communities
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A total of 42 Associations of Water Users, which are responsible for the operation of irrigation systems have been established since 2004.

The Public Services Regulatory Commission sets water tariffs.

The Ministry of Agriculture is the statutory body which develops the agricultural policy and strategies (including irrigation and drainage, and fish and shellfish industries). The Ministry also develops standards for irrigation and agricultural crop regimes.

The Ministry of Health:

According to Government Decision No. 1300-N of 15 August 2002 “On Creating a State Administrative Institution of “Administration of the Ministry of Health of the Republic of Armenia”, approving the charter and structure of the Ministry of Health of the Republic of Armenia”, ensuring the public health security of the population is one of the goals and objectives (Appendix 1, "7. The goals and objectives of the Ministry are)b) ensuring the public health security.” The Ministry is also responsible for the development of public policy and targeted programmes aimed at public health security, monitoring their implementation and drafting laws and other legal acts Government Decision No. 857 of 25 July 2013 and Decision No. 1134-N of 17 October 2013 defined the scope and objectives of activities relating to the public health security of the population, to be carried out by the State Health Inspectorate and the “National Center for Disease Control and Prevention” State Non-Commercial Organisation (SNCO) under the Ministry of Health.

The State Health Inspectorate (hereinafter: Inspectorate) under the Ministry of Health The aims and objectives of the Inspectorate, inter alia, are:

- to prevent the exposure of human beings to environmentally harmful and hazardous factors by establishing hygiene and anti-epidemic standards, rules and regulations, by developing hygiene norms and by overseeing the implementation of these requirements;
- to carry out the national hygiene and anti-epidemic surveillance;
- to ensure the sanitary and epidemiological security of the population of Armenia;
- to carry out hygienic and anti-epidemiological surveillance on the territory of Armenia;
- to organize hygienic, anti-epidemic and prophylactic measures, and develop proposals to prevent communicable and non-communicable diseases and toxic exposures in the context of ensuring the public health security of the population;
- to prevent communicable and non-communicable diseases and toxic exposures
- to identify violations of the laws on the public health security of the population, institute legal proceedings, and enforce appropriate penalties;

To achieve these goals and objectives the State Hygiene and Anti-Epidemiological Surveillance Inspectorate, inter alia, performs the following functions:

- monitors compliance with sanitary rules and norms, hygiene standards and anti-epidemic measures by legal and natural persons (other than food safety system requirements), through inspections, investigations, and studies based on technical analysis, as well as by receiving documents required from entities implementing economic activities in the territory of Armenia, in order to detect and prevent violations of the laws of Armenia, as well as to conduct sanitary and anti-epidemic activities;
- identifies violations of the laws on the public health security of the population of Armenia, and enforces appropriate penalties;
- studies environmental impacts on human health;
- organizes hygienic, anti-epidemic and prophylactic measures, and participates in the development of proposals to prevent communicable and non-communicable diseases and toxic exposures
- enforcement of appropriate penalty measures (enforcement) in case of violation of the laws on ensuring sanitary and epidemiological security of the population of the Republic of Armenia in accordance with the legislation of the Republic of Armenia;
- carries out situational analysis and evaluation in the field of public health security;
- organizes socio-hygienic monitoring of the environmental impact on human health, and the analysis and evaluation of the results;
- organizes the sampling of water and other products and substances for hygienic expertise and laboratory testing;
- decides on the temporary suspension of the operation of water management facilities, and allied structures and, processes until the violations of public health rules, regulations, standards and regimes have been eliminated;
- temporarily prohibits the application of chemical substances, means and methods to water for drinking, economic, industrial and technical needs, in case a danger has occurred to human health because of their impact;
- temporarily suspends the use of water for drinking, municipal, economic, industrial and technical needs if the water quality does not comply with sanitary-hygiene safety requirements;
- implements legal proceeding according to the Code of Administrative Offences of Armenia.

The scope and objectives of the “National Center for Disease Control and Prevention” SNCO in the context of ensuring the sanitary and anti-epidemiological security of population and in the sector of public health are:

- 1) implementation of integrated measures to prevent communicable and non-communicable diseases
- 2) implementation of sanitary and anti-epidemiological measures to prevent communicable and non-communicable mass diseases and toxic exposures ;

- 3) implementation of measures to ensure the mass immunization of the population, implementation and coordination of activities, within its jurisdiction, prescribed by the National Immunization Programme;
- 4) carrying out disinfection, rodent extermination and disinfestation in the foci of infectious and parasitic diseases to prevent the emergence and spread of diseases;
- 7) ensuring preparedness and response to epidemics, disease outbreaks, toxic exposures and other situations threatening the safety of public health (including ensuring the provision of reserve supplies, the formation and training of a rapid response team, the provision of transport and other material resources, and preparatory training);
- 8) carrying out professional observations in the field of sanitary-epidemiological security, situational analysis and evaluation;
- 9) carrying out observations, analysis and research on the prevalence of infectious and non-infectious diseases, their epidemiology and risk factors, and the identification of risk groups;
- 11) carrying out observations, analysis and research on measures to ensure occupational hygiene and the protection of workers' health;
- 12) coordination of the activities of the public health laboratory network in compliance with the requirements of international health regulations, and carrying out the functions of the reference laboratory within its jurisdiction;
- 13) providing sanitary and hygienic expertise, carrying out laboratory research on environmental factors, and publication of the findings;
- 15) social and hygienic monitoring of the impact of environmental factors on health, and the analysis and evaluation of results;
- 16) implementation of programmes to promote public knowledge about medical, sanitary and epidemiological safety, and healthy lifestyles, and educating specific population groups;
- 20) implementation of scientific and medical research.

The Ministry of Finance is responsible for organizing and implementing the financial and management audits of government agencies and departments, state non-profit organizations, and commercial companies with state participation. It supervises the water and environmental sectors, coordinates the loans and grants received from international donor organizations, and oversees the implementation of projects financed from the loans.

The Ministry of Emergency Situations, through the Rescue Service of Armenia, is responsible for civil defense and emergency situations, including water-related disasters: floods, torrents and flash floods, etc. It implements the prevention, reduction and elimination of possible effects of emergencies, and the civil defense and protection of the population and public facilities during emergencies.

The Armenian State Hydrometeorological and Monitoring Service of the Ministry of Emergency Situations is the statutory body that monitors the volume of surface waters, within the framework of the hydrometeorological services in the country.

Currently, this service has 7 hydrological stations and 92 observation points. Due to limited resources, the monitoring covers only the water level, consumption, water and air temperature and precipitation. After collecting the hydrological data from all observation points the Headquarters of the Armenian State Hydrometeorological and Monitoring Service in Yerevan publishes annual hydrological reports.

The Ministry of Energy and Natural Resources develops and implements energy policy and strategy, including for the hydropower industry.

The Zoology and Hydroecology Research Center of the National Academy of Sciences of Armenia is involved in scientific studies of fish breeding and ichthyology, including issues concerning shellfish.

D. Detailed analysis under twenty target areas

Target Area I

Article 6, 2(a)

Quality of the drinking water supplied

Article 6, paragraph 2 (a), of the Protocol requires the setting of targets and target dates regarding the quality of the drinking water supplied, taking into account the WHO Guidelines for Drinking-water Quality.

I. EXISTING FRAMEWORKS

A. Strategies, legal / regulatory framework and international commitments

The general requirements for ensuring the public health security of the population of Armenia in the water supply and water use sector are set out in the Water Code and the Land Code of Armenia, in the Law "Ensuring Sanitary-Epidemiologic Security of the Population of Armenia", in other laws of Armenia, in government decisions and in a number of inter-agency legal acts.

Water Code

Land Code

Law "On Ensuring the Sanitary and Epidemiological Security of the Population of Armenia

Government Decision No. 96 of 2 February 2002; Government Decision No. 26 of 14 January 2002

Government Decision No. 1147-N of 28 July 2005 "On regulations for establishing water standards"

The sanitary regulations and hygienic standards in accordance with the Law of Armenia "On Legal Acts" are considered departmental regulations and applied in accordance with the procedures established by this law.

- No. 2-III-A2-2 Sanitary Rules and Regulations (registered on 28 December 2002) on sanitary protection zones for household drinking water, water supply and water sources, which define the sanitary-hygiene and anti-epidemiological requirements for the establishment and operation of sanitary protection zones for household drinking water supply and water supply sources.
- Drinking water. Requirements imposed on drinking water quality for centralized systems. Quality control Sanitary Rules No. N2-III-A2-1 (registered on 28 December 2002), that defines the hygienic requirements for drinking water quality, as well as for drinking water produced and supplied to human settlements through water supply systems.

B. Institutional frameworks

Responsible agencies:

- Ministry of Health of the Republic of Armenia

II. ENVIRONMENTAL SITUATION – THE CURRENT STATUS AND PROSPECTS

A. Monitoring programmes and indicators

Drinking water quality

The quality of drinking water is monitored in accordance with the procedure established by sanitary rules and norms, particularly, production control and state hygiene and epidemiological surveillance should be carried out for drinking water quality

The quality of drinking water supplied is monitored by the company operating the water supply system.

The number of drinking water samples and the frequency of sampling at water abstraction locations for laboratory analysis shall be in accordance with the following requirements:

Table 5. Requirements for defining the number of drinking water samples and the frequency of sampling at water abstraction locations for laboratory analysis

Types of parameters	The number of samples per year, not less than	
	For underground sources	For surface water sources
Bacteriological	4 (according to the seasons)	12 (monthly)
Parasitological	not conducted	-/-
Organoleptic	4 (according to the seasons)	12 (monthly)
Generalized parameters	-/-	-/-
Inorganic and organic substances	1	4 (according to the seasons of the year)
Radiological	1	1

Table 6. Chemical parameters

Substance	Maximum permissible concentration, mg/l	Detected deviations, %, 2012
Fluoride	1.2-1.5	0
Nitrate and nitrite	45	0.47
Arsenic	0.05	0

Lead	0.03	0
Iron	0.3	0.51
Additional physico-chemical parameter 1: residual chlorine free	0.3-0.5	22.9
Additional physico-chemical parameter 2: Chlorid's	350	0.05
Additional physico-chemical parameter 3: Sulfat's	500	0.12
Additional physico-chemical parameter 4: Total hardness	7.0	1.1
Additional physico-chemical parameter 5: Ammonia	3.0	2.04

Table 7. Microbiological parameters

	Maximum permissible concentration	Detected deviations, %, 2012
E. coli	Should not be present	2012 - 70 522 samples, from which 13730 (19.5%) did not meet the standards
Enterococci	Not established	

Table 8. Drinking water microbiological and parasitological parameters

Parameter	Units of measurement	Norms
Thermotolerant coliform bacteria 1/	Bacteria quantity in 100 ml	Absence
Total coliform bacteria 2/	Bacteria quantity in 100 ml	Absence
Bacteria total amount 2/	Content of colony-forming bacteria in 1 ml	Not more than 50
Coliphages 3/	Content of shield-forming units in 100 ml	Absence
Sulphite-reducing clostridia spores 4/	Content of spores in 20 ml	Absence
Lambliа cysts 3/	Content of cysts in 50 ml	Absence

1) Triple investigation is carried out for the analysis of 100 ml water sample

2) Norms exceeding is not allowed in 95% of samples taken from exterior and interior distributing points of water-supply system during 12 months, in case of analysis of not less that 100 samples, during one year.

3) Analysis is carried out only in water-supply systems fed by surface water sources, before entering the water-distribution system

4) Analysis is carried out for evaluation of technological effectiveness of water treatment

The types of parameters to be determined and the number of drinking water samples to be analysed, before entering the distribution network, are set out in Table 9.

Table 9. The requirements for the types of parameters to be determined and the number of samples to be analysed, before entering the distribution network

Types of parameters	The number of samples per year, not less than				
	For underground sources			For surface water source	
	Population provided with water from the given water supply system, thousand people				
	up to 20	20-100	more than 100	up to 100	more than 100
Bacteriological	50 ^{1/}	150 ^{2/}	365 ^{3/}	365 ^{3/}	365 ^{3/}
Parasitological	not conducted			12 ^{4/}	12 ^{4/}
Organoleptic	50 ^{1/}	150 ^{2/}	365 ^{3/}	365 ^{3/}	365 ^{3/}
Generalized parameters	4 ^{4/}	6 ^{5/}	12 ^{6/}	12 ^{6/}	24 ^{7/}
Inorganic and organic substance	1	1	1	4 ^{4/}	12 ^{6/}
water preparation technology-related parameters	Residual chlorine. residual ozone not less than once an hour, other reagents not less than once during the shift				
Radiological	1	1	1	1	1

- The following frequency of water sampling is accepted:
1/once a week, 2/thrice a week, 3/ every day, 4/once during the seasons of the year, 5/ once every 2 months, 6/once a month, 7/twice a month.
- If the water from a system, fed by underground sources, which provides water for up to 20,000 people, is not treated, analyses for microbiological and organoleptic parameters are carried out not less than once a month.
- During the mud flows/torrents and emergencies it is necessary to define an enhanced inspection regime of drinking water quality.

Monitoring drinking water for bacteriological and organoleptic parameters in the water distribution network is carried out in accordance with the following frequency:

Table 10. The frequency of determination of microbiological and organoleptic parameters in the water distribution network during monitoring the production of drinking water

Serviced population, thousand people	Number of samples per month
up to 10	2
10-20	10
20-50	30
50-100	100
more than 100	100+1 sample, for every 5,000 people, if population is more than 100,000

The number of samples does not include any control samples required, to be taken from the network after repairs or other maintenance work.

Water from a supply network is sampled from water distribution facilities on streets, located in the highest and the dead-end segments, as well as from all other internal water supply systems of all buildings, which have injection and local water pumping tanks.

Monitoring the quality of drinking water during production is carried out by the laboratories of the companies operating the water systems or by laboratories of other organizations accredited to carry out drinking water quality analysis on a contract basis. Water sampling for analysis and laboratory investigations of water quality are carried out in accordance with methods established by Government standards.

B. Main issues related to the target area

Conclusion

In recent years, overall, significant improvements have been reported in terms of drinking water access, security and continuity of supply. However, in some areas the duration of water supply is still limited and characterized by significant geographical disparities. Ensuring the quality and security of the water supplied is a serious problem in rural communities.

- To prevent, control and reduce water-related diseases, it is necessary to continue the appropriate management, use and conservation of water resources and water systems by improving access to drinking water for all, particularly for rural areas and children's organizations, by ensuring the sustainable use of water resources, by ensuring the required water quality for human health and hygiene, and by the maintenance of aquatic ecosystems.

IV. EXPERT EVALUATION

Suggestions

1. Improve the quality and safety of water supplies, especially in rural areas through upgrading water supply systems and implementing quality assurance measures.
2. Pursue the development and implementation of “Water Safety Plans” by the water supply companies in compliance with WHO and EU recommendations.
3. Develop and introduce model parameters for water quality monitoring in accordance with the WHO recommendations developed within the framework of the Protocol on Water and Health and taking into account the specific situation in Armenia.

Target Area II

Article 6, 2 (b)

Reduction of the scale of outbreaks and incidents of water-related diseases

Article 6, paragraph 2 (b), of the Protocol requires the setting of targets and target dates related to the reduction of the scale of outbreaks and incidents of water-related disease.

I. EXISTING FRAMEWORKS

A. Strategies, legal / regulatory framework and international commitments

- Law "On Ensuring the Sanitary and Epidemiological Security of the Population of Armenia"
- Law "On Medical Care of the population"
- Government Decision No 1286 of 27 December 2001 "On Approval of the List of Diseases Dangerous for the Surroundings "

The list includes all kinds of infectious diseases transmitted by water: intestinal infectious diseases (all forms), viral hepatitises, tularemia, etc. The number of people to be treated is included in the state order approved for each year with regard to infectious diseases.

- Government Resolution No. 1913 –N of 29 December 2011 "On approval of the Strategic Plan for 2012 -2016 on preventing and combating infectious diseases in Armenia and its implementation"

The plan aims at reducing the burden of infectious diseases in Armenia. As an instrument of national significance, this strategic plan is a tool which will assist in maintaining the health of the population of Armenia, strengthening achievements in terms of infectious diseases, solving problems as far as possible through the prevention and control of infectious diseases, and ensuring long-term progress in the field of epidemiological surveillance and response to infectious diseases in collaboration with other ongoing programmes.

By the Government Decision No. 1285-N of 10 October 2012 "On making amendments and changes to the Government Decision No. 46-N of 14 January 2010", a new national vaccination calendar was approved, according to which vaccination against rotavirus was introduced from November 2012. The coverage of the vaccinated children was 90% as of 20 December 2012.

Towards the implementation of International Health Regulations:

Government Decision No. 1138-N of 26 August 2010 "On Approval of Mechanisms for Cooperation of the National Coordinating Body on International Health Regulations and Other Interested Agencies and Approval of Coordination

Procedures" which regulates the information exchange and cooperation issues related to public health emergencies, including water-related infectious diseases.

Order No. 26-N of 29 November 2010 of the Minister of Health “On Approval of Standard Procedures for Notifying the Body Responsible for the Implementation of the Public Health Rules (health care) when Reporting a Public Health Emergency Related to Biological, Chemical and Radiological Factors”.

Joint Order of the Minister of Health and the Chairman of the State Committee of Water Economy of the Ministry of Territorial Administration of Armenia (MoH Order No. 24-N of 6 December 2011 and MTA SCWE Order No. 163-N of 12 December 2011) “The standard procedures for cooperation between the Ministry of Health and the State Committee of Water Economy of the Ministry of Territorial Administration in case of emerging public health problems related to reported waterborne infectious diseases in a community”.

B. Institutional Framework

Responsible agencies

According to Government Decision No. 1300-N of 15 August 2002 “On creating a state administrative institution of “Administration of the Ministry of Health of the Republic of Armenia”, approving the charter and structure of the Ministry of Health of the Republic of Armenia”, ensuring the public health security of the population is one of its goals and objectives. The Ministry is also responsible for the development of public policy and targeted programmes aimed at public health security, monitoring their implementation and drafting laws and other legal acts. The Government Decision No. 857 of 25 July 2013 and Decision No. 1134-N of 17 October 2013 defined the scope and objectives of activities relating to the public health security of the population, to be carried out by the State Health Inspectorate and the “National Center for Disease Control and Prevention” State Non-Commercial Organisation (SNCO) under the Ministry of Health.

Main issues related to the target area

Table 11. Incidence of water outbreaks

	<i>Incidence</i>		<i>Number of outbreaks</i>	
	<i>Baseline</i>	<i>Current value</i>	<i>Baseline</i>	<i>Current value</i>
Cholera	0 (2010) 0 (2011) 0 (2012)	0 (2013 Jan-Feb)	0 (2010) 0 (2011) 0 (2012)	0 (2013 Jan-Feb)
Bacillary dysentery (shigellosis)	<i>All cases</i> 1241 (2010) 1041 (2011) 733 (2012)	84 (2013 Jan-Feb)	1 <i>outbreak with 8 cases and</i> 1 <i>outbreak with 76 cases</i> (2010) 0 (2011) 0 (2012)	0 (2013 Jan-Feb)

EHEC^a	No monitoring in 2010 11(2011) 15 (2012)	3 (2013 Jan-Feb)	0 (2010) 0 (2011) 0 (2012)	0 (2013 Jan-Feb)
Viral hepatitis A	379 (2010) 143 (2011) 98 (2012)	100 (2013 Jan-Feb)	0 (2010) 0 (2011) 0 (2012)	0 (2012 Jan-Feb)
Typhoid fever	0 (2010) 0 (2011) 0 (2012)	0 (2013 Jan-Feb)	0 (2010) 0 (2011) 0 (2012)	0 (2013 Jan-Feb)

Conclusion: The local outbreaks in Armenia occur from time to time, but do not turn into an epidemic. Mainly water-related and food-related intestinal infections are being recorded (mainly accidents occurring occasionally in the water and sewerage networks).

IV. EXPERT EVALUATION

Suggestions

1. Strengthen the system of monitoring of and response to emergencies causing water-borne diseases or outbreaks and their threat, and the epidemiological surveillance and response capacity and efficiency in accordance with Government Resolution No. 1913 –N of 29 December 2011 “On Approval of the Strategic Plan and the List of Measures for 2012 -2016 on Preventing and Combating Infectious Diseases in Armenia”.
2. Participate in the events organized in this field by the WHO and the Protocol on Water and Health.

Target Area III
Article 6, 2 (c)
Access to drinking water

Target area III of the Protocol sets targets and target dates on the access to drinking water.

1. EXISTING FRAMEWORKS

A. Strategies, legal / regulatory framework

- The objectives of the Water Code of the Republic of Armenia
- The Law of the Republic of Armenia ‘‘On National Water Programme’’

Activities under the Law of the Republic of Armenia ‘‘On National Water Programme’’ are based on the scarcity of water, the consideration of water as one of the main means supporting human life and health, fauna and flora, as well on the requirements for ensuring access to water.

B. Institutional frameworks

The management of water resources is implemented through the following bodies:

- National Water Council
- Dispute Resolution Commission
- Water Resources Management and Protection Body

Financial assistance in relation to water

Financial assistance may be provided in relation to water in the form of subsidies or tax privileges established by legislation, depending on the specific form of financial assistance enshrined in the National Water Programme.

By approving the Government’s annual budget, the National Assembly shall approve the amount of subsidies allocated to water suppliers and water users from the state budget, or tax privileges established by legislation.

2. WATER ACCESSIBILITY AND AFFORDABILITY

Water management policy issues are closely linked to the affordability of water. Access to water and sanitation is a fundamental human right essential for life, health and dignity, recognized by the UN General Assembly and Human Rights Council in 2010. During the Soviet Union era no one was concerned about the problem of access to water supply services, because the price of water supplied to the population was insignificant.

For this reason, with a planned economy and subsidized water sector, charges for water fees had no impact on the family budget. People started to think about this problem from the early 1990s in connection with the transition to a market economy after the collapse of the Soviet Union.

Water supply is commercially affordable, if consumers can pay for this service without a significant reduction of other living costs. One of the main factors in the effective functioning of the drinking water supply sector is a proper tariff policy.

Table 12 presents the water supply tariffs applied by the five companies in Armenia.

Table 12. The tariffs for drinking water in 2010 (AMD/m³)

		Of which for water supply	As % of the total
Yerevan Djur	174.065	161.88	93.0
Armenian Water and Sewerage	179.78	154.47	85.9
Lori Water and Sewerage	180.98	146.62	81.01
Shirak Water and Sewerage	172.21	146.3	84.37
Nor Akunk Water and Sewerage	202.63	184.02	90.82

The liberalization of prices and tariffs during market reforms led to a significant increase in the price of public utilities, which has had a severe impact on the budget of some strata of the population.

Tariffs for services provided through the centralized water supply system are determined by the Public Services Regulatory Commission of Armenia in accordance with the law. Accounting for centralized water supply is carried out by water meters or some other accounting procedures, taking into account the desirability of promoting the installation of water meters.

The coverage by water meters was 1.5% in 2001, 5% in 2002, 45% in 2003, 57% in 2004, 65% in 2005, 68.8% in 2006, 72.4% in 2007, 75% in 2008, 83.9% in 2009, 86.7% in 2010, 86.9% in 2011 and 87.1% in 2012.

For the residents of apartment buildings without water meters a fee for 200 liters per person per day is charged (in Yerevan for 250 litres), and for residents of individual houses a fee for 100 liters per day (in Yerevan for 150 litres).

Table 13 lists the number of water meters installed as of 2012.

Table 13. Water meters installed in the areas covered by the drinking water supply companies

N	Name of organization	Number of customers,	Number of customers with water meters	Installation Percentage (%)
1	Yerevan Djur CJSC	351,935	329,089	93.5
2	Armenian Water and Sewerage CJSC	285,579	213,970	74.9

3	Nor Akunk Water and Sewerage CJSC	17,916	17,700	98.8
4	Lori Water and Sewerage CJSC	39,910	37,548	94.1
5	Shirak Water and Sewerage CJSC	55,601	40,152	72.2
Total		750,941	638,459	85.0

The local authorities or water company charge for community drinking water supplies at the tariffs determined by the Public Services Regulatory Commission, taking into account the costs of maintenance and further development of the system as well as the number of customers.

The company contracted to provide alternative drinking water supplies distributes drinking water to consumers, records the quantity supplied, and charges customers at the tariffs determined by the Community Council.

The internationally accepted amounts of water needed to meet each component of basic human needs are (in litres/person/day): drinking 3-5, hygiene 10-15, sanitary-hygiene 10-20, and cooking 10-15.

Armenia acceded to the UN Millennium Declaration in 2000 and assumed a commitment to implement the Millennium Development Goals (MDGs). Global targets and indicators were adapted to local conditions by the Government of Armenia in 2005. MDG 7 concerning environmental protection includes indicators related to access to drinking water and sanitation (Annex 2). During the MDGs adaptation process in Armenia new indicators were added to Target 10: daily water supply in small and medium-sized cities⁷: see Table 14.

Table 14. MDG 7, Target 10. Increase access to safe drinking water

Indicators	Year					Target value in 2015
	1999	2004	2005	2006	2007	
Average daily duration of centralized water supply in urban (non-Yerevan) households, hours	...	7,3	7,4	7,5	8,9	>16
Proportion of population without access to safe drinking water in rural areas,%*	30,9	18,7	18,4	12,5	9,8	<5
Proportion of rural population using transported water to the total number of rural water users, %**	17.8	9.0	10.6	3.6	4.1	<1

⁷Armenia- Milenium development Goals: National Progress Report 2005-2009. Available at http://www.un.am/res/UN%20RC%20Annual%20Reports,%20UNDAFs,%20MDGs/MDG%202nd%20report_eng.pdf

*The proportion of rural households which are not connected to the centralized water supply and own water supply systems are considered as the population without access to safe drinking water

** The proportion of rural households to which drinking water provided by vendors is considered as the population using transported water relative to the total number of water users.

Source: Government of Armenia/ UN Country Team in Armenia 2010. Armenia, National Progress Report on the Millennium Development Goals: 2005-2009

The data of National Statistical Service (NSS) of Armenia on access to sanitation under Target 10 are presented in Appendix 3.

According to WHO and UNICEF Joint Monitoring Program (JMP) data, in 2011 100% of the urban population of Armenia had access to an improved water supply while for the rural population this figure stood at 98%, results in 99% coverage for the total population (Table 15).

Table 15. JMP – estimated trends of drinking water coverage

ARMENIA	Drinking water coverage estimates					
	Urban (%)		Rural (%)		Total (%)	
	1990	2011	1990	2011	1990	2011
Piped onto premises	95	98	52	91	81	96
Other improved source	3	2		7		3
Other unimproved	2	0		2		1
Surface water	0	0		0		0

Source: WHO/UNICEF JMP, 2013

Surveys of the drinking water availability among residents of Yerevan in 2012 showed that the main problems were: interruptions to the water supply schedule (23.7% of the population), low or high pressure in the pipes (12.8%), emergency situations (8.2%), poor conditions of the pipes (2.3%), the quality and taste of the water (2%), and dissatisfaction with the water tariff (approximately 60%).

Although Armenia is rich in high-quality underground water sources, at present more than 200,000 people in 250 cities and rural areas use surface water, including from mountain rivers: over 160,000 people in 7 urban settlements (Kapan, Kajaran, Artik, Meghri, Berd, Dilijan, Vanadzor), while 23 rural settlements are supplied with water from 16 water treatment plants.

The main sources for the drinking water provided by treatment plants are the upper reaches of mountain rivers, and rivers whose waters are relatively clean in terms of microbiological parameters and not contaminated with household or industrial wastewater, agricultural fertilizers and pesticides.

However, almost all treatment plants built during the Soviet period currently face difficulties due to poor management. As a result, the population is provided with poor quality drinking water. The water treatment processes have been disrupted and it is thus impossible to provide drinking water which complies with quality standards. The low hygienic and socio-economic levels of the lives of the people in these regions are largely associated with water deficit and the unsatisfactory quality of water.

At present, part of the headwater structures of the water supply and daily regulation reservoirs operated by water companies are in a bad state. Furthermore, the quality of the water in mountain rivers varies greatly: during the dry season the turbidity of water may be reduced to a few mg/l, while during floods it may rise to 1,000 mg/l. Under these conditions it is very difficult, and in some cases even impossible, to ensure the required level of treatment and uninterrupted supply of water using the existing technologies and structures.

Drinking water is less available in rural areas. Although in recent years the water supply system has improved, the supply is insufficient for small and medium towns. There are also dozens of remote villages and resorts in the country, where water for drinking and domestic purposes is taken immediately from the upper reaches of rivers without any treatment.

There are five operators, which manage the centralized water supply and sanitation works. There are also 560 communities, mainly in rural areas, which have their own water and sanitation services. The water supply in rural communities is less available due to insufficiency of technical, human and financial resources. Limited attention is paid to the problems of these communities, and these communities are often left out of the programmes under implementation. Information about the current situation in these communities is limited.

There are settlements that do not have their own sources of water and fetch water from the main channels located at great distances or in which water is supplied 2-3 times daily; in some areas people have to fetch the water themselves. Water supply is also a significant problem for educational facilities in rural areas, because they rely on scarce state funds for the operation and maintenance of the infrastructure.

According to the data provided by the Ministry of Education and Science, the number of public schools in 2011 was 1441 (Table 16), which provided education for 386,400 children.⁸ Of these, 868 schools are in rural communities (Table 17). Despite the existence of data on water supply and sanitation, these often do not reflect the reality. In many schools, especially in rural areas, the drinking water and sanitation system often is available (Table 18), but it does not operate because the village itself lacks this system. Children are not able to wash their hands before eating and after using the toilets.

Table 16. The total number of educational institutions in Armenia, according to the main secondary school programmes in the 2011-2012 school year

Province	Educational institutions, according to the main secondary school programmes								
	Secondary		Specialized		Special		Total		
	state	non state	state	non state	state	non state	state	non state	Total

⁸ www.armstat.am

Yerevan	200	35		6	1	13	219	36	255
Aragatsotn	121		1		1		123	0	123
Ararat	112						112	0	112
Armavir	119	2			2		121	2	123
Gegharkunik	126				1		127	0	127
Lori	162	1	2		3		167	1	168
Kotayk	102	1	1		1		104	1	105
Shirak	166	3	2	1	2		170	4	174
Syunik	117			0	4		121	0	121
Vayots Dzor	51	1		0	0		51	1	52
Tavush	81			0	0		81	0	81
Total	1357	43	12	2	27	0	1396	45	1441

Table 17. The number of secondary educational institutions in urban and rural areas of Armenia by provinces in the 2011-2012 school year

Province	Total			In urban areas			In rural areas		
	total	state	non state	total	state	non state	total	state	non state
Yerevan	255	219	36	255	219	36	0	0	
Aragatsotn	123	123	0	14	14		109	109	
Ararat	112	112	0	21	21		91	91	
Armavir	123	121	2	28	26	2	95	95	
Gegharkunik	127	127	0	27	27		100	100	
Lori	168	167	1	65	64	1	103	103	
Kotayk	105	104	1	39	39		66	65	1
Shirak	174	170	4	59	55	4	115	115	
Syunik	121	121	0	36	36		85	85	
Vayots Dzor	52	51	1	11	10	1	41	41	
Tavush	81	81	0	18	18		63	63	
Total	1441	1396	45	573	529	44	868	867	1

Table 18. The number of secondary educational institutions in Armenia by the state of buildings and facilities (infrastructure) in the 2011-2012 school year

Province	School conditions							
	building condition			water supply		sanitation		
	adequate	needs capital repair	needs current repair	available	lacking	centralized	individual	lacking
Yerevan	123	111	21	255	0	245	10	0
Aragatsotn	37	54	32	103	20	28	89	6
Ararat	35	59	18	102	10	48	38	26
Armavir	50	54	19	109	14	51	72	0

Gegharkunik	30	75	22	99	28	37	48	42
Lori	75	51	42	154	14	82	65	21
Kotayk	46	46	13	102	3	72	29	4
Shirak	78	50	46	150	24	96	51	27
Syunik	44	49	28	105	16	57	44	20
Vayots Dzor	33	14	5	48	4	24	26	2
Tavush	35	25	21	73	8	32	23	26
Total	586	588	267	1300	141	772	495	174

3. RELEVANT ONGOING AND PLANNED ACTIVITIES TO ADDRESS THE MAIN ISSUES

- It is impossible to consider water systems management issues without the creation of a legal framework for the management of these systems. While significant work has been done the legal basis for the management of water resources is still incomplete, and some problems requiring urgent solutions still obstruct the creation of such a legal framework.
- So far, a law “On Drinking Water” has not yet been drafted.
- The problems of implementing an effective tariff policy are associated with the fact that the existing tariffs are set at a unified price for 1 cubic meter of water consumed and do not include variable rates. It means that differences in the consumption of water by users in different regions and of different economic and social circumstances (such as affordability and purchasing power), and differences in trends in economic development are not taken into account.

4. EXPERT EVALUATION

- With a view to solving problems related to tariff policy, it is necessary to observe the main principles of price determination: economic efficiency, social equity, financial and environmental requirements.
- In the near future it is necessary to draft a law on drinking water, which will define the principles of government policy, and the regulatory and monitoring mechanisms thereof, in this sector, as well as ensure the supply of water of the necessary quantity, quality, and duration, for the well-being of present and future generations. It is necessary to transfer the water supply network inside apartment buildings to the water supply companies, which would allow them to solve the drinking water supply problems of those apartment buildings which have remained unsolved for many years.
- It is necessary to upgrade the level of equipment and training of water supply services and apply modern technologies in the rehabilitation and construction of water supply systems.
- It is necessary to assess the situation regarding the water supply in 560 villages.
- It is necessary to assess the situation in the educational institutions, particularly schools, with regard to water supply.

Target Area IV
Article 6, 2 (d)
Access to sanitation

Article 6, paragraph 2 (d), requires the setting of targets and target dates related to the area of territory, or the population sizes or proportions, which should be served by collective systems of sanitation or where sanitation by other means should be improved.

I. EXISTING FRAMEWORKS

A. Legislative field

The main legal acts of the Republic of Armenia regulating the field of sanitation are:

- Water Code of the Republic of Armenia
- Government Decision No. 130-N of January 22, 2004 “On approval of the procedures for defining the rules for drinking water supply and sanitation, of model forms of contracts for water supply and sanitation, and of the technical requirements for connection to water supply and sanitation systems, and repealing of Government Decision No. 149 of March 13, 1999.”
- Government Decision No. 1228-N of 28 August 2003 “On Defining the Rules for the Use of Sanitation Systems and Wastewater Treatment”

B. Institutional frameworks

The authorities responsible for the implementation of sanitation matters are:

- The Ministry of Nature Protection
- The State Committee of Water Economy of the Ministry of Territorial Administration
- The Ministry of Health
- The Public Services Regulatory Commission
- The Ministry of Finance

Centralized drinking water supply and sanitation is provided by five companies as shown in Table 19 specialized in water supply and sanitation services, operating on private-public partnerships.

Table 19. Settlements (by type) and population served by water supply and sanitation companies

Name of company	Settlements in the service area		Population
	Urban	Rural	

“Yerevan Djur” CJSC	2	31	1,244,230
“Armenian Water and Sewerage” CJSC	37	268	789,950
“Lori Water and Sewerage” CJSC	1	16	136,500
“Shirak Water and Sewerage” CJSC	2	34	188,970
“Nor Akunk Water and Sewerage” CJSC	2	10	73,430
Total	44	359	2,433,080

II. CURRENT SITUATION AND PROSPECTS

During the adaptation of the global Millennium Development Goals targets and indicators to local conditions, a new indicator was added by the Government of Armenia to Target 9: the number of cities serviced by wastewater treatment plants.

The data of National Statistical Service (NSS) of Armenia on access to sanitation, for Target 10, are presented in Annex 2.

According to WHO and UNICEF JMP data in 2011, sanitation services were available to 96% of the urban population and 81% of the rural population, bringing the total coverage to 90%⁹ (Table 20).

Table 20. JMP – estimated trends of sanitation coverage

ARMENIA	Sanitation coverage estimates					
	Urban (%)		Rural (%)		Total (%)	
	1990	2011	1990	2011	1990	2011
Improved facilities	95	96		81		90
Shared facilities	3	3		3		3
Other unimproved	2	1		16		7
Open defecation	0	0		0		0

Source: WHO/UNICEF JMP, 2013

All urban communities and some large rural communities have centralized sanitation systems.

Overall, there are about 620 km of main sewers and some 3200 km of sanitation networks in Armenia. In bigger cities (where 60-65% of the population live) the coverage of centralized sanitation systems is : Yerevan 96%, Gyumri 50%, Vanadzor 70%, Sisian

⁹ http://www.wssinfo.org/documents-links/documents/?tx_displaycontroller%5Btype%5D=country_files

41%, Ashtarak 100%, Alaverdi 37%, Ararat 38%, Artashat 55%, Vagharshapat 62%, Gavar 49%, Vardenis 48%, and Sevan 58%.

The majority of rural communities of Armenia have no access to centralized sanitation systems. Some 75% of rural households are not provided with main water supply and sanitation facilities. There are 560 rural communities in the country, which are not served by water and sanitation companies. Water is supplied from traditional local sources, which are managed by the community or the residents themselves. In order to resolve this issue, it is planned to carry out studies in these communities to assess the existing facilities and the costs involved, and make recommendations for their future management; the support of the German Kreditanstalt für Wiederaufbau (KfW) is envisaged for this activity.

The existing centralized sanitation systems are often poorly maintained or do not function any longer. No investments for the proper operation and maintenance of the sanitation systems have been made for more than 20 years (except for the elimination of accidents in a few large cities), and the systems have slowly broken down. The lack of wastewater treatment plants (of the previous 22 wastewater treatment plants only the "Aeratsia" plant and three newly built plants operate, which only carry out mechanical treatment), has become the reason for many human settlements to become major environmental polluters. Domestic sewage and industrial effluent in some cities flow into the surface water facilities, polluting the water resources and degrading aquatic and terrestrial ecosystems.

The educational institutions in rural communities are in a very sad state. Very often centralized sanitation systems are lacking in educational institutions (see Table 18).

In rural areas which have no centralized sanitation system, eco-san toilets could be applied as an alternative solution. A urine-diverting ecosan toilet is an alternative way to improve the sanitary and hygienic conditions of people, especially of children, and to protect the soil and ground water from the penetration of faeces. In almost all rural schools pupils use pit latrines located in a corner of the school yard. Such toilets are in poor condition, smelly and dirty, and do not provide privacy, because the doors either do not close or are missing. There is another danger, too, due to the toilets' slippery floors. In many schools there are no hand washing facilities either, and in some cases there is even no drinking water.¹⁰

Eco-san toilets have been constructed in different communities of Kotayk, Ararat, Lori, and other provinces by the NGOs "Armenian Women for Health and Healthy Environment" (AWHHE) and "Lore" eco club, either in the school building or for individual households.

Related gender issues: Women and girls suffer more from inadequate sanitation than men and boys. Surveys show that a lack of toilets is a main reason for girls not to attend

¹⁰ AWHHE

school. In addition to the aforementioned issues the use of an eco-san toilet inside a school has several other advantages, especially in cold climates, as girls benefit by reducing the risk of bladder infections and sexual harassment.

III. RELEVANT CURRENT AND PLANNED ACTIVITIES

Since independence, the former Soviet countries such as Armenia, have faced problems in providing adequate water supply and sanitation.

It should be noted that, although the reforms implemented in the water sector have greatly improved water supplies, they have not mainly affected sanitation and wastewater treatment. Therefore, in recent years the government has implemented a series of measures aimed at improving the sanitation systems and constructing wastewater treatment plants.

Within the framework of the environmental programme on the Lake Sevan basin, supported by the European Bank for Reconstruction and Development (EBRD), wastewater treatment plants in the cities of Gavar, Martuni and Vardenis of Gegharqunik province were built and put into operation in 2013, and 52 km of sewers and 794 drainage inspection pits were constructed and repaired in Gavar, Martuni, Vardenis, Sevan and Jermuk. It is planned to construct wastewater treatment plants in Dilijan and Jermuk, and put them into operation in 2015, with the financial support of the EBRD and the European Investment Bank (EIB), as well the co-financing of the Armenian Government. The French government has allocated funds for the reconstruction of the “Aeratsia” wastewater treatment plant in Yerevan.

Recently in Paraqar, a rural community not far from Yerevan, a new wastewater treatment system has been put into operation that will be able to treat small volumes of sewage, without big costs being required for construction.

Currently, an Organization for Economic Cooperation and Development (OECD)-funded study on sewerage systems and wastewater treatment plants is being carried out, which will result in the elaboration of principles for the development of this sector.

IV. EXPERT EVALUATION

The solution of problems in the sanitation sector is important to reduce and further prevent the leakage of untreated wastewater into the waters covered by the provisions of the Protocol on Water and Health.

The sanitation sector of Armenia is in extremely poor condition due to the country's economic and financial situation, as well as the issues mentioned above. One of the primary issues in terms of the safety and security of the drinking water supply is ensuring sanitation and wastewater treatment for human settlements located in the vicinity of water resources.

Overall, to ensure the development of a sanitation sector policy the following measures are to be implemented:

- determination of priorities;
- allocation and rational use of resources;
- choice of models of central or local sanitation systems (for example, ecosan), development of wastewater treatment plants, and construction of facilities for urban and rural communities located not far from each other;
- development of a tariff policy, which will provide access to sanitation, as well as the effective management and development of sanitation systems and wastewater treatment plants;
- assessment of the sanitation situation in 560 rural communities not covered by professional water utility companies;
- assessment of the sanitation situation in educational institutions, in particular schools.

Target Area V

Article 6, 2 (e), first part

Level of performance of collective and other systems for water supply

This part of the Protocol requires setting targets and target dates for the level of performance which can be achieved by collective systems and other systems for water supply, as well as for the reduction of water losses.

1 EXISTING FRAMEWORKS

Strategies, legal / regulatory framework

- Water Code of the Republic of Armenia
- RA Government Decision No. 130-N of January 22, 2004 “On approval of drinking water supply and sanitation rules, standard contract forms for water supply and sanitation, the procedures for determining the conditions for connection to water supply and sanitation systems, and repealing of Government Decision No. 149 of March 13, 1999”.

At present, much attention is paid to the process for achieving the efficient management, development and use of water resources, as laid out in the Law of 2006 on “National Water Programme”, where the mid-term (2015) and long-term (2020) goals are defined.

To promote the more efficient, effective and decentralized governance of water resources, six territorial divisions (Northern, Shirak, Ararat, Sevan, Hrazdan and Southern) were established within the Water Resources Management Agency.

In accordance with the Charter of the State Committee of Water Economy of the Government of Armenia, approved by the Decision No. H - 1400 of 5 September 2002, the management and use of state-owned water systems, as well as ensuring the implementation of the National Water Programme are considered the Goals and Objectives of the Committee.

Water sector development strategy in a generalized form can be viewed in three aspects: technical, economic and institutional. The technical strategy is aimed at equipping and modernizing the water systems which will allow the effective supply of water in the country's various human settlements. Some steps in this direction have already been taken, and much importance is attached to the implementation of the loan programme on community water supply and sanitation funded by the World Bank, and the credit programme supported by KfW and implemented in Armavir, Lori, Shirak regions, which will improve the water supply systems in many settlements selected by prioritization criteria, and allow the implementation of network zoning, the reduction of losses by leakage, etc.

The economic development of the sector will mainly depend on effective management, the introduction and improvement of an integrated accounting system, the necessary level of revenues, and possible reduction of expenses (particularly electricity costs).

One of the strategic approaches for institutional development is the involvement of the private sector in the management and operation of a state-owned company. This has been implemented for the first time by the Water and Sewerage CJSC whose activity over the past several years is already considered to be convincing.

Institutional frameworks

With the adoption of the Water Code of Armenia a new institutional system was introduced, in accordance with which the sector is managed by the following authorities:

1. The Ministry of Nature Protection with its Water Resources Management Agency implements the protection and management of water resources;
2. The State Committee of Water Economy of the Ministry of Territorial Administration implements the state management of water systems;
3. The Public Services Regulatory Commission sets tariffs for water services.

2. Level of performance of collective water supply and other systems

Currently, much attention is being paid to processes for achieving efficient management, development and use of water resources, contained in the 2006 Law “On National Water Programme”, which sets out medium (2015) and long-term (2020) goals.

The main issues hampering the activity of water companies for many years are: wear and tear of the water supply network, facilities and other fixed assets; the lack of an efficient water accounting system (water meters), the low level of fee collection for services provided, huge water losses, low prices for services, and the low level of operation of publicly-owned networks within apartment buildings which do not provide opportunities for the productive economic activities of the system.

Despite the numerous reforms in this sector, the norms for drinking water supply, quality examination, sanitary and hygienic requirements, filters, and the quality and use of materials that come into direct contact with drinking water during the supply process are still only partly addressed in Armenia.

The norms for drinking water quality imply adequate supervision and monitoring. Suppliers and users of drinking water should carry out the routine monitoring of water quality in accordance with the approved plans, which include monitoring the effectiveness of the treatment of the water supplied, especially the disinfection and quality of the drinking water. The list of the testing laboratories monitoring water quality, as well the parameters for analysis, shall be approved by the Government.

The operation of water supply systems, depending on local conditions, shall satisfy the demand for municipal and drinking water in residential and public buildings and organizations.

The drinking water in Armenia is supplied, mainly, by water supply companies through a centralized system.

The operation and maintenance of water supply systems require regular mandatory maintenance and rehabilitation, as well as emergency rehabilitation work.

As of 2011, the sewer networks have a total length of 5475 km of water mains and 6641.3 km of street network, of which 4184.8 km are in need of replacement. The interdistrict and interyard networks have a total length of 987.5 km, more than half of which need replacement, and the rest is in need of repair.

In recent years accidents to the water mains has become more frequent, especially as a result of landslides and irregular irrigation in areas where water pipes are installed. As a result, the population has been deprived of drinking water for a long time, even for days.

The physical facilities of the individual water companies comprise a number of structures of different types and quantity. Thus, the “Yerevan Djur” CJS Company's physical facilities include pumping stations located at 8 water sources, a 2645 km-long sewer network, 720 km of external water mains, 90 pipings, 29 wells, and 23 daily regulation reservoirs.

The “Water and Sewerage” CJS company's physical facilities include 12 drinking water treatment plants, 441 pipings, 78 deep wells, 42 major and 141 community pumping stations, 322 daily regulation reservoirs, 3848 km of water mains, and 4345 km of water supply network.

The water supply of the “Shirak Water and Sewerage” CJS Company’s physical facilities is carried out through the Ghazanchi, Zuygaghbyur, Krasar and Vardbakh water sources. The community network length is about 350 km and includes 9 daily regulation reservoirs, 78 intercommunity pumps and 5 chlorination stations.

The “Lori Water and Sewerage” CJS Company’s physical facilities include 77 pipings, 5 disinfection stations, 12 pumping stations, 1 treatment station for river water, 14 daily regulation reservoirs (of 23,500 cub. m total capacity), 176 km of water mains, 22 pumping stations and 285 km long water supply network.

The “Nor Akunq” CJS Company performs its activity through 1 piping, 14 deep wells, 14 main pumping stations, 8 daily regulation reservoirs and 5 water towers.

There are a lot of rural areas where the water is supplied through community efforts or community-based organizations.

The survey carried out in 2012 among the population served by the “Yerevan Djur” Company showed that 1% of subscribers had water for 4 hours daily; 1.5% had water for 4-6 hours; 2% had water for 6-8 hours; 15.2% had water for 8-12 hours; 17.3% had water for 12-20 hours; and 63% enjoyed water for 20-24 hours daily.

Table 21 presents the schedule of the drinking and municipal water supply (hours/day) by the five water companies during 2009-2012.

Table 21. The average duration of water supply by water companies in Armenia (hours)

Water supply company	Year			
	2009	2010	2011	2012
“Yerevan Djur” CJSC	20.4	21.9	22.9	23
“Armenian Water and Sewerage” CJSC	12.7	13.7	15	16
“Lori Water and Sewerage” CJSC	10.7		11	12.1
“Shirak Water and Sewerage” CJSC	9.2	10.4	11.9	13.7
“Nor Akunq Water and Sewerage” CJSC	22.3	22.4	22.4	22.4

The duration of drinking water supply is growing as a result of technical improvements in the water supply system, application of a private management system and implementation of a number of organizational and supervisory measures.

Among the major issues in water supply is the high rate of losses in water supply systems. These losses are classified into the following three main groups:

1. technical losses (accidents, system operation);
2. technological losses (washing of daily regulation reservoirs, production and transportation);
3. trading losses (illegal connections and water theft).

Solving these problems is very important for the future development of the sector, as well setting tariffs and increasing the financial viability of the systems.

3. RELEVANT ONGOING AND PLANNED ACTIVITIES TO ADDRESS THE MAIN ISSUES

The water losses in the five water companies currently range from 74% (Nor Akunq) to 84% (Yerevan Djur). These water losses are due to the system's technical condition, numerous accidents, illegal water connections, interfering with water meters, etc.

The rates of water losses are reflected in setting the tariffs, which range within seven different rates for the different companies, all of which contribute to high tariffs, high costs for transporting one cubic meter of water, and insufficient income.

One reason is that, due to the recent increase of pressure in the systems and longer water supply hours, the losses have increased as a result of the poor technical condition and wear and tear of the systems. The high losses are also influenced by the fact that the previous estimates were not realistic or accurate due to the incompleteness of the water accounting system.

Water is still supplied to a great extent through mechanical modes (pumping) in both the internal and external networks, which results in tremendous energy costs, and consequently, high service costs.

It is necessary to carry out specialized research in the areas for water intake structures, water mains, water sources and pumping stations in order to assess the possibilities for moving to gravity feeding, especially in the external network.

IV. EXPERT EVALUATION

For the period between 2014 and 2020 the five water companies are required:

- to drastically reduce the water losses from 84% to 40%;
- to completely eliminate illegal connections;
- to provide 24-hour service for 90-95% of the population in 2020 by increasing annually the uninterrupted water supply by about 2%.

Target Area VI

Article 6, 2 (e)

Level of performance of collective and other systems for sanitation

Article 6, paragraph 2 (e), of the Protocol requires the setting of targets and target dates related to the levels of performance to be achieved by collective systems and by other means of water supply and sanitation.

I. EXISTING FRAMEWORKS

A. Legislative field

The main legal acts of Armenia regulating the field of sanitation are:

- Water Code of the Republic of Armenia
- Government Decision No. 130-N of January 22, 2004 “Approval of drinking water supply and sanitation rules, standard contract forms for water supply and sanitation, the procedures for determining the conditions for connection to water supply and sanitation systems, and repealing Government Decision No. 149 of March 13, 1999
- Government Decision No. 1228 of 28 August 2003 “On Defining the Rules for Sanitation Systems Use and Wastewater Treatment”

B. Institutional frameworks

The authorities responsible for implementation of objectives in the sanitation sector are:

- The Ministry of Nature Protection
- The State Committee of Water Economy of the Ministry of Territorial Administration
- The Ministry of Health
- The Public Services Regulatory Commission
- The Ministry of Finance

In Armenia centralized drinking water supply and sanitation is managed by five companies specialized in water supply and sanitation services.

II. CURRENT SITUATION AND PROSPECTS

The volumes of water supply and sanitation provided by the companies supplying drinking water and sanitation services in 2011-2012 are as follows:

Table 22. Volumes of drinking water supply and sanitation by water companies in 2011-2012

Name of organization	2011		2012	
	water supply, mln m ³	sanitation, mln m ³	water supply, mln m ³	sanitation, mln m ³
“Yerevan Djur” CJSC	60.27	63.59	60.71	64.56
“Armenian Water and Sewerage” CJSC	26.10	15.39	30.4	17.10
“Lori Water and Sewerage” CJSC	2.39	2.04	2.64	2.08
“Shirak Water and Sewerage” CJSC	4.67	3.69	4.80	3.80
“Nor Akunq” CJSC	1.96	1.50	2.11	1.51
Total	95.39	86.21	100.66	89.05

In total, there are about 620 km of main sewers and about 3,200 km of sanitation networks.

Table 23. The length of sanitation networks by company.

Name of organization	Sanitation system, km	Main sewers , km
“Yerevan Djur” CJSC	950.0	220.0
“Armenian Water and Sewerage” CJSC	1782.0	319.0
“Lori Water and Sewerage” CJSC	148.0	58.0
“Shirak Water and Sewerage” CJSC	245.8	18
“Nor Akunq” CJSC	45.1	5
Total	3170.9	620

In the largest cities (where 60-65% of population live) the coverage of centralized sanitation systems is as follows: Yerevan 96%, Gyumri 50%, Vanadzor 70% , Sisian 41%, Ashtarak 100%, Alaverdi 37%, Ararat 38%, Artashat 55%, Vagharshapat 62%, Gavar 49%, Vardenis 48%, and Sevan 58%.

The sewage from settlements having centralized sanitation systems, due to their landscape features, reaches the wastewater treatment plants mainly by gravity. However, the wastewater is not completely treated and at best mechanical cleaning is performed. In other cases wastewater flows into water intake systems through emergency exits, bypassing the treatment plants, or passes through the whole treatment plant without any treatment.

During the years 1960-1980 a large number of wastewater treatment plants (22) were built, but due to maintenance costs and lack of new investment, the vast majority of these plants have broken down and currently do not operate, with the exception of the "Aeratsia" wastewater treatment plant in Yerevan which was designed for the mechanical and biological treatment of wastewater of the city and the adjacent settlements. However, currently only partial mechanical cleaning is carried out in this plant. In addition, it should be noted that the treatment technologies for these plants are rather energy consuming and thus financially unaffordable for the current period.

The ‘Aeratsia’ wastewater treatment plant of Yerevan (hereinafter referred to as WTP)

The construction began in 1963, and the plant was put into operation at full capacity in 1978. The design capacity is 600 000 m³/day. The WTP is a large energy consuming complex; the electric power consumed for each cubic meter of wastewater is 0,5 kW/h.

The technological parameters of incoming wastewater and the treated wastewater:

- incoming wastewater biological oxygen demand (BOD)	up to
240 mg/l	
- incoming wastewater chemical oxygen demand (COD)	up to
360mg/l	
- concentration of suspended particles in incoming wastewater	up to
215 mg/l	
- pH of incoming wastewater	6.5
- 8.5	
- treated wastewater BOD	
15 mg/l	
- treated wastewater COD	22.5
mg/l	
- concentration of suspended particles of treated wastewater	15
mg/l	

Description of the technological process of wastewater treatment plant

Wastewater treatment is designed to be carried out in the following, interrelated technological processes

- mechanical treatment;
- biological treatment;

- sludge recycling;
- disinfection of treated water.

As currently the technical condition of the WTP allows only mechanical cleaning, the treatment structures and their current condition is presented below.

The following structures are designed for mechanical treatment:

- acceptance cell/chamber;
- bar screens (five of MG-180 model);
- horizontally aerated sand traps (4 structures of size 54*6*3.35m);
- primary radial sedimentation tanks with their pumping stations (10 tanks with d=40m, 4.5 m deep).

The current state of the technological structures of the wastewater treatment plant

- The bar screens are worn and corroded.
- The grinding crushers of big wastes do not work, their electrical engines and pumps are worn out and must be replaced.
- The shield-like valves with electric drive installed in the drains that bring wastewater closer to the grates and remove from them are partially worn and torn.
- The pumps for the crushed wastes are worn out and do not work.
- The power supply system for the equipment is not in a proper state.
- The acceptance cell and the drains to drive the wastewater closer to the grates are filled with sand.

The efficiency of the WTP and its functional importance are largely dependent on the biological treatment process. It requires maintaining a proper medium that ensures the efficient work of microbes to deplete the organic compounds in the wastewater with a constant air supply. The operation of the plant requires considerable electricity costs. The electricity interruptions (more than 2 hours per day) cause the biological treatment process to shut down. Restarting the process takes 4-6 months.

Consequently, since the 1990s, as a result of the economic conditions of the country, the "Aeratsia" plant and the other wastewater treatment plants have ceased operating because they could not provide the required level of treatment. At present, as it has been previously noted, the only operating plant in the country is the "Aeratsia" wastewater treatment plant, where only partial mechanical treatment is carried out.

IV. EXPERT EVALUATION

For the solution of the most important issue in sanitation sector, i.e. construction of wastewater treatment plants, first and foremost it is necessary to create an appropriate legal and institutional base. It is necessary to allocate appropriate financial resources, ensure donor aid and investment programmes with government support, as well the participation of the private sector. It should be taken into account that the the standards

required for sanitation systems and wastewater treatment plants have been established during the Soviet era and do not meet the current requirements either technically or economically.

To regulate the sanitation sector it is necessary to develop and implement a variety of complex projects that require large financial investments. In case of limited financial capabilities it is recommended to study and identify the sanitation networks where accidents occur most frequently.

Target Area VII

Article 6, 2 (f), first part

Application of recognized good practices to the management of water supply

In this target area the accent shall be put on good but not necessarily the best practices (and not necessarily internationally recognized), which can be adapted to local conditions.

1. EXISTING FRAMEWORKS

Strategies, legal/regulatory framework

In accordance with the requirements set forth in Article 121, part 5, paragraph 12 of the Water Code of Armenia, the Government adopted a Resolution No. H64-N of 20 January 2005 on “Establishment of zones for water ecosystem protection, sanitary maintenance, flow formation, ground water protection, water protection, ecotones and inalienable areas”.

Institutional frameworks

- The Ministry of Nature Protection;
- The State Committee of Water Economy of the Ministry of Territorial Administration;
- The Ministry of Health;
- The Public Services Regulatory Commission;
- The Ministry of Finance.

In accordance with the Charter of the State Committee of Water Economy, approved by Decision No. H-1400 of 5 September 2002, the management and use of the state-owned water systems, as well as ensuring the implementation of the National Water Programme are the goals and objectives of the Committee.

In the centralized drinking water supply and sanitation sector of Armenia five specialized companies, with extensive international experience deliver water supply and sanitation services.

2. Application of appropriate recognized good practices in water supply sector

The integrated management of water supply systems and the planning and management of reforms currently depend on a number of issues requiring urgent solution:

- restoration, conservation and efficient use of water resources for drinking purposes;
- reduction of the level of drinking water losses;
- improvement of the drinking water quality;

- ensuring water supply accessibility/affordability, increasing the reliability and implementation of uninterrupted water supply;
- implementation of integrated measures in communities that are not covered by centralized water supply services;
- increase the duration of water supply and the number of settlements having a 24-hour water supply;
- selection of an appropriate management pattern for water supply services;
- improvement of the payment system.

According to the proposal of the Veolia Company in 2006-2015 it is envisaged:

- to dramatically reduce water loss from 84% up to 44% by completely eliminating illegal connections;
- to reduce the water abstraction from sources and bore wells from 347 mln. m³ to 150 mln. m³;
- to increase the collection of fees from 79% to 92%;
- to reduce energy consumption from 125 mln kW/h to 25 mln kW/h;
- to increase the duration of continuous water supply annually by 2%, and thus to ensure a 24-hour supply for 95% of population by the 10th year (2015).

During 2004 as a result of reorganization of the “Armenian Water and Sewerage” CJSC the separate “Shirak Water and Sewerage”, the “Lori Water and Sewerage” and the “Nor Akunq Water and Sewerage” CJSCs have been created. 51% of the shares of these three companies belong to the Government and 49% belong to the communities in the service area.

One of the problems of water systems management is the current quality of drinking water, because in some settlements the water still does not meet the requirements for drinking water quality standards.

A serious problem in water systems management is the solution of problems relating to the water supply for 560 rural communities (out of a total of 980) which have been left out of the centralized water supply services. The water supplies for these communities, fed from local water sources, operate through the efforts of the communities and the residents themselves. As these settlements are outside the service area of the water companies, they have also been left out of the investment, technical assistance and other programmes implemented in Armenia in recent years.

Unlike in the case of the water supply companies, issues relating to the management of water supply, such as tariffs or the basic quantity and duration of the water supply, have not yet been settled in these communities, where the institutions to operate and manage the water supply have mainly not been created yet.

The surface water-fed supplies of more than 200 small settlements, as well as of individual facilities (such as resorts or sports facilities, etc.) are considered to be the property of the community, department or private organization, and are not operated by any professional organization. Most of them do not have treatment plants or other equipment, and the water taken from the upper streams of rivers is used for household needs without any treatment and disinfection.

The effectiveness of the management of water supply systems depends to a significant extent on a correct tariff policy. It is well known that the existing water tariffs do not cover capital and management costs, and the possibilities of covering these costs by subsidies from the state budget are quite limited. One of the problems in implementing an effective water tariff is that current tariff is set at a single rate per cubic meter of water consumed, with no variation. This results in the different economic and social conditions of consumers in different regions, with varying economic development trends, purchasing power, and levels of their demand not being taken into account.

Another issue is the desire for increased reliability and an uninterrupted supply of water of longer duration, resulting in an increase in the number of settlements having a 24-hour water supply.

The selection of an effective management structure is critical for the water sector. It is impossible to solve the above-mentioned issues without creating an appropriate range of management systems. Experience in operating water supply systems shows that sophisticated water treatment technologies can be economically viable only for large settlements, and the use of these technologies in small-scale water supplies, especially in rural areas, is very difficult and sometimes technically and economically not possible.

A reliable and efficient water supply can be provided in these systems without reagents, but instead, using a multi-layer gravel filter for water treatment.

At present the reagent facilities in treatment plants are not operational, the filter layers are worn and torn and not replaced in time, the cleaning is not sufficiently frequent, and the sedimentation tanks and mixers have deteriorated as a result of the difficult operating conditions. Interruptions in water supply take place during winter frosts and springtime floods, the chlorination units operate irregularly, chlorination is not carried out during the winter months due to the treatment plant not operating, and water is often supplied without having been disinfected. Water coagulation is not carried out properly in treatment plants due to the lack of devices for preparing the correct doses of reagents and their solutions, as well as the lack of laboratories.

To ensure the quality and safety of drinking water the legislation defines sanitary protection zones, taking into account the type of water used for drinking purposes, and the hydrological, hydro-geological and hydro-chemical conditions. In the past the drinking water treatment plants had sanitary zones for the water intake structures and water sources, and for the building of the plant.

However, the majority of the sanitary zones are dilapidated or completely destroyed, their fences are damaged or destroyed, people come in and out freely, and cattle are pastured, especially beside the water intake structures. There are no police guards or lighting, and the zones are not designed for the proper run-off of rainwater, resulting in wet and marshy areas.

3. RELEVANT CURRENT AND PLANNED ACTIVITIES TO SOLVE THE MAIN ISSUES

- Currently a very serious problem is to provide proper water supply and sanitation in 560 rural settlements not covered by the centralized water supply systems.
- Since 2003 water basin management authorities (WBMA) have been established under the Water Resources Management Agency (WRMA) of the Ministry of Nature Protection. Government Resolution No. 649 - A of April 14, 2004 approved the WRMA's Charter and structure, but so far they have not been authorized to develop integrated management plans for watersheds, issue water abstraction permits, develop water abstraction regimes, or carry out other allied functions.

4. EXPERT EVALUATION

1. There is a need to include in the service area of water companies the communities so far lacking water supply and sanitation services, or, alternatively, to develop mechanisms for the creation of appropriate organisations, or to empower community leaders themselves to provide water supply and sewerage services as required by law.
2. It is necessary to speed up the transfer of the functions approved by the Charter of the WRMA to the water basin management authorities.

Target Area VIII

Article 6, 2 (f), second part

Application of recognized good practices to the management of sanitation

Article 6, paragraph 2 (f), of the Protocol requires the setting of targets and target dates related to the application of recognized good practices in the management of sanitation.

I. EXISTING FRAMEWORKS

A. Legislative field

The main legal acts regulating the field of sanitation are:

- The Water Code
- Government Decision No. 130-N of January 22, 2004 “On approval of drinking water supply and sanitation rules, standard contract forms for water supply and sanitation, procedures for determining the conditions of connection to water supply and sanitation systems, and repealing Government Decision No. 149 of March 13, 1999

Drainage systems are used for municipal, domestic, industrial and other wastewater collection, disposal and treatment. Collection of industrial wastewater in the drainage systems of settlements shall be done only if the quantities of pollutants do not exceed the limits defined by the contract.

- Government Decision No. 1228-N of 28 August 2003 “On Defining the Rules for the Use of Sanitation Systems and the Treatment of Wastewater” stipulates:
 - a. ensuring the required level of drainage systems management and use (operation), and of the treatment of the wastewater;
 - b. ensuring the durability and reliability of drainage systems constructions, as well as their efficient and uninterrupted operation;
 - c. timely prevention and elimination of blockages and accidents in the drainage network;
 - d. proper organization of the operations of the treatment facilities, and ensuring the conditions for more efficient working;
 - e. laboratory, managerial and technical monitoring of the treatment facilities to ensure their best possible operation.

B. Institutional frameworks

The authorities responsible for the sanitation sector are:

- The Ministry of Nature Protection;

- The State Committee of Water Economy of the Ministry of Territorial Administration;
- The Ministry of Health;
- The Public Services Regulatory Commission;
- The Ministry of Finance.

Centralized drinking water supply and sanitation is managed by five specialised companies, under various forms of public-private partnerships.

II. CURRENT STATUS AND PROSPECTS

"Yerevan Djur" CJSC: in 2006 the management of water supply of Yerevan and a number of adjacent villages was leased to the French organization "Veolia" for a 10 years term. It operates some 950 km of sewers and 220 km of main sewers.

During 2013, the company handled 15,899 accidents in the sewer networks. A drainage network of over 400 meters was built or renovated in 17 streets of Yerevan and Noubarashen district.

The "Water and Sewerage" CJSC was leased to the French company "Saur" in 2004, under a management contract which expired on 31 December 2013. It operates 1782 km of sewers and 319 km of main drains.

Under the Lake Sevan basin environmental programme the "Hubert-compact" type equipments are installed in the wastewater treatment plants in Gavar, Martouni and Vardenis.

4. EXPERT EVALUATION

The strategy for the development of the sanitation sector should include the development and construction of wastewater treatment plants with biological treatment capacities. In addition, wastewater collection and treatment are not only national, but also regional problems, therefore, they should be given appropriate attention by regional actors in the Caucasus, and the international environmental, financial and other interested organizations.

Target Area IX
Article 6, 2 (g), i
Occurrence of discharges of untreated wastewater

In line with article 6, paragraph 2 (i), target area IX requires setting targets and target dates related to the occurrence of discharges of untreated wastewater.

I. EXISTING FRAMEWORKS

A. Legislative field

The main legislation regulating the field includes:

- the Water Code;
- the Law on “National Water Programme”;
- Government Decision No. 1228-N of 28 August 2003 “On defining the rules for the use of sanitation systems and wastewater treatment”;
- Government Decision No. N130-N of 22 January 2004 ” On approval of the procedures for defining the rules for drinking water supply and sanitation, model forms for contracts for water supply and sanitation, the technical terms for connection to water supply and sanitation systems”; and
- Government Decision No. 75-N "On defining the standards for water quality of each water basin management area depending on the local characteristics”.

B. Institutional frameworks

With the adoption of legislative reforms a new institutional system was introduced, in accordance with which the management of the sector is implemented by the following authorities:

- The Water Resources Management Agency of the Ministry of Nature Protection;
- The State Committee of Water Economy of the Ministry of Territorial Administration;
- The Public Services Regulatory Commission;
- The Ministry of Health;
- The Ministry of Finance; and
- The Rescue Service of the Ministry of Emergency Situations.

In addition, the existing water supply and sanitation systems were leased to the following companies to ensure the supply of drinking water and sanitation services:

- “ Yerevan Djur”
- “ Armenian Water and Sewerage”
- “Shirak Water and Sewerage”
- “Lori Water and Sewerage” and

- “Nor Akunq”.

In addition, 20 of the 22 treatment plants were transferred to “Water and Sewerage”, the “Aeratsia” station to “Yerevan Djur”, and the treatment plant of the city of Kajaran is operated by the local government authority.

Large private industrial enterprises also try to prevent and reduce the discharges of untreated wastewater. For example, a wastewater treatment plant that was constructed in the Yerevan leather processing plant in 2005 with the USAID support¹¹, carries out mechanical, biological and chemical treatment. However, the treated wastewater, in spite of rather good water quality indices, is then pumped into the “Aeratsia” treatment plant for further biological and mechanical treatment. This plant treats not only the wastewater from the leather works but also from the “Armkarpet” enterprise located in the neighborhood. The sludge from the plant is then used as agricultural fertilizer.

C. Financial issues

Most of the ongoing and future activities to reduce and prevent discharges of municipal and household sewage, and of industrial wastewater, are financed by international donors, by grants and loan funds, as well as from the State budget.

II. CURRENT STATUS OF UNTREATED WASTEWATER DISCHARGES, AND FUTURE PROSPECTS

Almost all the discharges of urban and industrial wastewaters covered under the Protocol on Water and Health come from treatment plants. Discharges of wastewater from urban areas flow through the existing sanitation systems.

Sanitation systems

In Armenia all the towns and 20% of rural communities are provided with sewerage systems. The wastewaters from these areas flow into open ponds, with the exception of a few cities, where the discharges flow into dry valleys and storm sewers. The total length of the main sewers is about 3200 km, and of other sewers is about 860 km.

The urban sewerage networks and main sewers operate mainly by gravity, except for a few places, such as Sevan (three municipal pumping stations), and Masis (one municipal pumping station), whose pumping facilities require repair or replacement. To improve the situation inter-regional gravity collector networks have been built in several places to collect, transport and further treat sewage.

¹¹ The Kashi Tannery Effluent Treatment System is a public-private partnership activity supported by USAID through its “Sustainable Water Resources Management for Enhanced Environmental Quality,” and “Agribusiness Small & Medium Enterprise Market Development (ASME)” projects.

For instance, the Sevan-Hrazdan sewer collects the wastewater from the towns of Sevan, Tsakhkaadzor, and Hrazdan, the surrounding villages, and the Hankavan resort area, to be treated in the treatment plant at Qakhsi. The Charentcavan - Yerevan sewer collects the wastewater from Abovyan, Byureghavan, New Hachn, Yeghvard, and the surrounding villages to be treated in the Yerevan treatment plant. It is also intended to build the Spitak -Vanadzor sewer to treat wastewater in the Vanadzor treatment plant. In some cities or urban areas without sewerage systems, some of the wastewater flows into open basins without any treatment.

More than 60% of the networks and sewers built about 40 years ago are in a catastrophic state. An average of 2.5 accidents per year occurs per kilometer of the network. The irregular water supply also blocks and damages the sewerage system.

Wastewater treatment

Only 45-50% of the total volume of wastewater is subject to normal (partial) mechanical treatment; the rest flows into open ponds without treatment.

In almost all treatment plants the mechanical and biological treatment facilities were designed to achieve proper disinfection; they also have facilities for the treatment of sediments. However, they are all in poor condition.

The mechanical treatment facilities include:

- buildings with bar screens and mechanical rakes;
- horizontal sand traps with water cycle;
- primary radial sedimentation tanks with appropriate mechanisms and equipment.

The biological cleaning facilities include:

- aerotanks;
- secondary radial sedimentation tanks;
- industrial buildings with mechanisms for aeration;
- reservoirs for chlorination;
- complex sediment treatment facility;
- methane tank;
- a mechanical sediment dehydration facility;
- sludge areas.

The majority of the 22 treatment plants were built about 40 years ago under Soviet rule, but, in recent years, due to the lack of maintenance and new investment their condition has worsened and currently they do not actually operate. The exception is the "Aeratsia" plant built in 1972, where mechanical and biological treatment is carried out to some extent. The situation in rural areas is much worse. Most rural communities are not connected to treatment systems and have no sewerage networks. The wastewater infiltrates into the soil and groundwater and causes pollution.

After being built several treatment plants have not operated for various reasons. For example, after the 1988 earthquake the main buildings and structures of the Aparan

treatment plant need reinforcement. The treatment plants in Syunik, Lori and Stepanavan have not yet been completed.

The "Aeratsia" is characterized by badly worn out structures, pipelines, machinery, valves, and equipment. The buildings and equipment have been left in the open air and are completely worn out, the reinforced concrete structures are no longer impermeable, the water channels are partly destroyed, and the electric equipment and automatic devices do not work.

After the collapse of the Soviet Union the Vardenis, Martouni, Gavar and Sevan treatment plants in Gegharqunik province have collapsed due to the lack of proper maintenance and supervision and, as a result, untreated urban sewage and rain water flow into Lake Sevan without treatment.

Generally speaking, a steady growth in the volume of water supplied has been observed in recent years, as well as a decrease in water losses (Table 24):

Table 24. The volume of water entering the water supply system and the volume of wastewater entering the sanitation system

		<i>Water inflow into the system ('000 m³)</i>	<i>Total loss in the system ('000m³)</i>		<i>Water supply ('000 m³)</i>	<i>Sanitation ('000 m³)</i>
2012	<i>Yerevan Djur</i>	307,321.8	245,297.3	79.8%	62,024.5	65,864.7
	<i>'Armenian Water and Sewerage</i>	160,266.7	128,682.9	80.3%	31,583.9	17,043.8
	<i>'Nor Akunq</i>	6,030.1	3,961.3	65.7%	2,068.8	1,588
	<i>'Shirak Water and Sewerage</i>	43,118.9	38,408.1	89.1%	4,710.8	3,768.4
	<i>'Lori Water and Sewerage'</i>	16,612.1	14,067.3	84.7%	2,544.8	2,207.3
	Total	533,349.6	430,416.9	80.7%	102,932.7	90,472.2
2011	<i>Yerevan Djur</i>	319,519.7	259,252.8	81.1%	60,266.9	63,595.9
	<i>'Armenian Water and Sewerage</i>	159,975	133,865.6	83.7%	26,109.4	15,390.4
	<i>'Nor Akunq</i>	5,492.8	3,534.2	64.3%	1,958.7	1,530.2
	<i>'Shirak Water and Sewerage</i>	27,448.4	22,777.6	83%	4,670.8	3,687.7
	<i>'Lori Water and Sewerage</i>	6,070.5	3,678.7	60.6%	2,391.9	2,038
	Total	518,506.4	423,108.9	81.6%	95,397.5	86,242
2010	<i>Yerevan Djur</i>	346,211.4	289,219.7	83.5%	56,991.7	62,605.3
	<i>'Armenian Water and Sewerage</i>	172,792.3	147,037.2	85.1%	25,755.1	15,023.4

	<i>'Nor Akunq</i>	5,862.1	3,905.6	66.6%	1,956.5	1,522.7
	<i>'Shirak Water and Sewerage</i>	24,730.8	19,993.6	80.8%	4,737.2	3,711.4
	<i>'Lori Water and Sewerage'</i>	8,045.1	5,484.9	68.2%	2,560.2	2,134.4
	Total	557,641.6	465,641	83.5%	92,000.6	84,997.1

Source: Public Services Regulatory Commission

It should be noted that in 2012 the amount of wastewater discharged from the “Aeratsia” plant, the largest in Armenia, amounted to 65 mln m³. Given the capacities of the newly constructed treatment plants in Vardenis (3.15 mln m³ p.a.), Martuni (3.15 mln m³ p.a.), and Gavar (6.3 mln. m³ p.a.), it can be asserted that all the existing treatment plants, taken together, can only carry out mechanical cleaning of about 78 mln. m³ p.a.

III. RELEVANT CURRENT AND PLANNED ACTIVITIES TO REDUCE THE OCCURRENCE OF UNTREATED WASTEWATER DISCHARGES

1. In recent years there has been a positive change in this area. The French Government agreed to allot funds for the rehabilitation of the "Aeratsia" plant and the reconstruction of a number of sanitation networks.
2. Under the “Lake Sevan basin environmental programme” funded by the EBRD, treatment plants were constructed in Vardenis, Martuni and Gavar in Gegharqunik province, and the construction of a plant in the resort of Jermuk in Vayots Dzor province is underway. The new plants currently only carry out mechanical treatment of wastewater, although they are capable of biological treatment as well.
3. In addition, under the project on improvement of the water supply and sanitation of Dilijan, supported by USAID, UNDP, Coca-Cola and the Government of Armenia, the construction of a municipal wastewater treatment plant and main sewer on the River Aghstev has been launched. The project also envisages renovating the municipal sewage network. The cost of these works amounts to €6,080,000.

It should be stressed that there are no plans for the construction, repair or reconstruction of any treatment plants in any other urban or rural communities in coming years.

IV. EXPERT EVALUATION

Despite the facts that, in recent years, significant attention has been paid to preventing and reducing wastewater discharges, and that various legal and institutional reforms have been carried out, progress in this area is far from being positive.

Almost all the 22 wastewater treatment plants inherited from the former Soviet Union do not operate. The newly built treatment plants are engaged only in mechanical treatment. Since the treatment of wastewater, in particular the construction and operation of treatment plants, requires a lot of funds, adequate financial resources must be sought to improve the existing situation: donor aid, investment programmes, loans, as well as

attracting foreign companies experienced in this field, which would be willing to restore the existing plants, and build and operate new ones.

In addition, it is necessary:

- to complete the construction of treatment plants planned and under construction;
- to develop appropriate projects for the rehabilitation or construction of new treatment plants in major cities;
- to require major industries to properly treat their wastewater through appropriate legislative and institutional reforms.

To reduce the incidence of discharges of untreated wastewater into waters within the scope of the Protocol, great importance must be given to sewerage systems. In order to improve their condition, first and foremost, major repairs must be carried out in the more worn sections, new sewers and sewerage networks must be built and old ones rebuilt in a phased fashion, and new equipment and machinery for the proper operation of the networks and sewers must be bought.

Target Area X

Article 6, para 2 (g), (ii)

Occurrence of discharges of untreated storm water overflows from wastewater collection systems.

According to Article 6.2 (ii) of the Protocol on Water and Health it is required to set targets and target dates related to occurrence of discharges of untreated storm water overflows from wastewater collection systems to waters within the scope of the Protocol (Target area X).

I. EXISTING FRAMEWORKS

A. Legislative field

The main laws regulating the prevention and reduction of discharges of untreated storm water are:

- the Water Code adopted in 2002;
- the Law "On the National Water Programme"
- Government Decision No. 1228-N of 28 August 2003 "Defining the rules for the use of water disposal systems and wastewater treatment";
- Government Decision No. N130-N of 22 January 2004 "On approval of the procedures for defining the rules covering drinking water supply and sanitation, and model forms of contracts for water supply and sanitation and the technical terms for connection to water supply and drainage systems";
- Government Decision No. 75-N "On defining the standards for water quality of each water basin management area depending on the local characteristics";
- and other decisions. However, this legal framework does not entirely regulate storm water outflows to open basins from sewerage systems.

B. Institutional framework

Since untreated storm water overflows to open water bodies from urban and rural storm water sewers are not regulated by law, their institutional management is also not systematized. In cities, including Yerevan, the management and operation of storm water drains is carried out by the Yerevan Municipality and the Yerevan Djur company. In the other cities and rural communities that have storm sewer systems, their operation is carried out by the relevant communities or, depending on the region, by the Armenian Water and Sewerage, Lori Water and Sewerage, Shirak Water and Sewerage, and Nor Akunk companies.

The management and operation of storm water drains in industrial areas is carried out by the industry.

C. Financial framework

Maintenance, operation and modernization in this field will also be largely carried out at the expense of community resources. In recent years no major investments have been made in this area.

II. CURRENT STATUS OF STORM WATER SEWER SYSTEMS, AND FUTURE PROSPECTS

Storm water collection systems exist in all cities of Armenia but are almost completely lacking in rural areas. However, the systems inherited from the Soviet era are in poor condition due to the lack of adequate maintenance and financial resources. Moreover, the existing systems do not have even the simplest facilities for treating storm waters and wastewater. Therefore storm waters flow into open water bodies despite the fact that their pollution level is sometimes several times higher than the acceptable level.

The main pollutants in storm waters are the suspended particles, oil products and other contaminants typical of urban areas that flow into open water bodies without treatment after each rainfall and thaw. The storm water drainage systems and those for municipal and household wastewater are separate and have nothing to do with each other. Unlike the municipal storm drains, for which there are no strict requirements, the requirements for such systems in industrial enterprises are more stringent, in accordance with the standards and requirements for water use permits. Some industries have systems for the collection, transportation and treatment of wastewater, but the wastewater from treatment plants still flow into the urban sewerage system.

Unfortunately, no information is available on the existence, length or state of storm water drains, or on the design and actual capacity of storm water treatment plants, or on the approximate volume of storm water flowing into storm water drains and municipal or household wastewater facilities. The storm sewer systems and storm waters are not being monitored.

It should be stressed that the high level of pollution of urban storm waters is due to the improper accumulation of waste in places where it is not allowed, the unsatisfactory technical state of transport depots, and the insufficient level of sanitary cleaning of other areas. The improvement of storm drain systems is included in all major urban plans and development projects. These documents very often include even the construction of treatment plants. However, due to the lack of funds, nothing is being currently done.

In 2012, due to heavy rains and the poor condition of the storm drain systems, several streets in Yerevan were flooded. According to information provided by the Yerevan City Administration, a detailed inventory of the 350 km long storm drain system of the city is now being carried out to determine the priorities for its repair and modernization.

IV. EXPERT EVALUATION

Therefore, to achieve the requirements under target area X it is necessary to:

- explore and draw up an inventory of the existing storm drains systems, and identify the main shortcomings;
- examine the quality of storm water that flows into open water bodies from the sewer systems without treatment;
- investigate the effects of storm water which flows without treatment into waters within the scope of the Protocol;
- implement appropriate legislative and institutional reforms to prevent the discharge of untreated storm water into open water bodies;
- attract sufficient investments for the rehabilitation and modernization of storm drain systems in Yerevan and at least two other towns;
- develop appropriate strategies and policies for the management of storm water.

Target Area XI

Article 6, 2 (h)

Quality of discharges of wastewater from wastewater treatment installations to waters within the scope of the Protocol

In accordance with article 6, paragraph 2 of the Protocol on Water and Health it is required to define targets and target dates related to the quality of wastewater discharged from the wastewater treatment plants into the waters within the scope of the Protocol.

I. EXISTING FRAMEWORKS

A. Legislative field

In recent years, to monitor the quality of effluents flowing to open water bodies from wastewater treatment plants and regulate the management of the sector, a number of legislative acts, decisions, etc have been adopted by the legislative and executive bodies of Armenia. The main acts regulating this field are:

- Water Code;
- the Law on “National Water Programme”;
- the Government Decision No. 1228-N of 28 August 2003 “Defining the rules for the use of water disposal systems and wastewater treatment”;
- the Government Decision No. N130-N of 22 January 2004 ”Approval of the procedures for defining the rules for drinking water supply and sanitation, model forms of contracts for water supply and sanitation, and the technical terms for connection to water supply and drainage systems”;
- the Government Decision No. 75-N "Defining the standards for water quality of each water basin management area depending on the local characteristics”.

B. Institutional frameworks

In accordance with the new institutional system the management of this sector is carried out by the following authorities:

- The Water Resources Management Agency of the Ministry of Nature Protection;
- The Environmental Impact Monitoring Centre of the Ministry of Nature Protection;
- The State Environmental Inspectorate of the Ministry of Nature Protection;
- The State Committee of Water Economy of the Ministry of Territorial Administration;
- The Ministry of Health;
- The Ministry of Finance;
- The Rescue Service of Armenia of the Ministry of Emergency Situations.

II. QUALITY OF WASTEWATER DISCHARGED FROM WASTEWATER TREATMENT PLANTS INTO WATERS WITHIN THE SCOPE OF THE PROTOCOL: CURRENT STATUS AND PROSPECTS

The existing sewerage systems serve for the disposal and treatment of domestic/household, storm and industrial wastewater generated from apartments, public and public utility buildings, manufacturing enterprises and their surroundings. In Armenia, after the local treatment, industrial effluents are treated at municipal plants along with household wastewater.

Since the discharge of untreated wastewater into open water bodies is prohibited by law, according to all sewerage network projects, the wastewater from the sewerage systems should have been pumped to appropriate treatment plants. However, after to the collapse of the Soviet Union, the subsequent recession, poor maintenance, the lack of investment and finances, and because of many other practical reasons, the treatment plants were not built or left unfinished, and the majority of the existing plants have become unfit for operation.

At present there are only 4 operating treatment plants: the “Aeratsia” plant in Yerevan (requiring urgent repair) and newly built plants in the towns of Vardenis, Martuni and Gavar. The existing “Aeratsia” treatment plant currently operates using outdated technologies, and does not comply with maximum allowed concentrations, content or composition of pollutants, or with the intended volume or hydraulic load of inflows. Due to the poor condition of treatment plants and inadequate monitoring of wastewater discharged into open water bodies, as well as the lack of sewerage systems in most rural communities, the information available on the quality of effluents discharged into open water bodies is not complete.

IV. EXPERT EVALUATION

As was mentioned above, most of the 22 wastewater treatment plants in Armenia inherited from the former Soviet Union do not operate. The newly built treatment plants are engaged only in mechanical treatment.

Since the treatment of wastewater, in particular the construction and operation of treatment plants, requires a lot of funds, adequate financial resources must be sought to improve the existing situation. This may involve donor aid, investment programmes, loans, as well as attracting foreign companies experienced in this field, which would be willing to restore the existing plants, and build and operate new ones.

Therefore, to achieve the targets for the target area XI, it is necessary to:

- identify the gaps in the legislation with regard to the quality of wastewater discharged from wastewater treatment plants into waters within the scope of the Protocol;
- develop and establish standards for the quality of effluents from treatment plants into open water bodies and procedures for their discharge ;
- develop appropriate projects for restoring old, and building new treatment plants for the major cities of the country;
- carrying out the appropriate legislative and institutional reforms to require large industrial enterprises to carry out proper treatment of their wastewater;
- improve the existing quality monitoring system, in order to ensure the proper monitoring of the quality of effluents from treatment plants;
- monitor the qualitative indicators of the effluents discharged into open water bodies.

Target Area XII

Article 6, 2 (i), first part

Disposal or reuse of sewage sludge from collective systems of sanitation or other sanitation installations

In accordance with Article 6, paragraph 2 (i) of the Protocol on Water and Health, it is required to regulate the disposal or reuse of sewage sludge from collective systems of sanitation or other sanitation installations by setting relevant targets and target dates.

I. EXISTING FRAMEWORKS

A. Legislative field

The main laws regulating the the disposal or reuse of sewage sludge from collective systems of sanitation or other sanitation installations, drainage systems or treatment plants are:

- the Water Code;
- the Law "On the National Water Programme" ;
- Government Decision No. 1228-N of 28.08.2003 "Defining the rules for the use of water disposal sytems and treatment of wastewater";
- Government Decision No. N130-N of 22 January 2004 "Approval of procedures to define the rules for drinking water supply and sanitation, model forms for contracts for water supply and sanitation, and the technical terms for connection to water supply and drainage systems";
- Government Decision No. 75-N "Defining standards for water quality of each water basin management area depending on the local characteristics".

However, it is too early to consider that legislative reforms in this sector have been completed because the legislation regulating the disposal or reuse of sludge from collective systems of sanitation or other sanitation installations, drainage systems and treatment plants is still lacking, and the quality standards and regulations for the reuse of wastewater have not been defined. Unfortunately, no measures are currently being carried out to ensure the implementation of the existing legislative acts.

B. Institutional frameworks

Although this sector is regulated to some extent by the above-mentioned legislative acts, wastewater sludge is not being disposed of or reused due to the lack of treatment plants operating in compliance with standards or in poor condition; therefore, their institutional management is also not regulated.

C. Financial field

Recently no investments have been made in this field.

II. THE CURRENT STATE OF DISPOSAL OR REUSE OF WASTEWATER SLUDGE, AND FUTURE PROSPECTS

Almost all treatment plants were designed to have mechanical and biological treatment facilities with appropriate disinfection of the effluents, as well as sludge treatment facilities. However, they are all in poor condition.

The 22 treatment plants in the country were built 40 years ago, but, due to the lack of maintenance and investment, their state has worsened and currently none of the wastewater treatment plants operate, with the exception of the Yerevan ‘‘Aeratsia’’ wastewater treatment plant built in 1972, which carries out partial mechanical and biological treatment.

During the Soviet period, when most of the treatment plants were operating, after appropriate treatment the sediments were used as agricultural fertilizer. However, in the last years of the former Soviet Union and after its collapse, when the majority of plants did not work, they were not satisfactorily maintained, the concentration of harmful substances in the sediments increased, so their reuse could not continue. Due to the dilapidated state of the plants, the methane tanks, mechanical dehydration facilities and sludge surfaces do not currently operate. According to the information available, the sediments have accumulated in the ‘‘Aeratsia’’ plant for the last 20 years.

The newly built treatment plants in Gavar, Martouni and Vardenis only came into operation in 2013; the amount of sludge accumulated there is negligible, and it is therefore too early to speak about its use.

In the treatment plants built in recent years in large private industries, such as the one¹² built in 2005 with USAID support in the leather works, where the effluents from the neighboring ‘‘Armkarpet’’ enterprise are also treated, the treated sludge could be used as an agricultural fertilizer.

IV. EXPERT EVALUATION

Therefore, to achieve the targets it is necessary to:

- develop legislation regulating the disposal or reuse of sewage sludge from collective systems of sanitation or other sanitation installations;
- analyse sludge quality from collective systems of sanitation or other sanitation installations and set appropriate quality standards;
- draft regulations for the reuse of wastewater sludge;
- draft regulations for the disposal, transportation and accumulation of sludge from wastewater treatment plants;

¹² The Kashi Tannery Effluent Treatment System is a public-private partnership activity supported by USAID through its ‘‘Sustainable Water Resources Management for Enhanced Environmental Quality,’’ and ‘‘Agribusiness Small and Medium Enterprise Market Development (ASME)’’ projects.

- implement appropriate institutional reforms to improve the wastewater sludge disposal or reuse from collective systems of sanitation or other sanitation installations
- attract investment for the rehabilitation and modernization of integrated sludge treatment facilities in Yerevan and at least two other cities.

Target Area XIII
Article 6, 2 (j), second part
Quality of wastewater used for irrigation purposes

This target area requires setting targets and target dates for the quality of wastewater used for irrigation purposes.

I. EXISTING FRAMEWORKS

A. Legislation regulating the use of wastewater for irrigation

The existing standards for water used for irrigation do not apply to wastewater. At present, there are no integrated quality standards for water (surface, underground, rain, snowmelt and wastewater) used for irrigation.

The quality of surface water used for irrigation is partly regulated by Government Decision No. 75-N of 27 January 2011 “**On defining the standards for ensuring the water quality of each water basin management depending on the local characteristics**”.

The irrigation of agricultural land with untreated wastewater is limited by Article 99, paragraph 9, by Article 101 and by the last paragraph of Article 103 of the Water Code of Armenia.

Thus, the national legislation in this field is not complete. The secondary use of treated wastewater is not regulated.

B. Institutional frameworks

The authorities responsible for monitoring the quality of wastewater used for irrigation, for the procedures and management of irrigation water supply, and for the development of strategy and regulations for this sector are:

- The Water Resources Management Agency of the Ministry of Nature Protection;
- The Ministry of Agriculture;
- The Public Services Regulatory Commission;
- The State Committee of Water Economy of the Ministry of Territorial Administration;
- The Ministry of Health;
- The Ministry of Finance;
- The Rescue Service of Armenia of the Ministry of Emergency Situations;
- The Water Users Associations.

C. Financial frameworks

Most of the ongoing and planned irrigation projects are funded by the State budget, international donors, grants and loans. However, as treated wastewater is not used for irrigation, funding its use for this purpose is not being considered.

II. CURRENT SITUATION IN USE OF WASTEWATER FOR IRRIGATION

In Armenia untreated wastewater is normally not used for irrigation purposes, but very often water for irrigation is abstracted from points which are downstream of entry points of domestic and industrial wastewater already mechanically treated at treatment plants, as well as rainwater, snowmelt or domestic wastewater from settlements lacking a centralized sewage system.

III. REQUIREMENTS FOR WASTEWATER USED FOR IRRIGATION

Wastewater can vary according to the content of chemical elements, organic substances and microorganisms. The quality of wastewater used for irrigation should be regulated for chemical, bacteriological, biological and parasitic indicators.

Moreover, the quality of water is determined by chemical analysis taking into account the climate characteristics of the region and the soil conditions of the irrigated areas. Wastewater can be used for irrigation if the content of microparticles, including heavy metals, does not exceed the maximum permissible concentration for drinking and domestic water use.

Generally, wastewater used for irrigation shall comply with the agromeliorative requirements for irrigation water in order to ensure high yields of good quality products, as well as enhancing soil fertility and improving the soil.

Wastewater should be considered fit for irrigation if its use does not have an adverse effect on the quality of the irrigated areas and the soil crop capacity, does not diminish the yield and quality of crops, and does not cause the accumulation of toxic substances in the soil. Irrigation by wastewater must not cause salination, or suppress plant growth and development. The fitness of irrigation water depends on the type of plants, the soil type, the drainage characteristics, and the relationship between the cations and anions in the water.

The choice of crops is based on the sanitary requirements for crop production, wastewater composition and supply regime, soil conditions, as well as the purpose of agriculture in that particular area. When wastewater is used for irrigation, care should be directed to the conservation of the air–water optimal state, increase in soil crop capacity and hydrophysical properties. This contributes to the creation of better conditions for cultivation.

However, the use of wastewater can also lead to possible negative consequences that affect, for example, groundwater quality. To prevent groundwater contamination it is

necessary to observe the irrigation regime and operational requirements strictly, as well as ensure proper drainage.

Thus, when planning the use of wastewater for irrigation it is necessary to adhere to the following criteria:

- environmental standards, which do not allow environmental pollution, especially the pollution of ground and surface waters;
- sanitation standards to ensure safe working conditions for agricultural workers;
- meliorative standards that maintain the meliorative state of the irrigated land;
- agrochemical standards that maintain soil quality and yield;
- agro-economic standards, which maintain the yields of the crops cultivated.

The suitability of wastewater for irrigation depends on the following factors:

- soil salinization risk;
- secondary salinization risk;
- toxicity of individual ions, etc.

First of all, the quality of wastewater used for irrigation can be described by the following indicators:

- total saline ions dissolved in water;
- quantity of sodium ions;
- quantity of magnesium ions;
- sodium availability;
- chemical composition of dissolved salts.

Thus, if wastewater is to be used for irrigation, the agromeliorative and sanitary standards should be considered. Possible negative impacts on the meliorative conditions and the yield of irrigated areas shall be kept at a minimum, and the spread of infectious diseases shall be avoided.

IV. EXPERT EVALUATION

Considering the above, to achieve the objectives of the target area XIII it is necessary to:

- study the possible use of wastewater from treatment plants for irrigation;
- study the possibilities for secondary use of wastewater for irrigation;
- develop standards and procedures for the use of wastewater for irrigation.

Target Area XIV

Article 6, 2 (j), first part

Quality of waters which are used as sources for drinking water

The first part of article 6, paragraph 2 (j), of the Protocol requires the setting of targets and target dates related to the quality of waters used as sources for drinking water.

I. EXISTING FRAMEWORKS

A. Strategies, legal / regulatory framework and international commitments

- The Water Code
- The Land Code
- Law “On Provision of Sanitary-Epidemiological Security of the Population of the Republic of Armenia”
- Government Decision No. 26 of January 14, 2002
- Sanitary protection zones for household drinking-water, water supply and water sources No.2-III-A2-2 sanitary rules and norms (registered in 28 December 2002), which define the hygienic and anti-epidemiological requirements for establishing and operating sanitary protection zones for household drinking-water supply sources.
- By the Government Decision No. 218-N of 7 March 2003 “Approving the model Water Use Form and Water Use Permit Forms”, in case water is to be used for municipal, household, medicinal or health purposes, a specific conclusion is mandatory must be issued by the State Sanitary and Anti-Epidemiological Inspectorate of the Ministry of Health.
Government Decision No. 816-N of 5 June 2003 “Approval of the Procedure for the Free Water Use”

B. Institutional frameworks

Responsible authorities

According to Decision No. 1300-N of 15 August 2002 of the Government “On creating a state administrative institution of “Administration of the Ministry of Health of the Republic of Armenia”, approving the charter and structure of the Ministry of Health of the Republic of Armenia”, ensuring the hygienic and anti-epidemiological security of the population is one of its goals and objectives (Appendix 1, "7. The goals and objectives of the Ministry are ...).

The Ministry is also responsible for the development of public policy and targeted programmes aimed at sanitary and anti-epidemiological security, monitoring their implementation and drafting laws and other legal acts. According to the Government Decision No. 857-N of 25 July 2013 and the Decision No. 1134-N of 17 October 2013, the scope and objectives of the relevant activities within the Ministry of Health, relating

to the sanitary and anti-epidemiological security of population, are defined for the State Health Inspectorate and the "National Center for Disease Control and Prevention".

B. Main issues related to the subject area

Most drinking water sources supplying water to the population of Armenia through centralized water supply systems use groundwater with sustainable chemical composition and low bacterial contamination. However, there are 22 surface water sources (rivers), which provide water for approximately 150,000 inhabitants. Surface and groundwater must be disinfected before reaching the network, and surface water must be treated, but as some of the treatment equipment is not modern, treatment plants need to be re-equipped.

The strict regime sanitary protection zones for water mains and water supply sources used for drinking and domestic needs often do not exist, and hydrogeological calculations of the second and third zones are not currently carried out due to the absence of methodology and lack of resources. One cannot exclude the existence of economic activities in the second and third zones that could cause bacterial and chemical pollution of water.

Water quality requirements for drinking water sources need to be reviewed in accordance with EU requirements.

Conclusion

- Sanitary protection zones of water supply and sanitation facilities mostly do not exist.
- Appropriate technical equipment for drinking water treatment and disinfection does not exist in many cases. Significant amounts of drinking water do not undergo continuous decontamination or disinfection, and the treatment facilities for water from reservoirs need upgrading.
- The borders of the second and third zones around water sources are not delimited, which may contribute to chemical and bacterial pollution of water.

IV. EXPERT EVALUATION

Suggestions

- Adopt methodologies to delimit the borders of the second and third zones of sources of water supply, and map these borders;
- Develop methods to delimit the sanitary protection zones of sources of drinking water; prevent the installation of sources of contamination in the second and third zones;
- Improve the existing drinking water treatment technologies, and introduce new, modern technologies; develop and implement measures for the construction and rehabilitation of drinking water disinfection and treatment facilities;

- Prevent activities that may cause pollution of water sources in sanitary protection zones, and avoid issuing land use permits in such cases;
- Study high mountain lakes, that have not been studied for the last 40-50 years, and which could be used both as drinking water and for irrigation and other agricultural purposes.

These issues could be also considered:

- Development, introduction and approval of Water Safety Plans (WSP)
- Introduction of a model monitoring programme
- Approximation of water quality indicators to the requirements of the EU directives for drinking water, water sources and recreational waters.

Target Area XV
Article 6, 2 (j), second part
Quality of waters used for bathing

The second part of article 6, paragraph 2 (j), of the Protocol requires the setting of targets and target dates related to the quality of waters used for bathing.

I. EXISTING FRAMEWORKS

Strategies, legal / regulatory framework and international commitments

- Water Code of Armenia, Article 22, Free Water Use
- "Ensuring the Sanitary-Epidemiologic Security of the Population "
- Government Decision No. 1147 – N of 28 July 2005 "On defining regulations for water standards"
- Government Decision No. 756 – N of May 8, 2003 "Approval of the regulations for the use of water resources for tourism, sports and recreational needs"
- Sanitary Rules and Regulations N 2-III-2.2.4 "On hygienic requirements for the operation, hygiene and water quality of swimming pools":
 - 1,1 The requirements of these State Sanitary Rules and Regulations (hereinafter referred to as "sanitary regulations") apply to existing, newly constructed, and reconstructed swimming pools for the improvement of health, including outdoor swimming pools in schools and pre-school institutions, health facilities, and bathing complexes (saunas).
The hygienic requirements for buildings comprised in swimming pools (cloakrooms, shower cubicles, swimming pools, toilets, etc.) also apply to other similar buildings operating in other public buildings (bath houses, saunas, sports halls, etc.), including the cooling basins of saunas.
- Monitoring the quality of water (for microbial, parasitic, organoleptic, hygienic and chemical indicators) at water abstraction points used for recreational and leisure zones, and for drinking and household needs is carried out by the Ministry of Health; the quality standards are determined by the "Hygienic requirements for surface water conservation" (N 2.1.5.980 -00 Sanitary Norms and Regulations of the Russian Federation), and the permitted level of contaminants in drinking water is determined by the List of "Maximum permissible concentrations of harmful substances in water for household, drinking, educational and municipal facilities" defined by the "Drinking water. Hygienic requirements for the water quality of centralized water supply systems. Quality control." N2-III- A 2-1 Sanitary Rules and Regulations.

There are issues connected with the elaboration of hygienic standards, and the review and implementation of existing standards, which would be acceptable for Armenia in compliance with international requirements.

- The proper organization of the recreational zones along the shores of water resources is important from the point of view of both the public health security of the population, and maintaining the cleanliness of water resources. Currently there is no comprehensive legislation regulating this issue. Only Government Decision No. 1563 - N of December 18, 2008 “Leasing lands, granting building rights and the implementation of town building activity on the territory of the Sevan National Park and adjoining areas” defines the requirements for the organization of beaches along the lake, the development of the beach area, and the technical specifications of equipment and facilities.

B. Institutional frameworks

Responsible authorities

According to Decision No. 1300-N of 15 August 2002 of the Government “On creating a state administrative institution of “Administration of the Ministry of Health of the Republic of Armenia”, approving the charter and structure of the Ministry of Health of the Republic of Armenia”, ensuring the hygienic and anti-epidemiological security of the population is one of its goals and objectives (Appendix 1, "7. The goals and objectives of the Ministry are ...).

The Ministry is also responsible for the development of public policy and targeted programmes aimed at sanitary and anti-epidemiological security, monitoring their implementation and drafting laws and other legal acts. According to the Government Decision No. 857-N of 25 July 2013 and the Decision No. 1134-N of 17 October 2013, the scope and objectives of the relevant activities within the Ministry of Health, relating to the sanitary and anti-epidemiological security of population, are defined for the State Health Inspectorate and the "National Center for Disease Control and Prevention".

B. Main issues related to the subject area

Conclusions

- There are hazardous household wastes along the shores of open water bodies.
- Open water bodies have become polluted due to discharges from mine tailings.
- The legislative framework is imperfect, and there is a lack of a number of normative acts.
- There is no cross-sectoral coordination on the protection of open water bodies.

IV. EXPERT EVALUATION

Suggestions

- Review and harmonize the existing legal framework of health care standards for water resources management in line with international requirements and EU standards.
- Develop programmes to avoid emergency discharges of domestic, hazardous and mine tailings wastes along the shores of open water bodies.

Target Area XVI

Article 6, 2 (j), third part

Quality of waters used for aquaculture or for the production or harvesting of shellfish

This target area requires setting targets and target dates related to the quality of waters used for aquaculture or the production or harvesting of shellfish.

I. EXISTING FRAMEWORKS

A. Legislative field

No normative document has yet been developed in Armenia, on the basis of the Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, related to the quality of waters to be used for aquaculture, including shellfish production.

For this reason, the relevant departments of the Ministry of Nature Protection are governed by the following Decision of the Government when granting water use permits and checking water quality compliance, namely No. 75-N of 27 January 2011 on "Defining the standards for ensuring the water quality of each water basin depending on the local characteristics" (Annex 4) and N 47 - N 7 November 2003 on "Approval of the Form No. 1 fish (monthly) statistical reporting form on "Fishing and Fish Breeding" and instructions for its completion". It is known that different groups of aquatic animals have different physiological demands and hence requirements for optimum water quality indicators.

B. Institutional field

The responsibility for the fishing sector, including aquaculture and production or harvesting of shellfish, as well as for monitoring water use, and developing strategies and regulations for this sector rests with the:

- Water Resources Management and Bioresources Management Agencies of the Ministry of Nature Protection;
- Ministry of Agriculture.

It should be noted that the Zoology and Hydroecology Research Center of the National Academy of Sciences of Armenia is involved in scientific studies of fish breeding and ichthyology, including issues concerning shellfish.

C. Financial framework

The only large-scale investment currently under way in this sector in Armenia is for the evaluation of the Lake Sevan crawfish stocks.

II. CURRENT STATUS OF WATER QUALITY USED FOR FISH CULTURE, INCLUDING SHELLFISH PRODUCTION

The water bodies of Armenia are the habitat for 39 fish species belonging to 34 tribes, 9 families, and 5 categories of which 36 live mainly in rivers, but can also live in lakes and reservoirs. Three species, namely trout, whitefish and Sevan barbel, can be found only in Lake Sevan, and sometimes in the streams flowing into the lake. Many types of fish (whitefish, barbel, etc.) are of commercial importance, while some species (Armenian roach, silver crucian carp, chub/dace, etc.) are fished for sport.

At present there are about 250 fish farms in the Ararat Valley and elsewhere, where the species mainly cultivated are rainbow and golden trout, Gegharkunic or Sevan trout, river trout, Siberian sturgeon (Lena population), Japanese koi carp, catfish, carp, white and black amurs, silver carp, etc.

In recent years fish production has increased by about 40% and reached 8850 tons in 2012 in comparison with 5280 tons in 2009, including 4800 tons of salmonids, 1636 tons of sturgeonids and 2414 tonnes of other species of fish (carp, crucian carp, silver carp, white amur, etc.).

Molluscs do not exist in Armenia and therefore their breeding is not an issue. In recent years, commercial crayfish cultivation has rapidly increased, and as a result, the volume of, and demand for, water for this purpose has also increased. Crayfish are widely cultivated in the Lake Sevan Basin and in the Ararat Valley. Small crayfish are caught in the Lake Sevan Basin and transported to the breeding farms in the Ararat Valley, where they are cultivated until they reach commercial size. The only species bred in Armenia is *Pontastacus leptodactylus* Eschscholtz. Annual commercial production of this species does not exceed 500 tons.

Monitoring the quality of water used for crayfish breeding is carried out only in the Lake Sevan basin by the Institute of Hydro-Ecology and Ichthyology of the Zoology and Hydroecology Research Centre, guided by the indicators in Annex 5 for the aquatic ecosystems suitable for crayfish.

III. EXISTING FRAMEWORKS

It is obvious therefore that there is a need to develop regulations determining the water quality to be used for aquaculture in Armenia, paying special attention to research on the fish species and shellfish stocks in the aquatic ecosystems of the Ararat Valley, and the quality indicators and monitoring of water used for fish breeding and cultivation.

Target XVII

Article 6, 2 (k)

Application of recognized good practice to the management of enclosed waters generally available for bathing

Article 6, paragraph 2 (k), of the Protocol requires the setting of targets and target dates related to the application of recognized good practice to the management of enclosed waters generally available for bathing.

I. EXISTING FRAMEWORKS

A. Strategies, legal / regulatory framework and international commitments

- The Water Code of Armenia: Article 1. General Concepts Used in the Code;
- Law “On security of the population”; Government Decision No. 1147-N of 28 July 2005 “On procedures for establishing water standards”;
- Sanitary regulations and norms N 2-III-2.2.4 “Hygienic requirements for the design, maintenance and water quality of swimming pools”.

B. Institutional framework

Responsible authorities

According to Decision No. 1300-N of 15 August 2002 of the Government “On creating a state administrative institution of “Administration of the Ministry of Health of the Republic of Armenia”, approving the charter and structure of the Ministry of Health of the Republic of Armenia”, ensuring the hygienic and anti-epidemiological security of the population is one of its goals and objectives (Appendix 1, "7. The goals and objectives of the Ministry are ...).

The Ministry is also responsible for the development of public policy and targeted programmes aimed at sanitary and anti-epidemiological security, monitoring their implementation and drafting laws and other legal acts. According to the Government Decision No. 857-N of 25 July 2013 and the Decision No. 1134-N of 17 October 2013, the scope and objectives of the relevant activities within the Ministry of Health, relating to the sanitary and anti-epidemiological security of population, are defined for the State Health Inspectorate and the "National Center for Disease Control and Prevention" .

The responsibility for compliance with these requirements lies with the legal entity or natural persons operating a swimming pool or other places specially designed for bathing purposes.

Target Area XVIII

Article 6, 2 (I)

Identification and remediation of particularly contaminated sites

Article 6, paragraph 2 (I), of the Protocol requires the setting of targets and target dates related to the identification and remediation of particularly contaminated sites that adversely affect waters within the scope of this Protocol or are likely to do so, and that thus threaten to give rise to water-related diseases.

I. EXISTING FRAMEWORKS

A. Strategies, legal / regulatory framework and international commitments

- The Constitution;
- The Water Code of Armenia;
- The Law on “National Water Programme”;
- The Law “On the protection of the population in emergency situations”;
- The Law “On Freedom of Information”;
- Government Decision No. 75-N of 27 January 2011 “On defining the standards for water quality of each water basin management area depending on the local characteristics”;
- Government Decision No. 76 N of 25 January 2005 “On establishing models and instructions for water resources use and protection in emergency situations, including the minimum quantity of water to be supplied to the population, as well as compensation for damage to the water system”;
- Aarhus Convention on “Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters”.

B. Institutional frameworks

- Ministry of Nature Protection
- Ministry of Health
- Ministry of Emergency Situations

The Nubarashen landfill of obsolete and banned pesticides. In 1982 more than 500 tons of obsolete and banned pesticides were buried in the Nubarashen landfill, of which more than 60% were persistent chlorine-organic compounds, like DDT and HCH. The site belongs to Erebouni community of Yerevan and is located not far from near the village of Moushakan.

The problem of the landfill has been at the centre of attention of the “Armenian Women for Health and Healthy Environment” NGO (AWHHE) for about 10 years, as it was placed in an active landslide zone. The results of laboratory analyses carried out in recent years by AWHHE have pointed to high concentrations of POPs in soil samples taken from the areas surrounding the landfill. After the AWHHE had given the alarm about the

danger, the Government undertook some short term arrangements (fencing of the landfill, construction of drains, elimination of a swampy area, etc.) in order to ensure the security of the site. However, the measures undertaken did not in fact ensure its security.

At the beginning of March 2010 it became known that the landfill had been destroyed by unknown people with heavy machinery, and a lot of hazardous chemicals appeared on the surface of the landfill and around it, on an area of approximately 3000 m².

During the heavy spring rain the runoff from the area, contaminated with toxic chemicals, flow downhill, polluting the soil, vegetation and water of the nearby settlements. Moreover, the contaminated water flowing into the Getar and Hrazdan rivers may lead eventually to contamination of the trans-boundary Araks and Kura rivers.

On the basis of a Government decision, a Working Group was established under the Ministry of Emergency Situations, funds were allocated, and by June 2010 the landfill was covered by a protective layer (30 x 130 m) and fenced in, the drainage system was restored and a guard service was provided.

Surface water. When landfill had been destroyed, samples of sediment from a pond located 4 km downstream from the landfill have been analysed and high concentrations of DDT were detected.

Groundwater. The pesticide migration paths have not been determined. It is not clear whether groundwater is exposed to pollution. No surveys have been conducted on the possible effects on human health.

Currently, the situation is being assessed and solutions are being proposed with the support of the OSCE office in Yerevan, UNDP and GEF.

The Monitoring Center of the Ministry of Nature Protection monitors surface water quality. In 2012 surface water was sampled at 157 observation points on 47 water bodies. Some 44-49 indicators were analysed for each of 1080 samples, for a total of 48,600 indicators.

The National Statistical Service presents data on pollutants, on the number of cases of the maximum permissible concentration (MPC) being exceeded, on the level by which average annual concentrations exceed the MPC, and other associated data.

Lake Sevan. Lake Sevan is located in Gegharkunik province, at 1900 m above sea level. The total area of the basin was 1275 km², as of 31 December 2011¹³ (National Statistical Service, 2012). It is fed by 28 rivers and streams.

According to the NSS the concentration of heavy metals and contaminants in many rivers flowing into Lake Sevan exceeds the permissible standard.

In 2012 the cases of heavy metals and pollutants in Lake Sevan greatly exceeding MPC were:

¹³ <http://armstat.am/file/doc/99471428.pdf>

- the number of cases in Lesser Sevan: vanadium 104, manganese 84, selenium 85;
- the number of cases in Greater Sevan: vanadium 59, manganese 39, copper 19, selenium 37;
- level by which average annual concentrations exceeded the MPC in Lesser Sevan: vanadium 6.4, manganese 1.2, and selenium 2.6;
- the level by which average annual concentrations exceeded the MPC in Greater Sevan: vanadium 6.2, manganese 1.1, copper 2.1, and selenium 2.1.

According to research carried out by the Hydroecology and Fish Breeding Institute, the water in the mouths of rivers flowing into the lake is estimated as¹⁴:

- Vardenik: severely polluted;
- Gavaraget: moderately polluted;
- Litchq: from low to moderately polluted;
- Masrik, Dzknaget: lightly polluted;
- from the Arpa-Sran tunnel: very clean.

The pollution of the Masrik River is linked to the Sotq gold mine, as the water in the mouth of the river is more contaminated. Besides these heavy metals, high levels of silver, cobalt and gold have also been found in the samples of river sediments.

Dzoraget. As a result of the mining activities the Dzoraget River is endangered. The Dzoraget River is important for the Stepanavan region not only for eco-tourism, recreation and preservation of the unique ecosystem, but also because it is the only source of irrigation of agricultural lands. Being the largest tributary of the Debed River, it is also polluting the latter's waters¹⁵.

According to the National Statistical Service, the cases of the concentrations of pollutants and heavy metals in the Dzoraget River exceeding the MPC were:

- the number of cases 0.5 km above Stepanavan: aluminium 7 times, vanadium 9, chromium 4, manganese 5, copper 4, zinc 4, selenium 2;
- the number of cases at the mouth of the river: aluminium 9, vanadium 12, chromium 7, manganese 8, copper 10 times;
- the level by which average annual concentrations exceeded the MPC at a point 0.5 km above Stepanavan: aluminum 8; vanadium 6.1, chromium 1.6, manganese 4.2, copper 32.6, zinc 7.6, selenium 1.2;.
- the level by which average annual concentrations exceeded the MPC at the mouth of the river: aluminum 5.4, vanadium 4.5, chromium 1.2, manganese 2.8, and copper 4.3.

Voghchi River. The pollution of this river is linked to mining. According to data from the NSS, the number of cases in which the MPC were exceeded, in different sections of the

¹⁴ Danielyan K., Gabrielyan B., Minasyan S. et al (2011). General assessment of ecological situation of Lake Sevan: GEO – Lake Sevan. Available at: <http://www.grida.no/files/publications/sevan-report---fin.pdf>

¹⁵ Ecolore NGO

river, were: aluminium 9, chromium 9, copper 12, manganese 9, and selenium 11 and the level by which average annual concentrations exceeded the MPC were: aluminum 2.1, chromium 3, copper 5.5, manganese 2.7, and selenium 3.9.

In the mouth of *the Akhtala River* the level by which average annual concentrations exceeded the MPC were: for manganese 84.7 times, aluminium 45.2, copper 465.8, and zinc 337.1.

In the *Vorotan River* the especially high content was that of vanadium, the average annual concentration exceeding the MPC 18-fold.

IV. EXPERT EVALUATION

The following actions are recommended:

- Conduct an assessment of mining-related hazardous areas located near rivers;
- Conduct an assessment of waters flowing from tailings into rivers;
- Add monitoring points near the tailings;
- Develop an action plan to completely abolish burial site of obsolete and banned pesticides.

Target Area XIX

Article 6, para. 2 (m)

Effectiveness of systems for the management, development, protection and use of water resources

This target area requires setting targets and target dates related to the effectiveness of systems for the management, development, protection and use of water resources.

Legislative field

Reforms in water resources management in Armenia began in 1999-2000 with implementation of the "Integrated Water Resources Management Plan" developed with the support of the World Bank. As a result the water resources of Armenia were assessed, a structural reform programme for their management was proposed, and the water supply and demand management took shape. The idea of watershed management, with annual and long-term planning mechanisms, was also introduced.

On the basis of the proposals of the "Integrated Water Resources Management Plan" in 2001 the Government initiated a programme to upgrade the country's water sector management, reviewed the existing legal framework and clarified the institutional framework. All this was regulated by Government Decision No. 92 of February 2001 "On the Concept of Water Sector Reforms in Armenia".

This was followed by the adoption of a new Water Code on 4 June 2002 which served as the basis for many legislative reforms: the Law "On National Water Policy" (2005); the Law "On the National Water Programme" (NWP) (2006); the Government Decision No. 4 of February 3, 2011 "On Approval of the Content of Model Basin Management Plans"; and the Government Decision No. 75 –N of January 27, 2011 "On defining standards for ensuring the water quality of each water basin management depending on the local characteristics".

Institutional frameworks

With the adoption of the new Water Code a new institutional system was introduced, in accordance with which the sector would be managed by the following authorities:

- The Water Resources Management Agency of the Ministry of Nature Protection (MNP), which consists of 6 regional water basin management departments;
- The State Committee of Water Economy of the Ministry of Territorial Administration;
- The Public Services Regulatory Commission.

In order to support the water management a number of agencies under various ministries provide monitoring data for the decision-makers:

- The Armenian State Hydrometeorological and Monitoring Service of the Ministry of Emergency Situations;

- The Environment Impact Monitoring Center of the Ministry of Nature Protection (EIMC);
- The hydrogeological monitoring center (HMC) of the MNP;
- The Ministry of Health;
- The State Environmental Inspectorate (SEI) of the MNP.

Table 25. The agencies responsible for monitoring in Armenia

Monitoring functions	Responsible agency	Ministry
Surface water quantity	Armenian State Hydrometeorological and Monitoring Service	Emergency Situations
Surface water quality	Environmental Impact Monitoring Centre	Nature Protection
Groundwater quantity and quality	Hydrogeological Monitoring Center	Nature Protection
Drinking water sources and quality	National Hygiene and Anti-Epidemiological Inspectorate	Health
Water use and pollutants discharge	State Environmental Inspectorate	Nature Protection

In addition to the monitoring agencies a number of other organizations also include aspects of water management in their activities, such as:

- the Disputes Resolving Commission of the National Water Council,
- the Ministry of Agriculture,
- the ministry of Energy and Natural Resources,
- the Ministry of Finance, and
- the Ministry of Emergency Situations.

In 2004 the group of 42 Water Users Associations was created, which are responsible for operating irrigation systems.

The diagraph below (Figure 2) summarizes the various aspects of the organizational structure of the governmental ministries and departments responsible for water resources and water systems management, use, maintenance and monitoring.

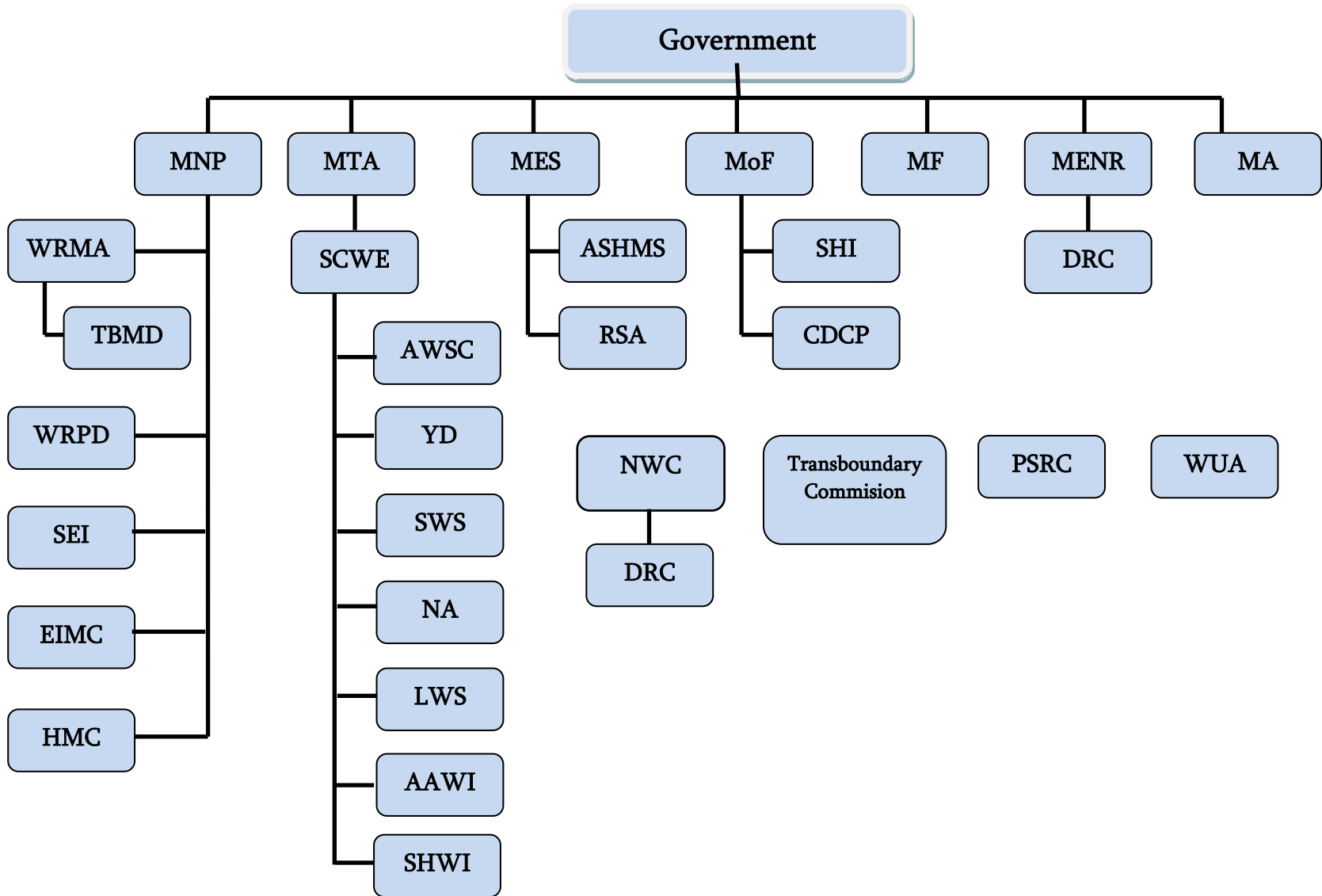


Figure 3. The institutional framework for water management in Armenia

WRMA – Water Resource Management Agency
TBMD - Territorial Basin Management Division
WRPD – Water Resources Policy Division
MNP- Ministry of Nature Protection
SEI – State Environmental Inspectorate
EIMC - Environmental Impact Monitoring Center
HMC - Hydrogeological Monitoring Center
MTA - Ministry of Teritorial Administration
SCWE - State Committee of Water Economy
AWSC - Armenian Water and Sewerage Company
YD – Yerevan Djur
SWS -Shirak Water and Sewerage
NA -Nor Akunq
LWS - Lori Water and Sewerage
AAWI - Akhuryan-Araks Water Intake
SHWI - Sevan-Hrazdan Water Intake
MES – Ministry of Emergency Situations
ASHMS - Armenian State Hydrometeorological and Monitoring Service
RSA - Rescue Service of Armenia
MoH – Ministry of Health
SHI - State Health Inspectorate
CDCP - Center for Disease Control and Prevention
MF – Ministry of Finance
MENR – Ministry of Energy and Natural Resources
MA – Ministry of Agriculture
NWC - National Water Council
DRC - Disputes Resolving Commission
PSRC - Public Services Regulatory Commission
WUA - Water Users Association

State Water Cadastre Information System

The Water Code of Armenia defines the State Water Cadastre (SWC) as "a permanent operating system that registers comprehensive information on the quantitative and qualitative parameters of water resources, catchment basins, materials extracted from watercourses and beaches of water basins, composition and quantities of biological resources, water users, water use permits and water systems use permits."

According to the Water Code of Armenia the SWC shall compile and disseminate information about the following:

- quantitative indices of water resources, including data on snow cover;
- qualitative indices of water resources;
- water resources use efficiency;

- results of anthropogenic impact on water resources, including pollution;
- wastewater and the composition and quantities of substances in them;
- rehabilitation of water resources;
- forecasts of floods, mud slides, and droughts;
- protection zones of aquatic ecosystems and their status;
- atmospheric precipitation and atmospheric temperature regime;
- water use permits and water systems use permits;
- implementation of the National Water Programme.

The Government Decision No. 1060-N of 2003 approved the procedure for registering documents and providing information to the SWC. In addition to the regulatory act defining the SWC's operating procedures, the Decision No. 514 of 30 December 2003 of the Minister of Nature Protection approved the "Forms of registers for data entry and maintenance procedure in the State Water Cadastre", which in 2006 was amended and supplemented by the Order No. 260-N of the Minister of Nature Protection.

The SWC is governed by the WRMA of the Ministry of Nature Protection that collects, compiles and stores all information on water resources in an official database.

During the period 2004-2008 the USAID-funded project "Strengthening the legal and institutional field in the water sector of Armenia" helped the Government set up the State Water Cadastre Information System (SWCIS), pursuant to the Water Code and the provisions of the Government Decision No. 1060-N. The SWCIS's aims are to provide:

- an interactive tool that makes it possible to develop spatial data on water resources in the geographic information systems (GIS) format, as well as a system for the improvement of a database for the summary information provided by interested institutions;
- maps at different scales that represent different governance levels: national, river basin and topography, and which are available for amending and reviewing on CDs;
- water resources database digital repository of every interested institution; a number of trained professionals from interested institutions who are actively involved in database management and GIS.

The SWCIS consists of a centralized Data Warehouse operated and maintained by the WRMA, which compiles tabular and spatial data on water resources at the national level, as well as three databases in the interested institutions that have the ability to export data to the database/data warehouse.

The main concepts of the SWCIS are summarized below:

- The SWCIS contains both spatial and tabular data, and uses relational database model and client-server architecture;
- The Data Warehouse uses a common water objects coding system (ERICA) to link the data of stakeholder organizations and geo-referencing water objects within the information system (Table 27);

- The SWCIS facilitates data/information sharing between stakeholder organizations on a regular basis;
- The stakeholder organizations agree upon the data sets to share among them and the scope of summary information to be provided to the Data Warehouse.

The system architecture of the SWCIS is shown in the diagram below.

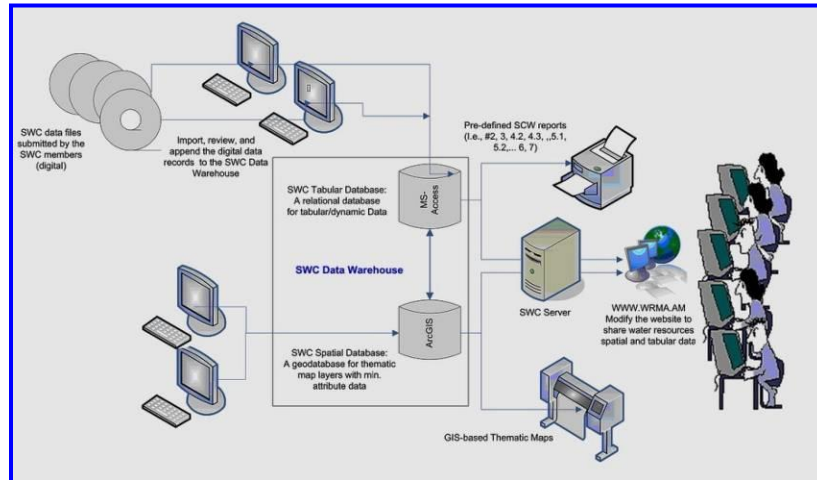


Figure 3. Technical structure of the SWC Information System¹⁶

Table 27. Key stakeholder institutions involved in SWCIS

Interested agency	Available data
Water Resources Management Agency, Ministry of Nature Protection	Data on water abstraction and sanitation Data on water use permits
Armenian State Hydrometeorological and Monitoring Service, Ministry of Emergency Situations	Data on surface water quantity
Environmental Impact Monitoring Centre, Ministry of Nature Protection	Data on surface water quality

However, the SWCIS is a new approach to data management and sharing. Most of the institutions do not fully accept the concept of "open" access. Although water resources data currently are available through the SWC database, the exchange of information between all the institutions and the public has not yet been realized. Moreover, each institution decides itself whether or not to exchange data. For example, the Ministry of Nature Protection has recently decided that there is no need for data of the WRMA to be provided online. As a result, the former website of the WRMA (www.wrma.am) is currently not available.

¹⁶ Ministry of Nature Protection of Armenia, 2012. Ten years of Experience in reforming water management sector in Armenia: towards the EU Water Framework Directive.

There is an urgent need to adopt and implement new procedures for data flow and information exchange between the institutions concerned. Information needs to be shared quarterly instead of annually so that the WRMA will be able to update the SWC more frequently.

Necessary "second generation" reforms

Despite the significant progress of legal and institutional reforms in the water sector, there are still many challenges that need to be addressed, relating to legislation, water institutions, and the modern maintenance of information through the SWC. Mainly because of the above-mentioned deficiencies many of short-term measures included in the programme of phased activities of the Law on the "National Water Programme" (which should have been implemented by 2010) have not been carried out yet, as shown in Annex 5.

This shows there is a need to implement "second generation" reforms in the water management sector, to enable the regional waterbasin management offices already created to become fully authorized bodies, fully able to implement watershed management plans and develop them in the future at the national level. In order to more clearly define the roles and responsibilities of these authorities there is a need to implement legislative changes, as well as to support the development of institutional and technical capacity using the resources available in the country, as well as international technical assistance.

Target Area XX

Article 6, 2 (n)

Frequency of publication of information on the quality of drinking water supplied and on other waters relevant to the Protocol

Countries shall set the frequency of the publication of information on the quality of the drinking water supplied and of other waters relevant to the targets set, in the intervals between the publication of information on the collection and evaluation of data on the progress towards the targets. Such publication should take place every three years, as decided by the Meeting of the Parties to the Protocol.

I. EXISTING FRAMEWORKS

Strategies, legal / regulatory framework and international commitments

Among the laws regulating this area are:

- The Constitution of Armenia, Article 33.2;
- The Law of Armenia on “Freedom of Information”, Article 7 and 12;
- The Water Code of Armenia, Article 20.

Main applicable international commitments (other than obligations under UNECE Conventions and Protocols):

- Armenia ratified the Aarhus Convention on “Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters” on 14 May 2001.
- According to the Protocol on Water and Health, Articles 6, 7, 9 and 15 also cover the issues of public participation and publication of information.

Armenia signed the *Protocol on Water and Health* to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes on 17 June 1999, but has not yet ratified it.

Institutional framework

The Law on “Freedom of Information”, Article 13, paragraph 1 states: “The official person responsible for freedom of information shall be the head of the institution holding the information or an official appointed by that person”. Article 9 of this Law prescribes the procedures for the provision of information.

II. THE CURRENT STATUS AND FUTURE PROSPECTS OF THE ENVIRONMENTAL SITUATION

Monitoring programmes and indicators

The State Committee of Water Economy of the Ministry of Territorial Administration provides the information on the work done in the field on its website (www.scws.am).

Water supply and sanitation services are delivered by five major companies specialized in centralized drinking water supply and sanitation.

- “Armenian Water and Sewerage”, which serves 305 urban and rural communities, publishes annual and quarterly reports which include data on water analyses and quality. The reports are posted on the website of the company (www.armwater.am).
- “Yerevan Djur” manages the water and sewerage systems of the city of Yerevan, as well as the surrounding rural communities. The company publishes annual reports which are posted on its website (www.veoliadjur.am).
- “Lori Water and Sewerage” supplies water to the city of Vanadzor and the surrounding rural communities (www.loriwater.am).
- The service area of “Shirak Water and Sewerage” covers the cities of Gyumri and Maralik, as well as the surrounding rural communities. A monthly report on drinking water quality in the form of a table is presented on the website (www.shirakjk.am).
- “Nor Akunk” provides water for the cities of Armavir and Metsamor, as well as the surrounding rural communities (www.norakunq.am).

The “**Environmental Impact Monitoring Centre**” presents detailed data on water basin pollution on its website on a monthly and annual basis (www.armmonitoring.am). According to the Centre, it monitors the water and chemical content of surface waters, including 39 rivers, 6 large and medium reservoirs, and Lake Sevan at 131 observation points between 7 and 12 times annually. Up to 65 indicators are analysed in the samples taken for the detection and evaluation of surface water pollution (main water and chemical components, heavy metals, organochlorine pesticides, etc.). The same information, in an elaborated format, is presented by the Ministry of Nature Protection (www.mnp.am).

The data provided by the EIMC on water basin pollution are also presented, on an annual basis, on the website of the National Statistical Service.

Information on drinking water in 560 communities not covered by water companies is not available.

Health indicators are available on the websites of the Ministry of Health (www.moh.am) and the Health Information Analytic Center (<http://www.healthinfo.am>).

The shores of Lake Sevan serve as beaches, and the results of water quality investigations are available on the website of the EIMC.

Information on all aspects of the state of the environment and health is also provided by the **National Statistical Service** in the form of various publications and through the website (www.armstat.am). For example, a monthly report on infectious diseases is published in Socio-Economic Situation of Armenia.

Some NGOs and international organizations also post on their websites information on projects under implementation. For example, the network of Aarhus Centres provides environmental information through its website (www.aarhus.am).

On November 9, 2012 the “Armenian Women for Health and Healthy Environment” NGO organized a Regional workshop for Armenia and Georgia on “Raising awareness about the UNECE Water Convention and its Protocol on Water and Health”. This was financed by the UNECE and organized within the framework of the project “Raising awareness about the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes and its Protocol on Water and Health and strengthening the role of civil society organizations in their promotion and implementation” implemented in partnership with Women in Europe for a Common Future (www.awhhe.am).

B. Main issues related to the subject area

- Specific information and publications on human health related to contaminated drinking or swimming water and/or wastewater is lacking;
- Information on drinking water quality is not complete and not very accessible;
- Information on drainage and wastewater treatment is not accessible.

IV. EXPERT EVALUATION

- Improve access to information on human health with regard to contaminated drinking or swimming water and wastewater;
- Improve access to information on the quality of drinking water;
- Improve access to information on drainage and wastewater treatment;
- Create an information centre, or "Clearing House", which will accumulate the data on groundwater and surface water, drinking water and sanitation, and water-related diseases.

III. Annexes

Annex 1. Participation of Armenia in international environmental agreements

	Name, Place and Date	Ratified by the National Assembly	In force for Armenia
	GLOBAL CONVENTIONS		
1.	Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)	Acceded as assignee at the request of MFA 1993	1993
2.	Convention concerning the protection of the World Cultural and Natural Heritage (Paris 1972)	Acceded as assignee at the request of MFA RA in 1993	1993
3.	UN Convention on Biological Diversity (Rio-de-Janeiro, 1992)	31 March 1993	14 May 1993
	Cartagena Protocol (Montreal, 2001)	16 March 2004	29 July 2004
4.	UN Framework Convention on Climate Change (New York, 1992)	29 March 1993	21 March 1994
	Kyoto Protocol (Kyoto, 1997)	26 December 2002	16 February 2005
5.	UN Convention to Combat Desertification (Paris, 1994)	23 June 1997	30 September 1997
6.	Convention for the Protection of the Ozone Layer (Vienna, 1985)	28 April 1999	1 October 1999
	Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, 16 September 1987)	28 April 1999	1 October 1999
	London amendment	22 October 2003	26 November 2003
	Copenhagen amendment	22 October 2003	26 November 2003
	Montreal amendment	29 September 2008	18 March 2009
	Beijing amendment	29 September 2008	18 March 2009
7.	Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel, 1989)	26 March 1999	1 October 1999
8.	Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemical and Pesticides in International Trade (Rotterdam, 1998)	22 October 2003	26 November 2003
9.	Stockholm Convention on Persistent Organic Pollutants (Stockholm, 2001)	22 October 2003	17 May 2004

10.	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington, 1979)	10 April 2008	21 January 2009
11.	Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979)	27 October 2010	1 March 2011
REGIONAL (EUROPEAN) CONVENTIONS			
	UNECE Convention on Long-range Transboundary Air Pollution (Geneva, 1979)	14 May 1996	21 February 1997
12.	Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP)	In the process of ratification	
13.	UNECE Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991)	14 May 1996	10 September 1997
	Protocol on Strategic Environmental Assessment (Kiev, 2003)	25 October 2010	24 April 2011
14.	UNECE Convention on Transboundary Effects of Industrial Accidents (Helsinki, 1992)	14 May 1996	21 February 1997
15.	UNECE Convention on access to information, public participation in decision making and access to justice in environmental matters (Aarhus, 1998)	14 May 2001	1 August 2001
16.	UNECE Convention on Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992)		
	Protocol on Water and Health (London, 1999)	In the process of ratification	
17.	Convention on the Prohibition of Military or any Hostile use of Environmental Modification Techniques (Geneva, 1976)	4 December 2001	15 May 2002
18.	European Landscape Convention (Florence, 2000)	23 March 2004	1 July 2004
19.	Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979)	26 February 2008	1 August 2008

Source: Ministry of Nature Protection, 2013. Available at <http://www.mnp.am/?p=201>

Annex 2

MDG 7. Ensure environmental sustainability

Targets	Indicators	1996	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Source
Target 10. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and sanitation	30. Proportion of population with sustainable access to an improved water source, % (% of households with access to centralized water supply)															ILCS ¹⁷
	- total	88.1	87.6	84.7	84.1	87.3	88.9	89.4	91.3	94.1	97.0	97.6	97.0	97.5	96.6	
	- urban	96.1	95.4	94.2	96.7	97.7	96.5	97.9	98.1	98.8	99.4	99.6	99.5	99.5	99.6	
	- rural	64.6	64.4	64.7	64.7	71.3	74.0	72.8	78.0	84.8	92.4	93.6	93.5	93.7	90.8	
	31. Proportion of population with access															ILCS

¹⁷ Integrated Living Conditions Survey

	to improved sanitation, % (% of households with access to flush toilet)														
	- total	64.1	63.3	62.8	58.8	60.2	61.6	65.1	66.1	67.0	66.7	69.1	69.2	69.6	68
	- urban	83.1	82.2	80.8	82.2	84.9	79.0	83.3	90.1	90.4	91.1	63.5	96.1	96.4	95.9
	- rural	12.8	17.7	24.6	22.5	22.3	12.8	17.7	19.1	21.1	19.0	21.4	16.4	17.0	13.0

Annex 3

The proposed system of interrelations of surface water quality categories in Armenia

Importance/function	Category by quality importance	I category, excellent	II category, Good	III category, medium	IV category, unsatisfactory	V category, bad
National water reserve		√	√	√	√	√
Water flows conservation		√	√	-	-	-
Ecosystems activity, breeding fish / protection	Salmonids	√	√	-	-	-
	Carp species	√	√	√	-	-
Irrigation*		√	√	√	√	-
Industrial use of water		√	√	√	√	√
Energy production		√	√	√	√	√
√ applied - not applied * applied for irrigation if the pH value does not exceed 8.5, and the electric conductivity value is less than 1000 μS/cm.						

Annex 4

Indicators of water ecosystems fit for crayfish

Indicators	Optimal values of required indicators for crayfish (Fedotov, 1993)	Present conditions of crayfish in Sevan Lake
Water penetrability	1-1.5 m	5-12 m
Amount of oxygen for large animals	5.4-9.1 mg/l	5.0-10.7 mg/l
pH	6-10	7.1-9.6
Water hardness	5-8 °	5-6.5 °
Carbon dioxide	Up to 10 mg/l	
Hydrogen sulphide	0	0
NH₄⁺	In summer 1.0 mg/l In winter 0.5 mg/l	0.2-0.4 mg/l
NO₃⁻	< 40 mg/l	0.02-0.17 mg/l
NO₂⁻	< 0.01 mg/l	0.02-0.03 mg/l
Total iron	0.36-1.0 mg/l	0.02-0.09 mg/l
Chlorine	Up to 5.0 mg/l	
Total calcium	10-60 mg/l	21-27 mg/l
Salinity	For southern lakes up to 3 g/l	0.5-0.7 g/l
Depth	more than 4-5 meters less than 10-15 meters	0.5-35 Û
Soil	clay, sand, peat, limestone	sand, silt sand, ooze

Annex 5.

The Status of short-term measures for the implementation of the National Water Programme

Problem	Short-term measure	Implementation status
Legal requirements		
Harmonization, elaboration and improvement of the legal framework	1. Harmonization and improvement of the existing legislation, including the analysis of implementation of requirements of Article 121 of the Water Code, and the exercise of the functions envisaged by this Article (the bodies responsible for implementation)	The requirements envisaged by Article 121 of the Water Code have been largely implemented; in parallel with this, the harmonization of inter-sectoral legislation is regularly being implemented.
	2. Process of making changes and amendments in legal acts; creation of a permanent inter-ministerial committee in the secretariat of the National Water Council which can ensure regular discussions thereof	Not completed.
Institutional development		
Clarification of the roles and responsibilities of water sector agencies	3. Review and implementation of recommendations developed on duplicated and missing competencies and responsibilities identified as a result of institutional and legal evaluations	Not completed.
Improvement of cooperation and coordination between the departments	4. Clarification and improvement of interagency cooperation and coordination mechanisms by the National Water Council	Ongoing.
Development of waterbasin management authorities	5. Development of an institutional reforms programme of the water basin management authorities	Ongoing.
Water resources management needs		
Development of new monitoring programmes of surface and ground water resources	6. Development and implementation of a pilot monitoring system for one basin management area	In 2009, within the medium-term expenditure framework, a programme was implemented, financed by the state budget, which should have served as a model to be replicated in other basins. With the support of the EU "Kura River - Phase II" project it was proposed to implement a monitoring programme in the Aghstev and Debed watersheds, which is in line with the EU WFD principles and includes biological, hydromorphological, physical and chemical monitoring. The proposed monitoring system is currently being implemented and experimented in the Debed River basin with

Problem	Short-term measure	Implementation status
		the support of the EU “Kura River-Phase III” project.
	7. Monitoring the development of strategy and national programmes, building the technical capacity of the monitoring services of regional divisions , needs assessment, structural reforms, technical re-equipment, creation of an electronic data interchange option	The application programme submitted within the medium-term expenditure framework has not been implemented due to a lack of funding.
	8. Rehabilitation of the ground water monitoring system	In accordance with Government Decision No. 1616 of 8 September 2005 the “Hydrogeological Monitoring Center” was established under the Ministry of Nature Protection, to assess the main trends of fresh water formation in Armenia, its quantitative and qualitative properties, as well the regional and geographical changes. This information shall contribute to the more efficient use and protection of groundwater, as well as to the development of measures to combat any adverse effects on groundwater resources. Due to inadequate funding during 2006-2008, ground water monitoring by HMC was carried out only partly, but since 2009 it has been carried out completely. The hydrogeological monitoring is carried out by measuring water sources, consumption, level (pressure), and temperature. The measurements are carried out in 70 inspection chambers and water sources of 6 waterbasin areas.
Improvement of the implementation of the right to water use	9. Improvement of the existing regulations on water use permits, , as well as determination of standards for evaluating the prioritization of water use applications	The programme was implemented in 2009 supported by the State budget. In parallel the Government approved Decision No. 677-N of 12 May 2011 “On amendments to Government Decision No. 218-N of 7 March 2003 on approving model water use forms and water use permit forms”, whose enforcement contributes to transparency and information-based decision-making, and ensures an effective and easy-to-use system of water use permits.
	10. Development of standards and guidelines on environmental impact assessment of water permits in case the proposed water use may significantly	The project was implemented in 2009 with the support of the State budget. In parallel the Government approved: 1. Government Decision No. 927-N of 30

Problem	Short-term measure	Implementation status
	affect the environment	<p>June “On determination of the demand for water for drinking, domestic, and agricultural purposes, as well as the assessment of the minimum ecological flow in accordance with the various water basins ”</p> <p>2. Government Decision. No. 118 of 14 January 2010 “On application of modern technology, and determination of measures to improve the monitoring of water resources, and reduce and prevent water pollution”</p> <p>These decisions regulate the assessment of the water use impact (quantity, quality) and set out the methodology to assess the minimum ecological flow to maintain the safe environmental state of water resources.</p>
Improvement of the State Water Cadastre management institute	11. Development and implementation of a State Water Cadastre short-term programme, including the development and implementation of water resources coding system, and of modern mechanisms for the State Water Cadastre management, as well as developing and implementing water resources coding systems.	<p>In accordance with the requirements of the National Water Programme, during 2007-2010 short-term projects funded by the budget have been implemented on management of the State Water Cadastre with the creation of a GIS on the basis of the State Water Cadastre which is currently used as an informative tool for data storage and dissemination, as well as for characterization of water resources through coding.</p> <p>To support the creation of the Cadastre, work on an information system has also been undertaken within the framework of the USAID-funded “Water sector institutional and legislative strengthening” programme. This initiative was aimed at ensuring the participation of the main agencies involved in water issues through the creation of a database of the State Committee of Water Economy, and the compilation and exchange of data</p>
Improvement of public awareness and participation in the water sector management process	12. Ensuring public awareness and participation in planning and management of water resources at the national and waterbasin levels	Not completed.
	13. Development of strategy and establishment and technical upgrading of public councils for water basins	Not completed.
Implementation of the National Water Programme	14. Implementation of the ongoing monitoring and evaluation of the implementation and update of the	Not completed.

Problem	Short-term measure	Implementation status
	National Water Programme 15. Establishment of a monitoring system of the programme implementation	Not completed.
Development of plans for integrated water resources management	16. Capacity building on integrated water resources management in the Water Resources Management Agency and the water resources management authorities	Under programmes funded by the European Commission, the Global Environment Fund, and other donors, a number of study tours have been organized to European countries, and a number of training courses have been held.
	17. Development of one pilot basin management plan and analysis of gaps in information needs	<p>With the support of USAID, EU, GEF and other donors, watershed management plans have been developed for the Marmarik, Meghri, Debed, and Aghstev rivers from 2008 to 2012. Similar plans are being developed for the Arpa, Vorotan, Akhuryan and Metsamor rivers and will be completed during 2013-2015. Most of them have identified significant gaps in the data which are necessary for developing watershed management plans in line with the EU WFD principles.</p> <p>Within the framework of the EU Water Initiative, and following the model of the Marmarik River Basin, a Government protocol has been developed “On approval of the content of model water basin management plans“, which was approved by the Decision , No. 4 of February 3, 2011. This will be the basis for drawing up technical specifications for the six basin management plans, as well as the plans themselves.</p>
Implementation of the Action Plan for Lake Sevan	18. Review and improvement of the annual and comprehensive program "On measures for the restoration, protection, reproduction and use of the Lake Sevan ecosystem ”	Ongoing.
Assessment of water resources and water reserve components	19. Specification of the current characteristics of the water resources and water resource components <i>a) adjustment of quantitative and qualitative spatial and time characteristics of renewable natural surface flow taking into account the quantitative and qualitative monitoring data for the last four decades, and the climate change and anthropogenic impacts on the flow</i>	Within the medium-term expenditure framework a programme was implemented in 2009 supported by the State budget.

Problem	Short-term measure	Implementation status
	<i>b) specifications for a disaggregated evaluation of surface and ground water resources, specification of depth flow</i>	Not completed.
	<i>c) development of methods to determine the minimum ecological flow of the main rivers</i>	Government Decision No. 927-N of 30 June 2011 “On determination of the demand for water for drinking, domestic, and agricultural purposes, as well as the assessment of the minimum ecological flow in accordance with the waterbasin areas of Armenia” includes the method of determination and calculation, but, in reality, it is not a minimum ecological flow, but rather a sanitary or hydrological flow, and does not impose any requirements for water quality.
	<i>d) adjustment of operating reserve of groundwater resources, and determination of the distribution of allowable (possible) water abstraction</i>	Not completed.
Definition and implementation of water quality standards	20. Adaptation and introduction of an internationally accepted methodology to define standards limiting the impact on water resources and ensuring water quality, taking into account internationally accepted approaches	On 27 January 2011 the Government adopted Decision No. 75-N "On defining the standards for ensuring the quality of water in each water basin management area, depending on the local characteristics" which is based on internationally accepted methodologies, and is considered a very progressive document.
Determination of conservation zones for the protection of aquatic ecosystems	21. Development of a methodology for the determination of aquatic ecosystems protection zones, including the flow formation zones, ground water protection zones, water protection zones, ecotone, zones of emergency ecological situations and ecological disaster in water basins, and inalienable zones	The Government approved Decision No. 64-N of 20 January 2005 “On defining the standards for areas of sanitary protection of aquatic ecosystems, flow formation, groundwater protection, water protection, ecotone and inalienable zones”.
Review of the status of agricultural lands previously drained in the Ararat Valley	22. Development and implementation of programmes for the use of agricultural lands previously drained in the Ararat Valley	Not completed.
Water resources expansion and river flow regulation	23. Implementation of activities envisaged by the perspective concept of reservoir engineering	Not completed.
Implementation of water quality management	24. Development of a strategy on water quality management	On 1 January 2011 the Government approved Decision No. 75-N "On defining the standards for ensuring the quality of

Problem	Short-term measure	Implementation status
		<p>water in each water basin management area, depending on the local characteristics". Depending on the peculiarities of the terrain, the permissible limits were determined for pollutants that might affect the quality of surface water resources for each of the six waterbasin management areas.</p> <p>The standards for ensuring water quality have been developed for all the watersheds taking into account the requirements of the EU Water Framework Directive and hydromorphological, hydrogeological, hydrophysical, environmental and other specifications.</p> <p>At the same time, within the framework of the National Policy Dialogue, an ecosystem services payments application scheme (ESP) was developed in 2011 for the Hrazdan River basin, which was the first introduced in Armenia. This scheme defines a charge per pollution unit based on "the polluter pays" principle.</p>
Establishment of regional planning standards and guidelines	25. Review and improvement of the current approaches to regional planning	Not completed.
Transboundary water resources management	26. Development of programmes for transboundary water resources management	No programme has yet been developed, but Armenia actively participates in all the water –related transboundary programmes and initiatives in the region. In addition to programme initiatives, a constant monitoring of surface water quality takes place together with Iran.
Water systems management needs		
Improvement of water supply and sanitation services	27. Study of implementation of water supply and sanitation services (potable, domestic water supply, irrigation, hydropower, etc.) and development and implementation of projects aimed at improving the service delivery	A number of studies have been carried out by international donor organizations and financial institutions, including the Japan International Cooperation Agency, the World Bank, the Asian Development Bank, the OECD, the European Bank for Reconstruction and Development, and other organizations, which are coordinated by the State Committee of Water Economy. The results of these surveys have been used by the water supply and sanitation companies.
Ensuring the safety of	28. Development of programmes to	Not completed.

Problem	Short-term measure	Implementation status
water management structures	increase the operational reliability and the safety of water management facilities.	
	29. Designation of bodies responsible for the maintenance and operation of major water management facilities.	Joint monitoring by the Ministry of Emergency Situations and the SCWE of the operation and conditions of dams and embankments .