

NATIONAL WATER STRATEGY OF THE REPUBLIC OF AZERBAIJAN

DRAFT

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ABBREVIATIONS

ADB	Asian Development Bank
AOJSC	Azerbaijan Amelioration and Water Management Open Joint Stock Company
AZERSU	Azerbaijan Drinking Water company
EECCA	Eastern Europe, Caucasus and Central Asia (countries)
EU	European Union
CB	Cabinet of Ministers
GEF	Global Environment Fund
GIS	Geographic Information Systems
GFDL	Geophysical Fluid Dynamics Laboratory
IWRM	Integrated Water Resources Management Plan
JICA	Japanese International Co-operation Agency
JSC	Joint Stock Company
KfW	Kreditanstalt für Wiederaufbau - German Development bank
MAC	Maximum allowable concentration
MES	Ministry of Emergency Situations
MFA	Ministry of Foreign Affairs
MENR	Ministry of Ecology and Natural Resources
NHD	National Hydro-meteorology Department (of MENR)
NPD	National Policy Dialogue
OECD	Organisation for Economic Co-operation and Development
OSCE	Organization on Security and Cooperation in Europe
OJSC	Open Joint Stock Company
IRBMP	Integrated River Basin Management Planning
SAWR	State Agency for Water Resources
SEED	Tate Environmental Expertise Department
TACIS	Technical Assistance to CIS (EU aid programme)
UNEP	United Nations Environment Program
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WB	World Bank
WFD	Water Framework Directive
WUA	Water User Association

FOREWORD

Water safety is considered as a strategically important issue in the world to be addressed in XXI century, along with other priorities such as energy, food and transport security. Thus, lack of water sources is one of the global problems threatening the modern world, and reliable water supply for the population has become one of the factors affecting the relations between the governments. Our country is also facing water related challenges and threats. Azerbaijan is forecasted to be one of the 13 countries in 2025 with least water resources per person (~972 cubic meters/year) according to estimations of World Water Resources Institute. Furthermore, geographical location of the country is very sensitive to impacts of climate changes. US Central Intelligence Agency lists Azerbaijan one of the 39 countries suffering from climate in its climate change report as well.

Lack of basin principle based integrated approach in water resources management, as well as existence of issues, such as unequal distribution of limited water resources throughout the country, extreme pollution of transboundary waters, poor management instruments and institutional relations, present threats to water safety and others are considered serious problems for Azerbaijan.

His Excellency Mr. President Ilham Aliyev, having assessed those threats presciently, mentioned in one of his speeches: "Today, the world is struggling for mostly oil and gas resources and fortunately Azerbaijan efficiently uses those resources for the sake of welfare of the people and development of the country. However, there will be a time when struggle for water resources will be aggravated. We have already been observing appearances of that struggle. In this case, water safety should be completely ensured in Azerbaijan".

Mr. President having emphasized ways to ensure water safety, said: "Efficient use of water resources, implementation of new projects, construction of new channels and establishment of water reservoirs are issues of strategic importance for Azerbaijan".

The country's Water Policy is also implemented through National Plans, State Programs and Action Plans. Government of Azerbaijan is implementing the National Environmental Action Plan since 1996, developed with the support of World Bank. There are completed and ongoing various state programs in social-economic sphere in Azerbaijan, which are listed below:

- National Program on Environmentally Sustainable socio-economic development in the Republic of Azerbaijan (2003);
- National Program on Restoration and Enlargement of Forestlands in Republic of Azerbaijan (2003);
- Program on Development of Hydrometeorology in the Republic of Azerbaijan (2004);
- State Program on Socio-Economic Development of Regions of the Republic of Azerbaijan for 2004-2008 (2004);
- State Program on Effective Use of Summer and Winter Pastures, Hayfields, and Prevention of Desertification in the Republic of Azerbaijan (2004);
- Comprehensive Action Plan on improvement of Ecological Situation in the Republic of Azerbaijan for 2006-2016 (2006);
- State Program on poverty reduction and sustainable development in the Republic of Azerbaijan 2008-2015;
- State Program on Socio-Economic Development of Regions of the Republic of Azerbaijan for 2009-2013 (2009);

- State Program on Socio-Economic Development of Regions of Republic of Azerbaijan for 2014-2018 (2014);

State Program on prevention of harmful impact of flooding, mudflow and inundation was drafted by State Agency of Water Resources under Ministry of Emergency Situations and submitted to Government of the Republic of Azerbaijan in 2012.

Strategy of the Republic of Azerbaijan for 2017-2035 regarding integrated water resources management has been developed in order to ensure sustainable socio-economic development of the country, and also for securing water safety.

Water strategy identifies main directions of development of water economy complex of the Republic of Azerbaijan, protection of water bodies, protection of population and territories against harmful impacts of waters, as well as establishment and realisation of competitive advantages of the country in the field of water resources.

Strategy also envisages establishment of favorable conditions for efficient mutual cooperation between the participants of water relations along with identifying main principles of state policy in the field of use and protection of water bodies, directions of decision making and implementation regarding the protection of water ecosystems with great social and economic impact.

Main objectives of state water policy are the following:

- Achieving safety of water resources, also good status of surface and ground waters:
- Supply population and also agriculture and industry sectors with safe water meeting relevant standards based on integrated water resources management principle while ensuring that amount of water needed for ecosystem and natural water recovery and also rights of current and future generations for use of water resources are guaranteed
- Provision of sustainable use of water resources for recreational purposes.

Water policy in Azerbaijan is mainly implemented through water legislation, particularly, through the National Water Code. Several laws and a number of bylaws were adopted on the basis of the Code including the Law on Water Supply and Wastewater, Law on Amelioration and Irrigation, Law on Hydro meteorological Activities, Law on Entrails, Law on Municipal Water Economies, Law on Safety of Hydro technical Facilities etc.

Aformentioned issues are main objectives of Sustainable Water Use, which is strategic goal of the Water Policy. Clearly formulated State Water Policy creates platform for achieving agreements on reasonable and equitable use, restoration and protection of transboundary water sites. These programs have managed involving funds for the development of water and sanitation infrastructure in the country. Since 2001, the Asian Development Bank has approved loans for projects amounting to US\$ 800 million for water and sanitation in secondary cities and large settlements. The World Bank has approved loans worth US\$ 490 million to improve water and sanitation conditions in 43 districts. Furthermore, bilateral cooperation with such countries as Japan and with other financial institutions is ongoing.

High attention is paid to water supply and sanitation systems improvement not only in rayon centres and secondary cities but also in almost all residential areas and similar work on improvement of above systems will be implemented in upcoming years.

Main national authorities responsible for water policymaking and management of water resources are Ministry of Ecology and Natural Resources (MoE), State Agency for Water Resources established recently (February 2011) within the Ministry of Emergency Situations, Amelioration JSC and Azersu JSC.

Establishment of given State Agency is important step in addressing most of institutional and management issues related to the water sector. However, there is still a need for clear identification of distribution of rights and responsibilities of above organizations in order to avoid redundancy and achieve most efficient use and management of water resources. There is no arranged state water management system based on basin principle in Azerbaijan. It is necessary to identify one state authority, which would bear responsibility for integration of water provision of all sectors, including population, economy, agriculture and etc with water resources, and implementing measures for improvement of condition of all water bodies (rivers, reservoirs etc).

The Republic of Azerbaijan is looking for an enhanced cooperation with the European Union. The priority areas for cooperation have been agreed by the Government of Azerbaijan and the European Commission in the Country Strategy Paper for 2007-2013 under the European Neighbourhood and Partnership Instrument (ENPI). Mutually agreed EU/Azerbaijan Action Plan shows Azerbaijan's commitment to implement jointly agreed priorities in compliance with the international and European norms and principles. The plan identified priority actions for key environmental sectors including water management. Water Framework Directive is most important piece of legislation covering protection of water environment in European Union. It defines the key principles as well as key objectives and the implementation plan for the management of water resources in the European Union.

National Policy Dialogues (NPDs) were launched in countries of Eastern Europe, Caucasus and Central Asia (EECCA) as the main operational instrument under the EU Water Initiative EECCA component to support achievement of UN Millennium Development Goals. The UNECE Secretariat acts as a strategic partner in implementation of the NPDs in EECCA on integrated water resources management (IWRM).

The NPDs IWRM objective is to initiate country-specific activities in EECCA countries regarding IWRM. NPDs are aimed to improve regulatory and administrative frameworks for IWRM; help countries in setting their priorities; identify relevant projects that need support and capacity building in the countries to address water management challenges. In addition to its original function, the National Policy Dialogues and their Steering Committees also became a national coordination mechanism for water-related projects, carried out under the auspices of international organizations and countries.

Since 2006, UNECE has been carrying out NPDs in IWRM in four countries of former Soviet Union. These policy dialogues have been mainly financed by the European Commission. In 2010, the UNECE has launched the NPDs in Azerbaijan and in a number of other EECCA countries.

The NPD IWRM in Azerbaijan started in April 2010 when a pre-mission by the UNECE representative visited Azerbaijan. Mission included meetings with the authorities and relevant national and international stakeholders. The NPD IWRM Steering Committee has been established and a Memorandum of Understanding on a NPD on IWRM was signed in September 2010. The first meeting of the Steering Committee took place on 12 October 2010.

The NPD IWRM in Azerbaijan focuses on the development of government strategy for management of water resources based on the principles outlined in the European Union Water Framework Directive (EU WFD) and the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) and its Protocol on Water and Health, as well as other United Nations and EU instruments. As party to the Convention Azerbaijan actively cooperates for implementing requirements under the convention

The Strategy is based on the principles of international water legislation and to EU Water Framework Directive (WFD).

The overall goal of the national water resources management strategy is: to enhance and

promote all national efforts towards the efficient, equitable, and optimum utilization of the available water resources of Azerbaijan for significant socio-economic development on sustainable basis.

The National Water Strategy(NWS) of the Republic of Azerbaijan will be aimed to have the water resources of the country be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the national legislation and international norms.

An international consultant was contracted to support implementation of the NPD IWRM in Azerbaijan and work with the National Experts to prepare inputs into the discussions of the second and third NPD IWRM Steering Committee meetings in April and November 2011. Steering Committee includes representatives of Ministry of Ecology and Natural Resources (MENR), Ministry of Emergency Situations (MES), Ministry of Health (MOH), Amelioration JSC, Azersu JSC, MFA, National Academy of Science (NAS), BSU, NGOs, other national agencies members.

Steering Committee had two meetings 2011. Work on preparation of WS according to MoU between MoE and UNECE was discussed in first meeting and the in the end of 2011 they discussed main content of strategy. The next meeting was planned to be held in May 2012 to discuss draft strategy, which then would be submitted to relevant agencies.

This work on preparation of WS has been undertaken by participation of the group of experts from different agencies in close collaboration with relevant government agencies, institutions and stakeholders, and will involve continued public input. Representatives from above agencies, mainly from Ministry of Ecology and Natural Resources, Ministry of Emergency Situations, Ministry of Health, Amelioration JSC, Azersu JSC, National Academy of Science, BSU, NGOs actively supported experts to prepare the strategy. In parallel with the National Water Plan development, comprehensive Water Resources Policy and other related legislation will be drafted as well.

Guidelines and other related documents and directive of EU, UNECE, UNEP, GWP and other international organizations have been used and most of requirements of international water legislation were taken into account during the process of strategy development. Expert group also studied and used experience of other countries which have similar water resources situation and water management traditions (Tajikistan, Kazakhstan, Nepal, Russia, Jordan) through their national strategies. Some principles included into strategies of different countries of Europe (England, Wells, Albania), Australia, USA and Canada and are relevant to water sector of Azerbaijan have also been incorporated into strategy as well.

With financial support of ADB for enhancing water strategy document, new version of Water Strategy was developed during last 2 years (2014-2015) and submitted to relevant organizations.

Both documents note that main goal of the Water Strategy is provision of sustainable water use.

By support of EU funded Environmental Protection of International River Basins Project in 2016 above 2 versions of draft Water Strategy document was finalised by participation of project team and above mentioned national experts and submitted to the government.

WATER RESOURCES, WATER ALLOCATION AND CURRENT STATUS OF WATER INFRASTRUCTURE

1.1 Water resources

Water resources of Azerbaijan Republic consist of surface and ground waters. The country is one of the lands with scarce water resources, drinkable waters are distributed unevenly within the country while having limited resources.

Surface waters and partially ground waters are formulated from atmosphere precipitations. Water resources are exposed to severe pressures as a result of climate changes and anthropogenic impacts.

Average annual amount of rainfall within the country is 427 mm (or 36,96 km³), out of this 119 mm (or 10.3 km³) is expended for water formulation (69 mm for surface and 50 mm for ground waters), remaining 308 mm is evaporated. Flow module within the country is 3.78 l/s* km², and flow ratio is 0.28.

Surface water resources are collected in rivers, lakes, water reservoirs and other ponds and glaciers. Assessment of surface water resources were conducted in the end of 80's of last century using results of stationary observations made until 1975 and their results were published in 1989 (S.Rustamov and R.Qashgai). In this case water resources in rivers with less or completely no observation data have been identified based on diverse regularity. According to those calculations, surface water resources of the country are 30,9 cub.km, and this resource is decreasing up to 22-24 cub.km in dry years. Almost 70% of freshwater resources of the country, i.e 20,6 cub.km are formulated outside the country boundaries and enter into the territory of the country with trans boundary rivers (21 rivers) across from territories of neighboring states.

Annual forecasted resources of drinkable groundwater sources within the country territory are near to 9 billion m³. Confirmed groundwater resources make 5.2 billion m³, almost one third out of this is used. Consumption resources of groundwater also are distributed unequally; they are mainly collected in Samur-Devechi, Sheki-Zagatala, Ganja-Gazakh, Karabakh, Mil, Shirvan, Lankaran, Jabrail, Nakhchivan foothill plains.

Daily amount of surface and ground waters per person within the country is almost 10 thousand liters including trans boundary waters, and approximately 4 thousand liters while not considering trans boundary waters. However, those resources cannot be used in full capacity. Thus, while general water capacity of 24 water reservoirs with more than 9 million m³ water capacity for each of them is 21442.3 mln. m³; their dead capacity makes 9747.2 mln. m³; that is why consumed useful volume is 11695.1 mln m³ when those reservoirs are filled with normal pressure levels. Practically, used amount of this capacity is even less due to water losses and other reasons.

Totally, the water resources of Azerbaijan are distributed as following:

- River waters: 28.5 to 30.5 km³ of which 9.5 to 10.0 km³ belong to internal rivers and rivers flowing into the Caspian Sea
- Freshwater lakes: 0.03 to 0.05 km³
- Water reservoirs: full capacity of 21.9 km³ and a useful capacity of 12.1 km³
- Exploitation capacity of ground waters: 8.0 to 9.0 km³
- Water resources of glaciers: 0.080 to 0.085 km³

Main water bodies in Azerbaijan and status of water resources are given in Annex 1

1.2 Water consumption and water use

Production of agricultural products is mainly concentrated in irrigated lands of our republic, with complicated climate and heavy land conditions. Almost half of 3.2 million hectare arable lands, or 1 million 424 thousand hectares are irrigated lands. Those lands are supplied with permanent engineering irrigation and collector-drainage networks. 85-90 percent of produced agricultural products fall in the portion of those lands.

Consumption out of 12,509 km³ general water intake in 2013 was 65.8%, i.e. 8,229 km³, out of which 5,746 km³ (69,8%) was consumed for irrigation and agriculture, 2,056 km³ (24.987%) for manufacturing needs, 311 mln m³ (3.78%) for domestic - drinkable water supply purposes. (Azerstat, 2013). Total amount of water (16,176 km³) taken from natural sources has been decreased by 32,67% and water consumption (12,477 km³) decreased by 34.1% compared to 1990. 53 million m³ of drinkable water has been used for production purposes. Amount of lost water during the transportation was 4280 mln. m³, that made 52% of consumed water. 5173 mln. m³ of wastewater is discharged, out of which 248 million m³ was untreated.

Total water intake from water sources in Azerbaijan in 2014 was 11,779.2 km³, out of this 8,2 billion cubic meter (86,7%) is consumed. 70% of consumed water, i.e. 5,8 billion cubic meter was provided to water users from the watersheds. All agricultural plants for the republic in 1361,4 thousand hectare lands are irrigated 3,2 times in average.

Supply of irrigation water is provided by 479 Water Users Associations established in territories of 48 administrative regions. The irrigated area served by them is 1329044 ha.

As seen from the above-mentioned figures, main water user in Azerbaijan is irrigation farming and water is used in this sector mostly in vegetation period (during April-August months).

Large volume of water used in irrigation confirms the existence of demand for water in agriculture, and this is related to dry climate conditions of plain areas in Azerbaijan. Irrigation development has been increased continuously in years of 1950-1990 and area of irrigated lands reached 1,45 million hectares. While general irrigation infrastructure has been developed intensively, especially secondary and third level irrigation channels have been degraded due to lack of maintenance. Because of extreme use of water and ineffective work of drainage systems, more than 600,000 hectares of irrigated lands exposed to salting and assessed as degraded. (FAO, 2009). Out of them, 9% considered heavily saline, 14,9% moderately saline and 35% less saline. (National Academy of Science, 2012) It should be noted that water use decreased during 1990-2015.

Water used for irrigation was 8,6 billion m³ in 1990, decreased to 3,7 billion m³ during 1990-2001, and since 2002 water used in irrigation increased while being 5.7 billion m³. (2011) (Azerstat 2012). Currently, irrigated areas are 1,42 million hectare. Azerbaijan Amelioration and Water Economy Joint Stock Company plans to reach 1,6 million hectare and therefore irrigated lands will be extended 0,18 million hectare more.

The population has been increasing in recent years averagely 100.000 person per annum. It is obvious this would increase demand for water. As irrigation is main water user, this growth could be 10-20% for next 10-20 years.

List of works important for implementation by the Azerbaijan Amelioration and Water Economy Joint Stock Company till 2015 according to State Program for Social-Economic Development of Regions of the Republic of Azerbaijan adopted by the Presidential Decree dated

April 14, 2009 and Works implemented and planned on drinking water supply and industrial water supply are presented in Annex 2-4.

1.3 Water scarcity

Limited water resources. Average annual water scarcity has been calculated as 3,7 km³, and this makes 4,75 km³ in dry years. According to country Second National Report regarding the UN Framework Convention on Climate Changes, water resources are forecasted to be decreased more 23% by 2050 resulted from climate changes. Dependence ratio of regional countries on trans boundary waters is 76,6% for Azerbaijan, 11,7% for Armenia and 8,2% for Georgia. As since from this data, Azerbaijan is the only country facing with water scarcity problems in Southern Caucasus.

1.4 Water quality

The quality of the water in the rivers of Azerbaijan (such as Kur, Araz and other trans boundary rivers) is determined mainly from the neighbouring countries. According to the data of corresponding agencies of the three countries, in 2000 468 Mm³ of wastewater were discharged into rivers in the Kura River basin of which 227 Mm³ (51%) are from Georgia, 219 Mm³ (46%) are from Armenia and only 12 Mm³ (3%) are from Azerbaijan. It is noted that in 1992, these discharges averaged 35 to 55 per cent more than in 2000. Because of the large discharge of wastewater into the Kura River and its trans boundary tributaries from the neighbouring countries, the waters of these rivers enter into the territory of the Republic contaminated with nitric compounds, phenols, oil products, metals, and other chemical compounds.

The Aras River exerts considerable influence on the quality of waters of the Kura River, especially on the mineralization. The Aras River is seriously contaminated in Armenia (in the tributaries of Razdan, Agarak, and Okhchuchay Rivers). Thus, below the Aras River, the mineralization of waters of the Kura River increases to a level of 800 to 1200 mg/l. It is double in the upper part of the river from Mingachevir Reservoir and 35 to 50 per cent higher in the Aras River. High amounts of phenols, metals, sulphates (correspondingly 13, 9 and 6 times the PA) is observed in the river water. The value of mineralization (1,130 mg/l) exceeds the standard by 25 to 30 per cent.

The Ganykh (Alazan) River is also one of the trans boundary rivers influenced by contamination in Georgia. For example, the amount of phenols exceeds the standard 5 to 7 times, metals 6 to 8 times, and oil products 2 to 3 times in the river water.

The Agstafachay River is one of the tributaries of the Kura River and exerts a high influence of contamination in Armenia. In the boundary area of the Agstafachay River with Armenia, the amount of phenols exceeds the norm 9 times, metals 5 to 8 times, oil products 3 to 4 times, and sulphates 2 times.

National Department of Environmental Monitoring (NDEM), National Hydro meteorological Department (Hydro met), Caspian Complex Monitoring Administration and Geological Exploration Service under the Ministry of Ecology and Natural Resources operate monitoring networks on water. Samples taken from water bodies are analysed at Central Laboratory of Department in Baku. Analytical laboratories equipped with modern facilities started operating in Gazakh District on the Kura River and Beylagan on the Aras River for checking water quality at points of entry of trans boundary rivers in Azerbaijan in 2005. Monitoring for pollution of surface water was conducted in 50 observation points for 42 water bodies (27 rivers, 4 water reservoirs, 1 port, and 10 lakes).

It has been observed that a number of indices of the quality of water in the boundary area of the Kura River with Georgia (second Shykhly point) regularly exceed the permissible amount (PA) of these parameters. Thus, the amount of phenols exceeds the PA 4 to 8 times, metals 6 to 10 times, sulphates 1 to 2 times, and oil products 2 to 3 times.

Quality of irrigation water is controlled by 79 hydrometric points established on irrigation channels and collectors. Mineralization (mg/l), hardness (eqv/l), NO₂, NO₃, NH₄ (mg/l) ion and cations, suspected substances (mg/l), alkalization (mg/l) is measured in hydrological points with the frequency of 3 times per year and water abstraction (m³/s) and flow volume (km³) is measured 3 times a month.

Number of surveys related to quality of drinking water has been increased. Thus, physical-chemical analysis on 53578 samples and microbiological analysis on 53388 samples have been conducted. As a result of taken measures mass portion of samples non-compliant with available standards has been decreased from 32,1% in 2009 to 10,44% in 2014. Along with that, mass portion of samples in microbiological analysis non-compliant with available standards has been respectively increased from 2,38% to 18,55%.

1.5 Water use and protection

Water legislation and legislation on environmental anticipates complex of legislative enactments and legal standards on protection of water resources and water objects (Water Code of the Azerbaijan Republic, Article 14, pages 81-95). Furthermore, the Government of the Republic approved a number of decisions, defining rules of state monitoring, exploitation, and protection of water objects.

The main provisions on mechanisms for compliance with and enforcement of environmental requirements in Azerbaijan are provided in Article XI of the 1999 Law on Environmental Protection. Such mechanisms include:

- State monitoring of compliance and enforcement by competent public authorities, namely competent executive branch authorities;
- Self-monitoring of compliance by operators of industrial activities;
- Public environmental control upon appeals and complaints by individuals and non-governmental organizations

The major economic instruments related to water are water use fees, fines and compensations.

1.6 Existing water use permitting and fee structures

Article 98 of the Water Code shows that water use payments, depending on water's quality, purpose (drinking water, irrigation water, etc.), technical performance of water economy object, methods of intake and transportation of water, other factors influencing volumes of production expenditures, shall be differentiated by separate water economy systems. Payment types and rules have been secured in Article 99 of said Code and following payment types have been identified for the use from water bodies:

- Water intake from water bodies for specific purposes and discharge of wastewaters into water bodies;
- Use of water bodies for hydropower and transport needs;
- For extraction of minerals from water bodies and geological survey and drilling works, also construction and operation of underwater facilities;
- organized use of water objects for sport, recreation and tourism purposes;
- Use of water bodies for other purposes envisaged in the legislation.

Payments for use of water bodies for hydropower and transport needs, as well as organized sport, recreation and tourism purposes have not been established since 20 years from adoption of Water Code.

All regulated tariffs and fees in the Republic of Azerbaijan are subject to approval by Tariff Council.

Relevant stakeholder authorities (state institutions) prepare proposals on tariff structure or rate reconsideration and submit to Tariff Council. Tariff Council is chaired by Minister of Economy and holds sessions upon reception of proposals. Depending on infrastructure sector Council invites representatives of appropriate state bodies to the session.

Few additional characteristics of the existing system should be noted:

- Water use permit states that the water user should install a water metering device to record the actual volume of water used. If water meters and/or water metering posts do not exist or do not function properly, the calculation of the volumes of water withdrawal is made by an alternative methods or models. It is asserted that these alternative models aim to overestimate the actual quantity of water by approximately 300%.
- Control over the regulations for calculation and payment of water resources fees (including the transfer of calculated fees to the state budget) and actual water use volumes is exercised by the Cabinet of Ministers and Ministry of Taxes;
- Legislation stipulates a penalty for each day of payment delay, but enforcement of penalty is complicated and in most cases very expensive procedure and beneficiaries rarely start court trial against non-payers.

While the system of water resource fees is relatively clear and simple, the following important issues and recommendations have been noted:

- The current system of water resource fees does not take into account the relative abundance (or scarcity) of water at the basin level (supply and demand, seasonal variations, differentiation of surface and ground waters). Furthermore it takes only partial account of the economic value of water (by sphere of use, quality of water used, level of pollution);
- Currently there is no provision to adjust automatically (e.g. once per year) the level of the water resource fees for inflation (as measured for example by the consumer price index). The fee thus gradually loses its real value over time, and fails to create incentives for the promotion of water conservation.

Wastewater discharge fees

Wastewater collection and treatment fees are collected by AzerSu JSC. Currently no volumetric fees applied to wastewater discharge to the environment. Permissible volumes of wastewater discharged into water resources or their watersheds, description of outflows, as well as permissible limits of discharges of hazardous substances in wastewater are included in wastewater discharge permits. Fees rate vary from region to region depending on cost of services.

Fees for use of natural resources

In accordance with Law on Environmental Protection (into force on August 4, 1999), Government Decision N410 (dated February 22, 2001) define environmental fees to be applied for wastewater discharge permit issued by Ecology Expertise Department of MENR.

Maximum permissible quantities of pollution discharge for each of the substances are defined in the wastewater discharge permits. If these permissible quantities are exceeded, the base fees are multiplied taking into account harm to environment.

Water Use Permitting

Water use and discharge permits are issued by Amelioration and Water Economy JSC and Ministry of Ecology and Natural Resources (MENR). For the different type of water abstraction and discharge the following steps are envisaged by legislation:

Surface water:

- Applicant submits WUP application to Amelioration JSC
- Initial assessment of WUP application by Amelioration JSC
- Determination of need EIA with State Ecology Expertise Department of MENR
- Depending on water use purpose State Hygienic-Epidemiological Centre of Ministry of Health checks water on compliance to relevant State Standards
- Experts of Amelioration JSC review
- Establishment of preliminary draft permits (by Amelioration JSC)
- Applicant reviews draft WUP
- Amelioration JSC issues permit or rejects application

Groundwater:

- Applicant submits WUP application to MENR
- MENR transfers application to its Hydro-geological Expedition Service and Ecology Expertise Department
- Determination of need EIA with State Ecology Expertise Department of MENR
- Depending on water use purpose State Hygienic-Epidemiological Centre of Ministry of Health checks water on compliance to relevant State Standards
- Experts of MENR's Departments review
- Creation of preliminary draft permits (by MENR)
- Applicant reviews draft WUP
- MENR issues permit or rejects application

Discharge permit

- Applicant submits discharge permit application to MENR
- Application is a document which contains comprehensive information regarding discharge object, including technical design of facilities
- MENR transfers application to its Ecology Expertise Department for EIA
- Depending on water use purpose State Hygienic-Epidemiological Centre of Ministry of Health checks water on compliance to relevant State Standards
- Experts of MENR's Departments review
- Creation of preliminary draft permits (by MENR)
- Applicant reviews draft WUP
- MENR issues permit or rejects application

1.7 Irrigation water use

Azerbaijan is ancient irrigation cropping land with complicated relief and natural-climate conditions. Out of its overall land fund of 8660 thousand hectare, only 54,9% (4799 thousand hectare) is fit for agriculture. 1925.3 thousand ha of those areas are tillage lands, 230.0 thousand ha are lands under permanent vegetation and 2614.4 thousand ha are the lands under regular pastures and hayfields. Irrigated cropping has been intensively extended over the country. Thus, 1684.3 thousand ha or 87.5% out of 1925.3 thousand tillage lands are plantations, and 1435.2 thousand ha or 85.2% out of those lands are irrigated. 80-90% of agriculture products are produced from irrigated areas.

Arable and fit lands for agriculture are mainly located in plain-arid zone that is characterized with hot climate and less rainfalls. As summer is hot and less precipitation falls in winter months, this does not allow enough moisture reserve in the soil. That is why cropping is carried out in 78% of 1925.3 thousand ha that could be used under tillage through artificial irrigation and relevant amelioration and irrigation measures are required to be taken. Currently 1435.2 thousand ha area is irrigated within the country. 126 thousand hectare of generally irrigated lands is under occupation. Irrigated lands are equipped with amelioration and irrigation funds constructed at high technological and engineering level. Complex amelioration works have been carried out in 609 thousand hectare of those lands, 288 thousand hectare was supplied with open, 309 thousand hectare with closed and 13 thousand hectares with vertical drainage networks.

Water economy complex has varied and wide infrastructure. Water economy complex consists of water reservoirs, hydrological units (waterworks), irrigation, drainage networks, water intake facilities and different hydro technical facilities, pumping stations, sub artesian wells etc. that are varied for their designation, regime characteristics and parameters.

Because there were challenges in operation of irrigation and collector-drainage networks within the farm, the Cabinet of Ministers of the Republic of Azerbaijan has made special decision in 2000 to take them under state patronage. According to this decision, and as a result of inventory works made 24,9 thousand km out of 82,3 thousand internal farming irrigation and collector-drainage networks was considered completely unfit and 35 thousand km irrigation channels and 22,4 thousand km collector-drainage networks, 82,9 thousand hydro-technical facilities, 151 pumping stations, 1196 sub artesian wells and other internal farming amelioration and irrigation objects were accepted to the balance of Amelioration and Water Economy Joint Stock Company.

Some of them have been repaired and restored for the funds allocated from state budget. Repair and cleaning works are being continued in these networks for the account of operational measures and thorough maintenance. However, implemented works meet the demand partially and additional measures are required in this field. Certain issues are still remaining in preserving existing ameliorative systems, their operation and development of this sphere, which need to be addressed significantly.

Main part of 2930 km metal, asbestos and polyethylene pipes of various diameters installed in water supply systems for winter pastures have been physically and morally worn-out because of operation for a long time (40-50 years) and some parts of metal pipes have been exposed to corrosion. There is a need for repair and reconstruction of water supply systems for winter pastures.

In order to prevent disproportionateness in river flows and efficient use of water resources in national economy, 135 water reservoirs, 16 hydro junctions have been constructed on the rivers, 7119 sub artesian wells have been drilled for meeting irrigation needs from groundwater, including 305 sub artesian wells for meeting drinkable water demand of population.

Currently 120 water reservoirs, 19 hydro junctions, 51,7 thousand km irrigation channels, 29,6 thousand km collector-drainage networks, 931 pumping stations, 7517 sub artesian wells, more than

132 thousand various hydro-technical facilities, 209 km stone-concrete and concrete, 1677 km soil dams, other water farming systems and facilities of state importance with general 21,5 billion cubic meter water capacity are being operated by Amelioration and Water Economy Joint Stock Company.

Several water reservoirs, including Takhtakorpu water reservoir outside the course, Shemkirchay and Takhtakorpu water reservoirs on water course and Takhtakorpu-Jeyranbatan channels have been constructed according to dynamic development of the country. Thorough repair measures have been taken on several main channels, collectors and water collecting facilities. Only in 2014, construction and reconstruction of 1024,3 km irrigation channels, 314,9 km collector-drainage networks, water supply improvement in 45230 hectare land and improvement of ameliorative conditions in 26012 hectare land have been carried out for the account of fundamental investments from all financial sources, 508.5 hectare new irrigated lands have been included into planting turnover, water supply improvement works have been carried out in 4600 hectare land area in 324 residential settlements of 34 regions (more than 622 thousand population) and protection measures against torrent and flooding waters for the length of 12631 km in the rivers have been taken.

Furthermore, current situation of water economy complex is not considered satisfied. So that, water reservoirs, large main channels, hydro junctions, main collectors have been worn-out because they were operated for a long time without thorough maintenance. More than 90% of irrigation channels are in land course, significant volume of water is lost during transportation of water. 20% of 51450 km irrigation network, i.e. 10424 km, also 19% of 32360 km collector-drainage network, i.e. 6229 km need repair and rehabilitation.

Water level increase of Caspian Sea leads to deterioration of ameliorative conditions of irrigated lands in coastal zones. Coastal protection dams mainly constructed from the soil have been exposed to deformation. Reduction of capacity of water reservoirs is also observed due to siltation.

Hydrological study works of water reservoirs also started in middle of 50's of last century. Only 5 of 41 large or middle capacity water reservoirs are covered by hydrological observation points in the republic. Thus, for improvement of hydro-meteorological service to water reservoirs, extension of observation network and increase of accuracy of received information is required.

As efficient and economical use of water resources requires adoption of water-saving progressive irrigation techniques and technologies, and improvement of water farming systems and their management principles; starting from 1997, the transfer has been gradually made to paid use of water; establishment of Water Users Associations was initiated in the regions based on the will of water consumers. According to requirements of Law on «Amelioration and Irrigation», Associations are registered again as Water Users Units. Already 450 Associations have been registered again as Water Users Units, while 21 Units are prepared for re-registration. Works in this direction are being continued.

1.8 Drinking water supply

In Azerbaijan all existing water sources are used for drinking water supply. Main sources of water supply in regions are surface and ground water sources of near located areas. Polluted waters of Kura River below Mingechavir reservoir is used by local populations as drinking water sources.

From all volumes of water supplied to the city of Baku annually (16 m³/sec) the purest are waters of:

- Khachmaz (constructed in 1956, capacity 2.65 m³/s) and;
- Shollarlines (1917-1937, capacity 187 km from Baku, about 1.5 m³/s).

Water from Djeiranbatan water intake (Samur-Absheron canal, of 26.4 m³/s water 12.3 m³/s is

pumped to reservoir) has some pollution by ground and surface water, air (iodine, Zink, Cu,) is also of good quality (7.5 m³/sec drinking and 5 technical) From Kura river:

- Kura I-1972, 3.9 m³/s;
- Kura II-1987, 5.2 m³/s

Water taken from Kura River is more polluted. Currently water intake is 7 m³/sec of which 4 reaches Baku.

About 1.7 cub km of ground waters (20% of the total) annually is used for water supply to provincial towns and rural areas.

Government is implementing Oguz-Gabala-Baku water pipeline project (5 m³/sec). As mentioned above, scarce water resources of regions of Azerbaijan are used by different purposes without considering of environmental requirements. For many of rivers in summer water discharges reduce significantly and as result of significant water intake in downstream near their mouth some of them dry. This is serious environmental issue as river ecosystem loses its meaning in that case. Most of the rivers can only meet local water demands.

In order to identify necessary sources of drinking water relevant surveys are being carried in gout.

There are many issues relating to water supply and sanitation sectors. As result of water scarcity, improper state of the water supply and distribution network water supply coverage in the republic still needs to be improved, mainly in rural areas. Today these indicators are as below:

Population connected to water supply (in %):

- Baku 95
- Sumgayit, Ganja 95
- Secondary cities 83
- Rural areas 11

In sanitation sector

- The waste-water networking Baku serves about 72% of the city, but only about 50 % of the waste water is treated; 90 %- biologically and only 10 %- mechanically.
- In other urban areas in the country, the coverage drops up to 32%. There are waste - water treatment plants in 16 cities and towns; most are partly or completely out of operation.
- In rural areas, on-site sanitation is used, primarily latrines

The quality of water supplied to population in many cases doesn't need required standards. To address these issues government undertake necessary steps in cooperation with the donor community.

The Government of Azerbaijan adopted wide program on rehabilitation of WSSS of 60 rayon centers. Works have already been started in 20 regions.

2. MAJOR CHALLENGES

The main characteristics of the water resources of Azerbaijan are their limitations, uneven spatial and seasonal distribution, and the fact that some 70 percent of available surface water resources come from neighbouring countries and enter Azerbaijan in a heavily polluted state (namely the Kura and Aras rivers). The quotient amounts to an average of about 1 000 m³ of water per person per year, putting the Azerbaijan Republic to one of the lowest rankings in the world. Most water

loss occurs in agriculture mainly because of inefficient and poorly maintained irrigation systems. A decrease of 15% of both run-off and groundwater recharge is expected within the next 50 years due to the predicted increase of air temperature by 2 °C to 3 °C.

Water quality is a pressing issue in Azerbaijan. Majority of the population does not have reliable access to safe drinking water, and the lakes and rivers of the country are heavily polluted with both organic and inorganic substances. The Kura River delta and the Absheron peninsula constitute two of the five pollution hotspots of the entire Caspian Sea. This situation is caused by mining, leather and fertilizer industries along the rivers, and the lack of wastewater treatment facilities. About 80 per cent of the water consumed by the whole population for drinking and irrigation comes from contaminated rivers, posing serious challenges to public health.

By the information of WHO and WB following health related indicators were observed in Azerbaijan in 2008 (See Table below)

Table. Water related health information by WB and WHO

	2008 (actual or estimated)
Population (million)	8.68
Birth rate (births per 1000 population)	17.8
Mortality rate from diarrhoea among children < 5 years (deaths per 1000 live births)	4.2
Mortality rate from other infectious diseases among children < 5years (deaths per 1000 live births)	14.0
Diarrhoea (cases/year, children < 5 years)	2.5
Diarrhoea (cases/year, population >= 5 years)	0.5
Household size	4.1

By the information of State Statistical Committee total infant mortality less than 1 year was 11.4 (per 1000 live births) in 2008

Deforestation in the upper part of river catchment areas has led to poor soil protection with damaging mudslides in mountainous areas of Azerbaijan. This in turn results in sedimentation of the rivers, and flash floods are frequent. Deforestation and overgrazing have led to erosion, causing as well high turbidity of river water. Floods also occur frequently downstream of the confluence of the Aras River due to a combination of increased water level in the Caspian Sea.

Groundwater resources are mainly restricted to the foothills and intermountain plains. Generally, underground waters are characterized by high quality. It is generally used in agriculture and common industries. In some areas ground water is mainly used for irrigational purposes. Total capacity of exploitative underground water reserves is estimated to be 8 to 9 km³ per year, which plays a significant role in sustainable water supply.

However, in the lowlands groundwater often has a high salt content due primarily to geological

characteristics, as well as to poor drainage and, to some extent, to the use of fertilizers. In some areas, groundwater is shallow and poorly protected. According to the national water company, about one-fifth of the water supplied derives from groundwater. Out of the 70 small cities, 48 are supplied with groundwater, and groundwater is the sole source of water supply in 35 cities.

Level of water supply (88% in urban areas and 71% in rural areas) and sanitation (some 34 per cent of the population was connected to sewerage systems) is also big issue in the country

There are many water reservoirs, channels and pipelines in the territory of Azerbaijan actually with a purpose to provide the population, industry, irrigation, energy and other sectors with water and to carry out annual and long-term run-off regulation. Further development of the water use facilities will lead to increased use of water resources. Although huge number of water facilities exist in the territory, needs in water provision still remain. It is connected to limited water resources and lack of economical water use scheme. There are concerns that the existing and planned hydropower stations will result in changes in natural river flow regime, river dynamics and morphology. Therefore it would be essential to develop the regulation of water courses into multipurpose direction taking into account the different needs between different interests.

Major challenges include the following:

- uneven spatial and seasonal distribution of water resources
- the lakes and rivers are heavily polluted with both organic and inorganic substances (municipalities and industry)
- groundwater often has a high salt content in the lowlands
- majority of the population does not have reliable access to safe drinking water
- leaking sewers and only about 3 per cent of the discharged water is treated
- water losses in agriculture mainly because of inefficient and poorly maintained irrigation systems.
- floods and sedimentation of rivers
- trans boundary pollution
- water constructions and River Systems regulations environmental effects
- dam safety issues
- Decrease of 15% of both run-off and ground water recharge is expected within the next 50 years due to the predicted increase of air temperature by 3 °C to 4 °C.

3. POLICY PRINCIPLES

The Strategy aims at the development of water resources management and water protection as well as water supply and sanitation in Azerbaijan to better meet both international and EU level standards and objectives. The Strategy contains goals which are divided into short-term (6 years), medium-term (18 years) and long-term goals. Strategy proposes that the regional administration would be based on the catchment areas.

The Strategy will be supplemented by a separate and more detailed Action Plan which will facilitate the implementation of the Strategy.

The current Strategy document concentrates on the following issues:

- strengthen protection of water resources and aquatic eco-systems

- ensure sustainability and effectiveness in use of water resources
- meet the needs of different water users including improvement of water and sanitation services to all citizens of the country and also irrigation water supply
- identify the needed programs and projects
- facilitate water protection and sustainable use of water resources
- define the goals of water resources management, the institutional improvements and creation of the legal framework required for the implementation of the Strategy.
- Promote water saving and cost-recovery
- improve the trans boundary cooperation
- enhance the participation of the stakeholders in water protection and management planning
- enhance communication between authorities, regional organizations and citizens
- strengthen capacities in the national and regional level

As water resources in Azerbaijan are not sufficient for meeting all the different needs and interests, Strategy therefore sets clear priorities, such as access to clean water and sanitation, the reduction of point source pollution and the establishment of cooperation on transboundary water courses. Water safety, adaptation to climatic changes and flood risk management is highlighted in the strategy.

Environmentally sustainable use of the water resources will be the basis on which the long-term economic utilization of the water resources is being built.

Regarding water resources management, the first step in introduction of integrated water resources management (IWRM) will be to use the system as contributory tool for promoting multiple uses of water resources and to set preferences to different water users. Otherwise, there is the risk that the targets set for the integrated management are simply impossible to reach in short term. It should also be kept in mind that IWRM should in principle be applied on a catchment level.

4. PRIORITIES FOR WATER STRATEGY

The main environmental problem related to water is the polluting of the scarce water resources in Azerbaijan Republic. The resources of clean water are not sufficient compared to population and water demand. This issue is also connected to high losses of water in irrigation because of bad condition of infrastructure and also use of low efficiency irrigation methods.

Groundwater forms a major part of total water resources, and 2/3 of the surface waters are in transboundary water bodies which are seriously polluted already in the territory of upstream countries. Based on opinions of citizens, main problems are lack of safe drinking water and poor sanitation. The treatment of wastewaters is in general outdated. The water resources are not evenly distributed either spatially or seasonally. So the pollution prevention and development of water saving practices are the basic ideas in the national water strategy.

Therefore the key goals for water strategy are:

- Guarantee good quality of drinking water and sustainable use of ground water resources
- Improve water supply system on the territory of the country and upgrade the wastewater treatment systems by increasing investments on water supply and sewage infrastructure
- Start practical and regular cooperation in transboundary waters

- Implement integrated planning approach on water uses and water protection in constructed water courses, reservoirs and irrigational infrastructures
- Promote water savings with education and investments on new technologies especially in irrigation
- Increase capacity building in administration based on IWRM principles
- Develop water legislation concerning water rights based on IWRM principles
- Create GIS based information on river basin (catchment) areas and water infrastructure
- Develop water monitoring and data system for surface and ground waters (including the study, management and protection of thermal and mineral waters)
- Adaptation to climate change and exceptional water conditions,
- Set up targets for surface and groundwater (including the study, management and protection of thermal and mineral waters) status, establish environmental flow requirements for water courses and provision of their realization

The Water Resources Strategy intends to achieve short, medium and long-term purposes, defined as follows:

- Short-term (6-year) purpose: Implementation of the comprehensive Water Strategy provides benefits to people. Quality and quantity of water supply is sufficient to address water demands of key sectors. Significant improvement in institutional capacity and legal basis supports interagency cooperation and stakeholder participation
- Medium-term (12-year) purpose: The Water Resources Strategy is operated to provide substantial benefits to people for basic needs fulfilment as well as other increased benefits related to sustainable water use. Coordinated water management allows covering water needs of involved sectors. Environmental condition of water ecosystems is improved.
- Long-term (18-year) purpose: Benefits from water resources are maximized in Azerbaijan in a sustainable manner. Water supply is efficient. Water quality corresponds to water requirements of relevant sectors. Undertaken measures allow providing environmental requirements.

In addition to the key activities associated with each of the outputs, indicators that may be used to evaluate the success of Strategy implementation are identified for 6-12- and 18-year timeframes.

5. IMPROVEMENT OF INSTITUTIONAL STRUCTURES AND CAPACITY BUILDING ACCORDING TO IWRM PRINCIPLES

Azerbaijan already has existing water legislation and a permit system with tariffs and sanctions in use but the administration is quite fragmented and the tasks related to water management are fairly scattered in the administrative system.

The Strategy suggests clear distribution of responsibility of policymaking, regulation/permitting and supervision of regulation compliance between the agencies. The permitting and supervision of water use should be separated from each other administratively and thus ensure an independent permitting process.

Catchment areas should be taken into account in the administrative set-up. Despite of that, the uniform supervision of legal compliance and the development of organizations' functions and operations necessitate centrally planned management of regional authorities.

Monitoring data, including primary data should be available for all government organizations both for collector and payer. Otherwise holistic assessments of problems and solutions for policy makers are impossible. All the laboratories that execute surveys and analyse field data should be certified.

Establishment of regional cooperation groups to support integrated water resources management on regional level is worth considering. These groups would consist of government, communities, enterprises and NGOs representatives which altogether are the key players for implementing water strategy at the regional level. These cooperation groups might also discuss the objectives of water use and protection, plan necessary new studies and seek new regional financing opportunities.

Above principles on improvement of institutional structures and capacities can be summarized as followings:

- clarifying the roles and duties of organization (short term target)
- establishing regional cooperation groups to support integrated water resources planning and management on regional level
- creation of an appropriate administration taking into account national and regional needs (long term target)
- enhancing personal's capacity building in water sector

Main activities to be carried are as:

- Enhance planning and implementation capacities of all stakeholder institutions. Strengthen National Agencies in the field of Water.
- Develop together a program for the establishment of river basin management institutions at water scheme levels.
- Assess technical capacity gaps, develop training programs to bridge these gaps, and start implementing these programs.
- Strengthen technical capacities of all stakeholders (public institutions, private sector, local communities etc.) in relevant aspects of water resources development, planning and management. Promote their active participation in basin planning

Indicators

- By 2023, NWAs designated and empowered to coordinate national level planning for the entire water sector;
- By 2023, rights and duties of all relevant institutional levels clearly defined and available, and their accountability demonstrated;
- By 2023, integrated river basin management planning(IRBMP) concept for all delineated river basins are selected as main target and start to develop ecosystem oriented RBMP;
- By 2023 adequate permitting and supervision procedures are created and independent authority for permitting procedure is identified
- By 2029 capacity of central and regional administration are strengthened to provide compliance with regulation and efficiency water management.
- By 2029, NWAs are capable to start implementations of RBMP and have adequate resources;

- By 2029, major river basin entities established and start to address river basin water issues according to RBMP;
- By 2035, all major and medium river basin entities established and implement RBMP

6. FACILITATION OF COOPERATION ON TRANSBOUNDARY WATER COURSES

Trans boundary waters pose a big problem, as the waters runs in the territory of each country. There are many examples of progress achieved through transboundary cooperation. The cooperation is especially useful in cases where countries have mutual water conflicts. At its best, trans boundary cooperation can be useful in mitigating mutual suspicions. The Strategy therefore includes goals and measures for promoting trans boundary cooperation.

Establishing international trans boundary cooperation in trans boundary river basins is essential. One of weak prerequisites of cooperation is connected with the fact that the other countries in the region are not parties to the UNECE Water Convention.

The Guide to implementing the UNECE Water Convention (ECE/MP.WAT/2009/L.2), adopted by the fifth Meeting of the Parties to the UNECE Water Convention in 2009, could be useful in advising how to take steps towards trans boundary cooperation. The Guide is also meant for non-Parties in the application of the Convention's provisions prior to accession. The Guide explains, inter alia, the contents of Article 11 of the Convention concerning joint programmes for monitoring and joint or coordinated assessments.

The cooperation with other basin countries is essential to the successful development of water resource potential and projects capable of supporting multipurpose benefits and improving the quality of water and its use. Throughout the Strategy implementation period, Azerbaijan will continue to foster good cooperation with its neighbours through government and non-government channels.

Activities

- Identify common development projects that can be developed jointly with the other riparian countries on equitable basis. Start developing these projects in line with the international requirements
- Review and update the projects that were prepared in the past but not implemented.
- Appraise and understand the water –related needs jointly neighbouring countries.
- Pursue confidence-building measures with neighbouring countries.
- common monitoring of transboundary water resources with neighbouring countries

Indicators

- by 2023, road maps for IWRM plan for joint river basins have prepared jointly with Georgia
- by 2023, some multipurpose projects agreed to and undergoing implementation;
- by 2029, expected benefits from treaties and multipurpose projects achieved;
- by 2029, riparian issues between neighbouring nations resolved;
- by 2029, several joint/multilateral water resource development projects implemented and functioning satisfactorily; and

- by 2035, international cooperation agreements and mechanisms for water-sharing available and mutually beneficial. IWRM plans are approved as a main tools for transboundary river basin management

In its first 6 years, the Strategy emphasizes the need to develop and implement an improved framework for regional cooperation. Existing water-sharing treaties will be monitored in conjunction with an effective mechanism for ensuring compliance. Water use demands in transboundary basins will be evaluated on regional basis jointly with neighbours and exploration of appropriate treaty mechanisms for due protection and use of water will be continued.

In the following 12 years, the Strategy anticipates that an effective mechanism will be found to facilitate possible regional and bilateral cooperation. Expected benefits from multipurpose projects will be realized, riparian issues between neighbouring countries will be resolved, and effective bilateral agreements for equitable water sharing will be in place. By the end of 18 years, various bilateral and multilateral projects for irrigation, hydropower, transmission grid and others will be completed and substantial mutual benefits will be achieved.

7. PROMOTION OF WATER SAVING AND COST-RECOVERY

When the problem lies in the lack of clean and usable water, resources should be directed to measures that have a direct or indirect effect on the problem. One important element is the saving of and even possible recycling of water. The tariffs and sanctions seem to lack incentives that would encourage people to save water. In the utilization of household water, the tariffs alone are not sufficient means to promote water saving. The system in general should be developed into a more supportive direction. In addition, the improvement of water systems and especially awareness-raising of citizens can help in reducing the water consumption per capita.

In order to secure access to the services for all people, the tariffs could be scaled based on the water consumption and people's ability to pay, thus providing everyone the possibility to receive the basic daily amount of water.

It is clear from above description how widely the following tariffs are applied in Azerbaijan: tariffs for water abstracted from springs, tariffs for wastewater treatment and environmental tariffs. The tariffs that are in use in Azerbaijan do not reflect the costs of water consumption sufficiently. The tariffs are one way to control the use of water but it might be also worth considering how to improve the pre-control of water consumption, introduce wider application of water permits and application of water purification obligations and permit regulations. Through these means the costs of water consumption could be reduced and covered, in addition to regular tariffs. All the different water users should be involved in the equitable cost-recovery.

In agriculture food production and pure drinking water should be prioritized. It is important to optimize the agricultural systems, develop cultivation practices and change cultivated species into less water consuming species. On the other hand retooling of irrigation systems and more centralized machinery should be emphasized.

In industry application of Cleaner Production and Clean Technology will help in saving water as well as in reducing the pollution load into water. These measures are very cost-effective, but their implementation necessitates subsidy systems of investments and international funding.

Overall, the tariff system should be developed so that it is not a means of punishment nor merely a way of fund-raising but a policy that encourages various water users to reduce their water consumption and water pollution load.

Water conservation and water demand management relate to the efficient and effective use of water and to the minimization of loss and wastage of water, and are important elements of the approach to the care and protection of water resources.

Achieving the sustainable development of water resources is one of the most important challenges facing Azerbaijan.

Actions

- River, lake, and shore land habitat and the general environmental, subsistence, and economic values of rivers, lakes, and wetlands shall, where possible, be conserved.
- Soil conservation, wetland retention, and the application of appropriate land use practices shall be promoted primarily by the provision of incentives, but with regulation where required, not only as essential elements of water conservation and protection, but also as key measures to reduce siltation impacts, downstream flooding, and non-point source pollution.
- Water retention, and control and timing of runoff, shall be promoted as part of watershed management.
- authorizations and licenses for water use will be in places
- The role of wetlands needs to be integrated into the water planning process.
- Map important, critical and priority watersheds and aquatic ecosystems.
- Ensure compliance with environmental regulations.
- Assessment of Climate change impact to water resources and development of relevant adaptation measures
- Setting up environmental flow requirements and their application
- Promote community participation.
- Develop resource planning to ensure habitat and resource conservation measures are included in policies.
- Research and develop better scientific tools to ensure ecological integrity is maintained.

Indicators

- by 2023, management plan for pilot watershed and aquatic system prepared and initiated;
- by 2023, water quality and wastewater quality standards developed and initiated, environmental flow requirements identified and applied,
- by 2023 Climate change impact to water resources has been assessed and relevant adaptation measures identified.
- by 2029, full scale environmental protection and management projects implemented in all priority watershed and aquatic ecosystems;
- by 2029 Climate change impact adaptation measures applied.
- by 2029, stakeholders participating in environmental protection and management;
- by 2035, quality of watersheds increased by 80% in all regions; and
- by 2035, adequate water quality for aquatic habitat including fish, human consumption and recreation, in all rivers and lakes.

In the next 6 years, emphasis will be placed on strengthening institutional capacity for watershed and aquatic ecosystem protection and management. An integrated and centralized environmental database system for information related to water resources development and management will be

developed. Relevant authorities will be designated as lead agencies for the design and implementation of pilot scale programs in selected watersheds and aquatic ecosystems.

During the following 12 years, based on the outcome of these programs, full-scale management activities will be implemented in all priority areas. An important component of this output will be the development of water and wastewater quality standards and regulations, to be carried out by the MOE with the assistance of National Tariff Regulatory Council. MOE will implement and enforce effective environmental review and assessment mechanisms.

Within 18 years, sustainable management of major watersheds and aquatic ecosystems will be a reality and development projects in all sectors will be expected to fully comply with environmental protection measures identified in project-specific EIAs. In recognition of the importance of community involvement in environmentally sustainable development, it needs to promote, facilitate and monitor community participation in watershed management and the protection of aquatic ecosystems

8. DEVELOPMENT OF MULTI - OBJECTIVE INTEGRATED USE OF CONSTRUCTED WATER COURSES, RESERVOIRS AND IRRIGATIONAL INFRASTRUCTURE, PROVISION OF DAM AND OTHER HYDROTECHNICAL INFRASTRUCTURE SAFETY

Due to uneven and unfavorable seasonal distribution of water, it is and has been imperative to construct reservoirs for water storage. The usage of the reservoirs should be based on the multi-use principle. There is no point in constructing reservoirs for solely irrigational or hydroelectric power production purposes. The reservoirs should be utilized widely for all different water needs. Measures on their and other hydro technical infrastructure safety are developed and applied. Development of legislation and administration are prerequisites for applying this kind of a multi-use system in practice.

In some cases water transfers between the catchment areas are as solutions to the water problems. From the perspective of sustainable use of water resources water transfers should be used only as a last resort and applied to a very limited extent.

As the consumption of groundwater seems to be increasing, resources should be allocated for identification of groundwater sources and determination of their water yield taking into account adequate protective factors. Prohibition of groundwater pollution and prevention of overuse should be included in the legislation. This necessitates mapping of groundwater resources.

The existing water infrastructure should be modelled at least in the key areas in order to facilitate the joint use of the systems and thus also reduce water consumption. The modelling would help in assessing the needs for new infrastructure and its integration into the existing infrastructure.

In the development of hydroelectric power production (HPP) it is important to take into account environmental aspects. This can be done by starting a preplanning process, before actual planning for increasing HPP starts, to identify the most suitable and feasible locations for new hydropower plants. This could be done for example by following Austrian approach to identify go-go areas, wait-and-study areas and no-go areas. The Austrian assessment criteria should be modified to local circumstances.

Targets for Investments for Water Infrastructure should be:

- developing the national investment plan for water infrastructure
- supporting the investments for water services and clean technology in industry

According to above descriptions, following should be done for development of multi-objective integrated use of constructed water courses, reservoirs and irrigational infrastructure:

- developing usage of the reservoirs on the multi-use principle
- in developing hydroelectric power production the other needs and environmental aspects are taken into account
- improvement of dams and other infrastructure safety
- Improvement of irrigation infrastructure
- Application of effective irrigation methods and technologies

Indicators

- By 2023, for main reservoirs multipurpose management plan are developed
- By 2023, for hydropower plants over Kura and Aras rivers main hydropower development plans include other needs and environmental aspects are taken into account
- By 2023 efficiency of irrigation water use significantly increased as result of application of modern irrigation methods and technology
- By 2023 measures on provision of dam safety are identified
- By 2029 water losses are significantly reduced as result of improvement of the state of irrigation infrastructure
- By 2029, multipurpose management plans for all reservoirs are developed
- By 2029, for all hydropower plants over all rivers hydropower development plans include other needs and environmental aspects are taken into account
- By 2035, multipurpose management plans for all reservoirs are operational;
- By 2035 dam safety measures are fully implemented and included into dams operational plans;

9. DEVELOPMENT OF WATER MONITORING AND DATA SYSTEMS

In countries like Azerbaijan, where the water quality varies greatly depending on the variation in the water discharge, it is essential that the water quality monitoring system is planned so that:

- the extreme high and low values of water quality can be defined
- the monitoring of discharge and monitoring of water quality are carried out in the same place
- amount of groundwater abstraction and monitoring of groundwater quantity and quality are carried in the same place
- monitoring programme supports decision-making processes and does not include all "nice-to-know" information.

Monitoring will be cost-effective by this way only, which is particularly important in countries where the financial resources allocated for water monitoring are very limited. This means also that the sampled information is mainly based on physical-chemical parameters although information on some pressure sensitive biological parameters might be reasonable to collect on certain places. Water quality information should be collected at least every three years with rotation principle in order to get data on more sites in a longer time period.

In order to improve multipurpose and cost-effective use of collected information, development of a water information system, which is common for all relevant institutions and organizations, is necessary. The system could contain all the available data on water status and on the use of surface and ground waters. Connecting information on the catchment areas and the geographic information system (GIS) is essential for utilizing the information in decision-making and in water resources management. GIS also enables connecting available information on pressures, land use, diffuse and point source loading to water status. In the long term, the purpose should be to open the data system for citizens to increase awareness on water issues.

Based on above descriptions the development of water monitoring and data systems following needs to be done:

- developing the national monitoring programme for surface water and ground waters taking into account hydrological and water quality data
- developing national data systems
- certification of laboratories
- developing international cooperation

Indicators

- by 2023, national monitoring network is created according to the monitoring programme that allows assessing the state of ground and surface waters. Staff training is provided and investment is allocated to carry monitoring and apply modern monitoring and laboratory technology for assessment of state of water resources
- by 2029, monitoring program includes biological, morphological and chemical observation, national water cadastre information system is created and operational. Relevant data collected from monitoring system is placed in databases and can be used for water resources assessment and other purposes
- Monitoring programs are in full compliance with EU Water Framework Directive and allow to assess environmental quality status of water resources according to the Directive

10. DEVELOPMENT OF LEGISLATION ACCORDING TO IWRM PRINCIPLES

Existing permit system for water use and water pollution in Azerbaijan is shortly noted in section 1 of this document. In connection with further development and implementation of the Strategy, a more wide-ranging application of water permits might be worth considering. A wider application of permits could support consolidation of different water needs, and during the permitting process the conditions for water use could be assessed also from the point of view of adequacy of water resources.

When developing legislation and environmental norms, it is recommended not to take direct quotes from the EU directives or from legislation of other developed countries. The changes in the legislation should be realistic and applicable. Unrealistic legislation and norms give the society a dangerous indication that the set norms need not to be met because it is simply impossible.

Azerbaijan lacks legislation on the integrated water resources management (IWRM). The water rights and the water ownership are not clearly regulated, either. The existing legislation does not form a unity and it does not provide possibilities for the private sector to participate in water projects.

The regulation of the water rights could be said to be of highest priority. It could promote consolidation of different water needs, and the improved legal security would also create

possibilities for the private sector to participate in the projects.

The water rights could be defined either directly through legislation, i.e. normative guidance, or through a permitting system. For example, in Finland water use and water protection are connected to permitting. The use of water resources and the effects of contamination need often case-specific consideration, and therefore permitting is often the most appropriate way to define the water rights. It is clear, though, that not all activities should be obliged to apply for a permit but certainly projects and other activities that have significant effects on the water resources.

One of the objectives mentioned in the Strategy is the substantial increase in and rationalization of irrigation. Irrigation would be extended by utilizing groundwater resources. However, it is important that along with and instead of irrigation, groundwater is used for water supply purposes, and that irrigation is rationalized to ensure the adequacy of water resources. The current plans will require truly extensive improvements in the efficiency of irrigation.

The management and protection of water resources is regulated by several legal acts in Azerbaijan. It is important to understand what fundamental changes will be needed in the legislation in order to implement the Strategy. It seems that, for example, permitting for water use could be applied in a wider and more efficient way, and wastewater pollution, i.e. point source pollution, should be addressed more roundly.

Therefore strategic and legislative objectives of the strategy are:

- Protection of water resources and eco-systems
- Sustainable and efficient use of water resources
- Meeting and prioritizing the needs of different water uses
- Promotion of water saving and cost recovery
- Improvement of transboundary cooperation

Possible legal priorities can be:

- Clear defined rights for water use
 - Water use permitting
- Order of priority for different water uses
 - Drinking water, necessary food production...
 - Alternative water sources
- Water protection
 - Point-source water pollution permitting
- Access to water and sanitation
 - Water services
 - Basic needs and recovery of costs
- Co-operation on the use of international water resources

Development of legislation should be based on followings:

- goals in the development of legislation should be realistic and applicable
- regulations of the water rights and prioritizing of different water needs
- independent status for water permit authorities
- prohibition of groundwater pollution and prevention of overuse
- developing multi-use possibilities for River Systems and reservoirs

The list of legislation should also include the following:

- amendments of water code according to basin principle

- developing water use permitting
- developing source pollution control
- developing access to and affordability of water services
- developing recovery of costs of water services

Indicators

- by 2023, national water legislation is amended according to basin principle
- by 2029 main requirement of EU WFD is attracted in legislation and following areas have needed legal basis for enforcement:
 - water use permitting
 - source pollution control
 - access to and affordability of water services
 - recovery of costs of water services
- By 2035, legislation is in compliance with EU WFD. Water use permitting, pollution control systems are operational. Access and affordability of water services and also recovery of costs of water services are effective.

11. TARGETS FOR SURFACE AND GROUND WATER STATUS

Activities

- Water quality monitoring programs will be developed
- Water Quality Criteria for surface and ground waters will be determined and Water quality Objectives” shall be adopted and implemented to protect water uses
- Actions to combat degradation of water quality will be taken and criteria to reach good water quality status prepared
- Water quality shall be enhanced through the management and protection from pollution of water resources,
- Water quality enhancement programs shall be designed to restore environmental quality, as well as deliver economic, cultural, and heritage benefits
- The quality of wastewater discharges shall be improved and non-point sources of pollution decreased to achieve water quality objectives.
- Pollution control programs shall be designed in consultation with affected user groups and, where possible, implemented in such a manner as to cause minimum disruption to established land and water uses
- Wetland classification system needs to be developed
- Environmental flow assessment methodology will be developed and applied to all water courses
- Measures on study, management and protection of thermal and mineral waters are developed

Indicators

- By 2023, monitoring programs and water quality standards system for surface and ground waters (including measures on study, management and protection of thermal and mineral waters) are developed and applied in accordance with international requirements.
- By 2023, program of measures to reach good water status has been developed and environmental flow assessment methodology developed and applied to all rivers;
- By 2029, significant part of program of measures is being implemented for most of water sources
- By 2035, good water status is reached in majority of water bodies

12. GUARANTEE GOOD QUALITY OF DRINKING WATER

As indicated above, implementation of National Water And Sanitation programs of Government by support of international donor communities in coming years will allow provide the population with drinking water of good quality and needed quantity by improvement of these systems in urban and rural areas, which in turn will also serve a role of ecosystem services in relevant areas by reducing environmental pollution by untreated waste waters.

Reasonable access to safe water would be provided to the entire population of Azerbaijan. At present not all people have access to a basic water supply service. National coverage with respect to sanitation is also very low. The output of the Water Strategy is to provide every citizen with reasonable access to quality potable water and sanitation facilities, as well as to promote and support hygiene awareness.

Reliability and safety of regional water services will be improved by implementing Water Safety Plan approach, which aims at managing drinking-water quality from catchment to consumer.

Groundwater sources will be identified and water yield will be determined taking into account adequate protective factors

Activities

Conduct studies and research on traditional WSS technologies (indigenous technology, culturally and socially acceptable) and alternative appropriate and low-cost WSS technologies (including: systems, equipment and materials) to promote the acceptability of most suitable technologies for given site specific conditions.

Develop and enforce standards and guidelines for maintaining water quality in all recognized water uses; e.g., water supply (domestic, industrial, livestock, others etc.) and sewerage and sanitation

Promote the development of site specific water tariffs based on financial, economic, and social equality considerations. Involve local communities in price setting to ensure that tariff structures are compatible with consumers' ability to pay, with a view of providing sustainable services at affordable prices, and based on equitable and practical guidelines and cost-sharing criteria

Promote the 'user pays' principle in accordance with the user's willingness and ability to pay for the service, based on costs of services vis-à-vis given socio-economic conditions of the beneficiaries/users.

- Strengthen implementation capacity for new rural water supply and sanitation schemes.
- Improve management of urban water supply and sewerage systems.
- Identification of new sources and construction needs (reservoirs, pipelines etc.)

Promote and encourage water conservation through regulatory and demand management measures in those existing system

Indicators

- by 2023, water supply system improved and 85% of the population will have access to water supply through developed relevant water sources and infrastructures and other measures;
- by 2023, sewage water system improved and 60% of the population will have safe sanitation facilities by developed relevant waste water treatment infrastructures and other measures;
- by 2029, 100% coverage of water supply;
- by 2029, 80% of the population have access to safe sanitation services;
- by 2029, 85% of the population will have improved quality water and good service level;
- by 2035, 100% of population will have safe sanitation facilities;
- by 2035, 100% of the population will have good quality water supply; and by 2035, all will have safe sanitation facilities.

13. FLOOD RISK MANAGEMENT

This outcome is aimed to alleviate human suffering and minimize the economic costs of damages caused by flooding and other water related disasters in addition to preparations for emergency response, rescue and relief; the Water Strategy identifies a number of actions that will be taken to mitigate the effects of water-induced disasters.

Activities

- Install automatic stage recorders at the strategic sites on the flood-prone areas to record flood levels. Estimate flood sizes, in particular peak floods.
- Determine the possible methods of flood protection; and select the appropriate sites for disaster prevention actions; and ensure appropriate and timely maintenance of flood control structures.
- In drought affected areas, intensify ground water exploration; formulate a comprehensive program for the selection of wells, boreholes, stock ponds, sub-surface dams etc.
- Carry out periodic safety checks, at least once in three years, on existing water systems.
- Establish safety regulations for major water structures
- Prepare and implement flood and other water-induced disaster management policy and plan. Conduct risk/vulnerability mapping and zoning.
- Strengthen the disaster networking and information system.
- Establish disaster relief and rehabilitation systems.
- Implement disaster reduction/mitigation measures. Construct needed protection infrastructure. Strengthen institutional set-up and capacity.
- Undertake hydrological modelling and flood risk mapping of the most crucial river systems.
- The legislation on land use and construction should be developed in such a way that planning and construction in flood risk areas is no longer allowed.

Indicators

- By 2023, potential disaster zones identified by type and located on district maps;
- By 2023, emergency relief materials are available;
- By 2029, infrastructure for mitigating predictable disasters put in place
- By 2029, warning systems established and functioning, encompassing the country;
- By 2035, social and economic losses reduced to levels experienced in developed countries.

The goal during the Strategy's first 6 years is to enhance institutional capabilities for managing water-induced disasters. To that end, the relevant agency will be designated and given a clear mandate to implement output activities, including the development of a disaster management policy and plan. It will also be responsible for coordinating efforts to reduce risks and mitigate damages. Other agencies involved in the prevention and management of water-induced disasters will include the Hydrometeorology Department of MoE, MoEmS, Amelioration JSC, Azersu etc.

In the following 12 years, effective measures will be adopted to better manage and mitigate the effects of water-induced disasters. High-risk areas will be identified and warning systems will be established in locations subject to flooding and landslides. A disaster relief plan will be developed for each priority area and involved state agencies will assist local authorities in carrying out community awareness and education campaigns. Within 18 years, the Strategy's goal is to make Azerbaijan's water disaster management system fully functional, effective and responsive to people's needs.

14. IMPLEMENTATION AND MONITORING OF THE STRATEGY

An effective and transparent method of implementing Azerbaijan's Water Strategy is crucial to ensure long-term conservation of water resources. The development of this implementation framework will be a participatory process that considers both present and future demands on water, and ensures the protection of ecosystems.

Azerbaijan's Water Strategy is comprised of actions that have been undertaken or proposed, to address specific issues in the different policy areas. Implementation has begun and will continue to be a priority. An implementation framework to integrate and coordinate strategy includes the development of an integrated water planning and management system, review and consolidation of water legislation according to EU Directives and the development of the mechanisms for financing water management and planning.

Steering committee will regularly meet to review preparation and implementation of Strategy Action Plan. In order to prepare Action Plan expert group will need to be working in collaboration with all water agencies to realize goals and short, medium and long term actions indicated in the strategy.

Based on the input provided from users and user groups, the watershed-planning processes will tackle specific issues and prioritize water needs and allocations on a local level. These will then be compared to other management plans, embodying the framework of ecosystem-based planning outlined in the COSDI report.

A targeted approach will be used during the strategy implementation as strategy provides a consistent framework for water resources management in Azerbaijan. It is clear that more effort

may be needed sooner in some locations and that economics will play a major role in determining appropriate solutions. There will be different delivery mechanisms for the actions in the strategy

The vast majority of the actions will be appropriate for areas where pressure on water resources is greatest such as the Kura - Aras lowland area and Absheron

There is need to produce more detailed Plan for Actions indicated in the strategy after the strategy is published. These plans will show how the actions in Azerbaijan can meet local circumstances, and will allow different priorities to reflect local needs. For example, some actions may have different timescales.

The lead organization responsible for water resources management in Azerbaijan should adopting a 'better regulation' approach and continues to follow a risk-based approach, so that they can focus our resources on those areas that will have the greatest potential impact or potential benefit.

Risk-based approach is reducing the administrative burden on business, so that abstractors have an incentive to improve their environmental performance while remaining competitive.

Many individuals and organizations are involved in, or have an interest in water resources management. There is no single or simple solution to the pressures that country faces, and it is essential that all organizations work together. There isn't enough water for people and the environment and it will take a lot of hard work to make sure that use and management of this precious resource is in a way that protects the environment for future generations and allows water to be used efficiently and enjoyed.

The public will continue to be consulted on a variety of water management issues. The information gathered will be used to determine and develop the future course of water management in Azerbaijan. The following approach will also be used within the implementation framework.

In addition to the key activities associated with each of the outputs, indicators that may be used to evaluate the success of Strategy implementation are identified for 6-, 12- and 18-year timeframes.

Next steps are to use as a basis of above goals and mentioned in annexes 2-4 and other state programs to develop National Water Action Plan as a key to implement the Water Strategy.

This Water Action Plan will be based on ongoing and planned State Programs, including those related to improvement of water supply and sanitation in the cities and villages, rehabilitation of amelioration network etc in coming 10-15 years.

In recent years main activities to improve water resources use and protections have been carried by investment of several billions of USD from state budget and also by support of IFI, such as WB, ADB, JICA, KfW, EBRD and other donors.

Within the framework of the project of the National Water Supply and Sanitation for the population, works have been performed in 17 towns and regional centers on providing people with sustainable water and sanitation in amount of several billions USD and investment of about 7 billion USD will be required in order to complete work on improvement of this work for remained cities and villages.

In accordance with the State Program on Social and Economic development of regions of the Republic of Azerbaijan within the actions on Amelioration as a result of increasing state care for amelioration and water economy complex in recent years, construction of Takhtakorpu water reservoir together with Hydro-Power Station included to “Project for reconstruction of Samur-Absheron irrigation systems”, Velvelechay-Takhtakorpu and Takhtakorpu-Jeyranbatan channels, Shamkirchay and Tovuzchay water reservoirs have been successfully completed. Taking into account the work on improvement of status of main irrigation system the total investment in this sphere made over 2 billion USD. Within the amelioration action plan, over 5 billion USD investment will be needed in order to rich high efficiency in amelioration system.

In order to apply basin approach in water resources management Azerbaijan intends to develop RBMPs in different river basin districts and implement Program of Measures to improve ecological status of water resources according to environmental quality objectives set in the RBMP. This work also will require some investments as well. Investment will include cost of development of RBMPs and implementation of Programme of basic and secondary measures. Measures may include legal and institutional strengthening, enforcement of regulations, monitoring and assessment, rehabilitation of infrastructure and application of modern water use technologies and methods.

Different water related plans and programs, such as assessment of water resources, elimination of flood risks and damages resulted from flooding, integrated water resources management and some others with total cost of about 0.5 billion USD are being implemented and planned for implementation by State Agency for Water Resources under the Ministry of Emergency Situations.

All above spheres, including sustainable water supply of population and economy, improvement of ecological status of water resources will be main goals of National Water Action Plans to be developed. Main directions in this regards will be relevant state plans and programs. Short, medium and long term actions and economic instrument, including sources of possible investment for their implementation will be identified in the National Water Action Plan.

In this regard there will be a need to identify tools for efficient donor and interagency coordination. As in many cases water infrastructure carry multipurpose character (for example water reservoirs and other infrastructure at the same time can be used for drinking and irrigation water supply, energy production and ecosystem conservation) therefore agencies in different sectors will need to be better coordinated and ways of interagency cooperation needs to be clearly identified in the Action Plan. Therefore application of international approach, including international tools on IWRM, principles of EU WFD and others should be given due consideration when developing the action plans.

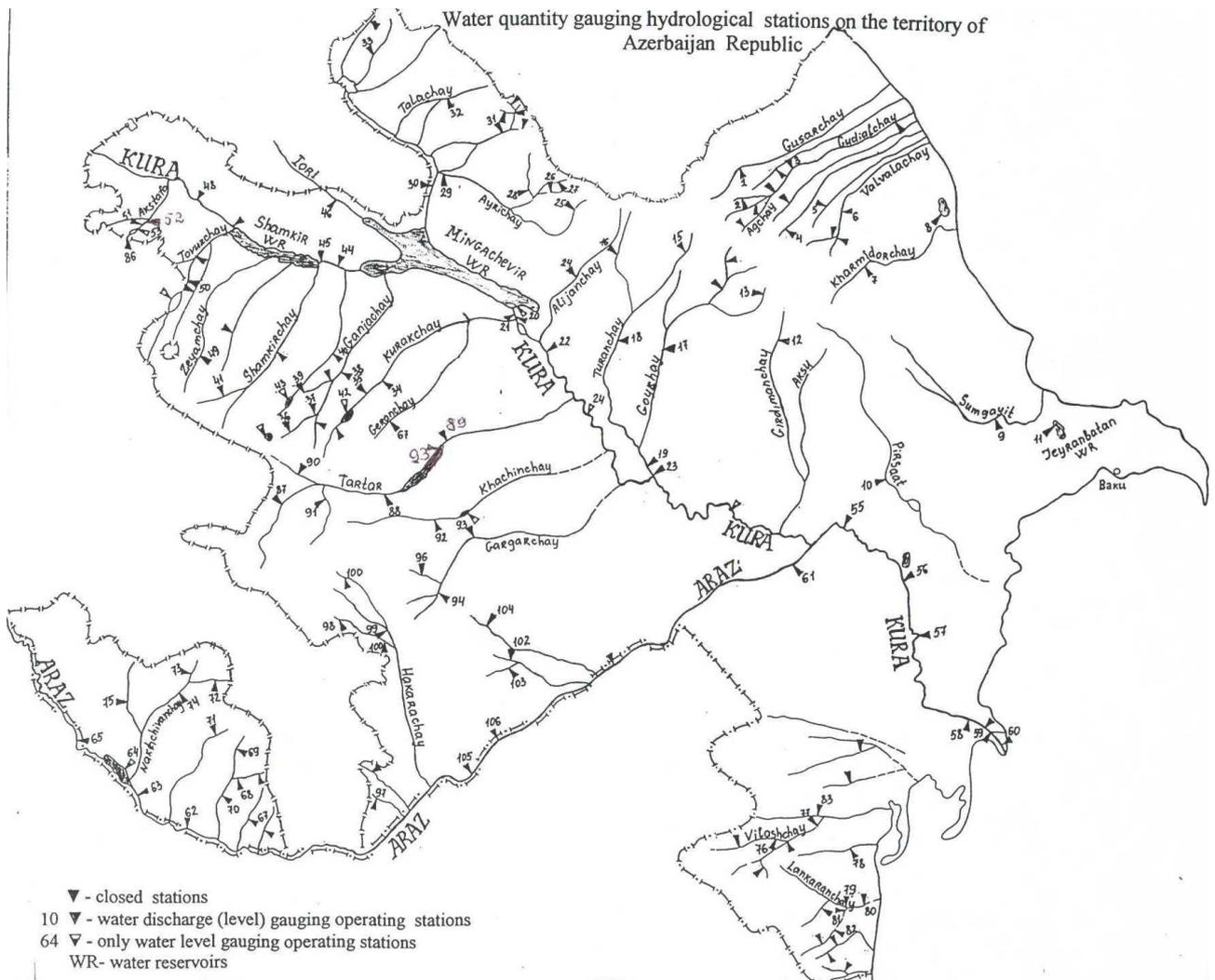
ANNEX 1.MAIN WATER BODIES IN AZERBAIJAN

1.1. Surface water bodies

1.1.1. Rivers.

There are 8,359 rivers in the Republic of Azerbaijan and two of them (Kura and Aras Rivers) have a length of more than 500 km. Water discharge of Kura river before its joining with Aras is $540 \text{ m}^3/\text{s}$ and Aras $300 \text{ m}^3/\text{s}$. Another 22 rivers have length of 101-500 km, 40 rivers have a length of 51 to 100 km, and 107 rivers have a length of 26 to 50 km. There are 5,141 rivers in the Kura River basin and 1,177 are of Aras River basin. The number of rivers that flow directly into the Caspian Sea together with their branches is 3,218. Common river network density is about $0.36 \text{ km}/\text{km}^2$.

Below the map with hydrological stations is presented.



In the Caspian Sea basin, the rivers relate to mainly two areas:

- The Kura River basin rivers (right and left tributaries, including left side tributaries of Aras River),

- The rivers flowing directly into Caspian Sea (Lenkeran region rivers and rivers flowing through Major Caucasus Mountains northeast slope).

1.1.2. Transboundary Rivers

The main transboundary rivers of the Republic (21 rivers) are Kura, Aras, Qanikh (Alazan), Gabirli (Iori), Astara Rivers, and small rivers that flow through Armenia that are tributaries of Kura and Aras Rivers.

The Kura River, composing 64 percent of South Caucasus, flows through the entire territory of Armenia, through 80 percent area of Azerbaijan, and 52 percent of Georgia. The total drainage area of the Kura River is 188,000 km²; the length is 1,515 km, with 906 km in the country. The Kura River annual average flow is 840m³/s (26.5 km³). The river has a full-flow regime and 47 to 58 percent of Kura River's annual flow takes place in spring. The largest water reservoir on Kura River is the Mingachevir Reservoir. The minimal water discharge in the Kura River was observed in Khuluf Station of 7.69 m³/s, the maximum water discharge was 2,720 m³/s at the same station and 2,680 m³/s at the Surra Station. After construction of reservoir (1953) flow was regulated and as result in downstream of reservoir high water discharges reduced and discharges in low flow period increased.

The Aras River, being the biggest branch of Kura River system, starts from Bingol Mountain range in Turkey and flows into Kura River near Sabirabad. Its length is 1,072 km and the area of the basin is 102,000 km². The maximum water discharge was 2,910 m³/s (Garadonlu), and the minimum was 11.0 m³/s (this is resulted from upstream water regulation and intake). The average annual flow of Aras River is 290 -310 m³/s (or 9.0- 9.5 km³). In order to keep ecosystem of river there is need to leave water discharges in the river which is in conformity with environmental flow.

Lake percentage in the Kura river basin is low and is a bit higher than 1%. In Aras river basin it is close to 2%.

1.1.3. Lakes and reservoirs.

There are nearly 450 lakes with an area of 394 km² in Azerbaijan of which ten have the surface area more than 5 km². Some of the lakes are freshwater lakes and others are saltwater lakes. The largest lake is Sarisu Lake located in the Kur-Araz lowlands with an area of 65.7 km² and capacity of 59.1 Mm³. Jandargol Lake is located on the border with Georgia and has an area of 10.6 km² and capacity of 51 Mm³.

The highest mountain lake is Tufangol Lake (3,277 m) located in Demiraparan River basin. Its area is 0.1 km² and the capacity is 0.11 Mm³. The most picturesque and freshwater lake of Azerbaijan is Goy-Gol that was formed as a result of earthquake in the Agsu River at an elevation of 1,556 m in 1139. Others lakes (Maralgol, Zaligol, etc.) were also formed as a result of that earthquake. Goy-Gol is running water pond. The area is 0.79 km² and the capacity is 24 Mm³. One of the lakes formed as a result of easy meandering of Kura River is stagnant at Hajiqabul Lake. The area is 84 km², and average depth is 1.4 m, length is 4.2 km, the capacity is 12.1 Mm³

136 water reservoirs and artificial pools have been created in Azerbaijan, their general area is 982.84 km², and total capacity is 21464 mln. m³. There are 64 water reservoirs, each having the capacity more than 1 mln. m³. Water reservoirs are located both on the rivers (within the course), and outside the rivers (water reservoirs outside the course).

Examples for course water reservoirs are Mingachevir (although water surface area is 605 km² and full capacity according to the design is 16050 mln m³, currently this figure is 15730 mln m³

because of siltation), Varvara (22.5 km²; 62 mln m³), Shamkir (115 km²; 2677 mln. m³), Yenikend (22.61 km²; 158 mln m³), Aras water reservoir on Aras River (145 km²; capacity according to the design is 1350 mln. m³ and currently this figure is 1254 mln. m³ because of siltation), Sarsang water reservoir on Terter River (14.2 km²; 565 mln. m³); and one can show Jeyranbatan (13.89 km²; 186 mln. m³), Ashig Bayramli (0,8 km²; 3.6 mln. m³), Upper Khanbulanchay (2.46 km²; 52 mln. m³), Sirab (0.16 km²; 12.7 mln. m³) water reservoirs as an example for outside the course.

Mingachevir hydro junction and water reservoir was put into operation in 1954. This water reservoir working in perennial regulation regime has comprehensive designation and is mainly used for fighting against flooding, hydro power and irrigation purposes.

1.1.4. Water Quality.

The National Department of Environmental Monitoring (NDEM), the National Hydro meteorological Department (Hydromet), the Caspian Complex Monitoring Administration and the Geological Exploration Service under the Ministry of Ecology and Natural Resources operate monitoring networks on water. Samples taken from water bodies are analysed at Central Laboratory of Department in Baku. Analytical laboratories equipped with modern facilities started operating in Gazakh District on the Kura River and Beylagan on the Aras River for checking water quality at points of entry of trans boundary rivers in Azerbaijan in 2005. Monitoring for pollution of surface water was conducted in 50 observation points for 42 water bodies (27 rivers, 4 water reservoirs, 1 port, and 10 lakes).

Taking into account above information and that 75 per cent of the total water used in all sectors of the economy fall to the share of the Kura River and its tributaries, Ministry of Ecology and Natural Resources of the Republic of Azerbaijan is monitoring the quality of surface waters of the country including transboundary rivers through National Monitoring Department.

It has been observed that a number of indices of the quality of water in the boundary area of the Kura River with Georgia (second Shykhly point) regularly exceed the permissible amount (PA) of these parameters. Thus, the amount of phenols exceeds the PA 4 to 8 times, metals 6 to 10 times, sulphates 1 to 2 times, and oil products 2 to 3 times.

1.2 Surface water resources

The water resources of Azerbaijan are limited in comparison with other countries in the South Caucasus and are only 15 percent of the all water resources in the region. Water per area and per person in Azerbaijan is 7.7 and 8.3 times less than in Georgia and 2.2 and 1.7 times less than in Armenia, respectively.

Sources of surface water resources of the country are made of rivers, lakes, water reservoirs and glaciers. Surface water resources are mainly collected in rivers. 67-70% resources of river waters are generated in the territory of neighbouring countries, and remaining part (local flow) is formulated in internal rivers of our country. Total natural demand of river waters is 28.5-30.5 km³, water resources entering from neighbouring countries through transboundary rivers are 19.0-20.5 km³; while local flow is 9.5-10.0 km³. Water resources are decreased up to 22.6-27.0 km³ in dry years. 17.1-14.3 km³ of these waters respectively belongs to Transboundary Rivers (Table 1.)

General surface water resources consist of waters of Kura River and waters of rivers directly flowing into Caspian Sea. 26.3-28.0 km³ out of mentioned water (28.5-30.5 km³) belongs to Kura River and remaining part (2.2-2.5 km³) belongs to rivers directly flowing into Caspian Sea (except from Samur River). Water resources of internal rivers of Kura Basin are 7.5-7.8 km³. Water resources of Kura-Aras Rivers are decreased by 20% resulting from water consumption by water intake facilities in the territory of neighbouring countries. This leads to growing water scarcity in

the country (approximately 4-6 km³ per annum) and creates challenges in meeting water demand in Azerbaijan.

Azerbaijan is one of the most arid regions globally because of water supply. Water supply by 1 km² territory in our country is 110-115 thousand m³/year according to local flow and 329-352 thousand m³/year according to general resources of river waters; while water supply per person is 1043-1098 m³/year according to local flow and 3128-3348 m³/year according to general resources of river waters.

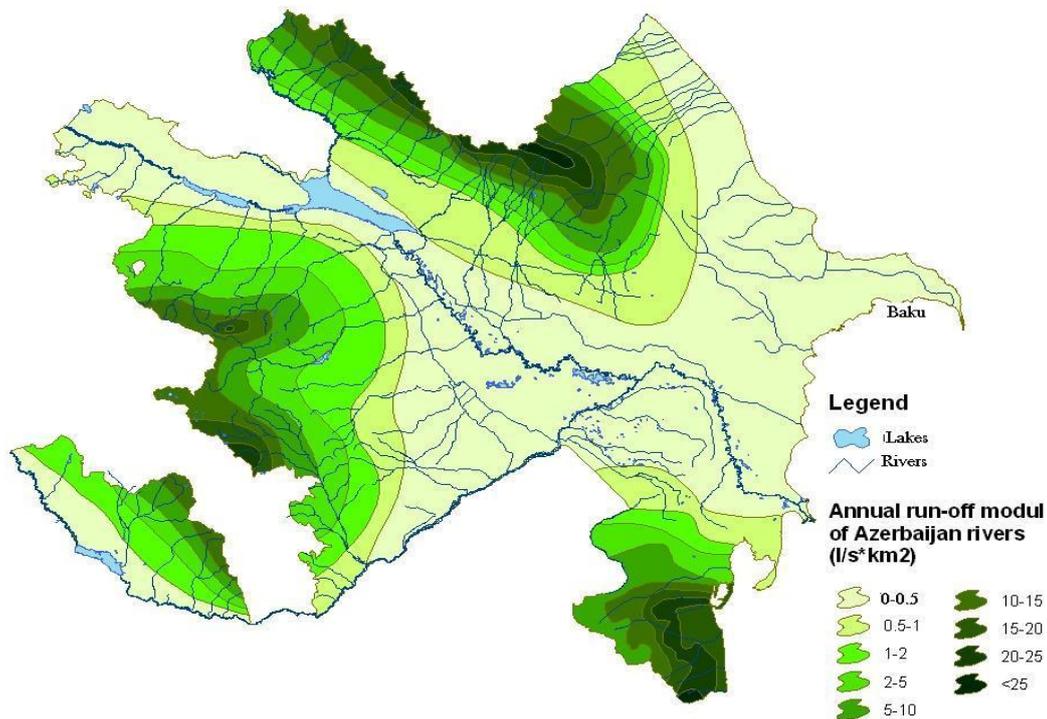
From the water supply point, the Republic is considered to be one of the driest regions of the world with approximately 100,000 m³/year of water per km², and the annual amount of water per person is 950 to 1,000 m³/year. The total of water resources of the republic varies from 28.5 to 30.5 km³. The number is further reduced in arid years to approximately 27.0 and 22.6 km³. The water resources of the Republic are shared unequally.

The lack of water is not observed in the Sheki-Zaqatala and Khachmaz-Kalbajar mountain areas, while in the Qobustan-Absheron and Kur-Araz lowlands where irrigation is developed, this problem exists as about 1.42 Mha of agricultural lands in the Republic requires irrigation.

In total local water resources of Azerbaijan change between 9.5 and 10.0 km³ and are distributed by region as:

- Gazakh – Ganja - 1.28-1.40
- Right tributaries of Kura (Below Ganjachay river) -0.98-1.05
- Sheki- Zagatala region- 1.29-1.40
- Shirvan- 1,48-1.60
- Nakhichevan- 0.73- 0.90
- Downstream tributaries of Aras within Azerbaijan Republic- 0,93 -1.05
- Guba- Khachmaz region- 1.18-1.30
- Lenkoran- 1.13-1.30

Change of water resources by regions can also be clearly seen from below flow module map.



The total water resources consist of surface and underground waters. The surface waters are rivers, lakes, reservoirs, and glaciers. About 67 to 70 per cent (19.0 to 20.5 km³) of water resources are formed in transboundary, and 9.5 to 10 km³ in mainly internal rivers. The water resources in arid years reduce further to 27.0 and 22.6 km³. Accordingly 17.1 and 14.3 km³ of these waters belong to transboundary rivers (Table 1).

The annual water resources of rivers that flow directly into the Caspian Sea (without the Samur River) is 2.2 to 2.5 km³, of which 1.0 to 1.1 km³ belong to Major Caucasus Mountains north-east Slope Rivers and 1.2 to 1.4 km³ to Lankaran Region rivers. The water resources of internal rivers of Kur basin make up 7.5 to 7.8 km³.

The water resources of Kura and Aras rivers at the territories of neighbouring countries are decreased by about 20% as result of water intake. This also leads increasing of water deficit in the country (About 4 to 6 km³ annually) and create problem to provide water demands in Azerbaijan.

Main glacier territories in Azerbaijan are located in Gusar River basin in Major Caucasus Mountains. There are nine glaciers having an area of 3.24 km² and the reserve of glaciers is approximately 0.08 km³.

Table 1. Transboundary Rivers Flowing into Azerbaijan

Rivers	Total water discharges (m ³ /s)	Total Flow (km ³)	Transboundary Flow (km ³)	Local Flow (km ³)
Kura (before Aras), including			12.0-13.0	5.0-6.0

Rivers	Total water discharges (m ³ /s)	Total Flow (km ³)	Transboundary Flow (km ³)	Local Flow (km ³)
	540-600	17.0-19.0		
Kura (before Mingechavir)	325-360	10.3-11.4	6.8-7.2	3.47-4.2
Qanykh (Alazan)	120-140	3.8-4.4	2.4-2.8	1.4-1.6
Qabirli (Iory)	16-19	0.5-0.6	0.49-0.58	0.01-0.02
Khrami	57-60	1.8-1.9	1.8-1.9	-
Ingesu	0.8-0.9	0.026-0.03	0.022-0.024	0.004-0.006
Agstafachay	12-13	0.39-0.42	0.34-0.36	0.05-0.06
Akhinchay	4.8-6.3	0.15-0.20	0.12-0.16	0.028-0.038
Aras, including	280-300	8.8-9.6	7.2-7.8	1.6-1.8
Aras, before Aras reservoir	238-253	7.5-8.0	6.0-6.4	1.5-1.6
Arpachay	14-17	0.44-0.54	0.36-0.45	0.08-0.09
Okhchuchay	9-10	0.29-0.32	0.27-0.29	0.02-0.025
Bazarchay	18-22	0.58-0.69	0.53-0.63	0.05-0.06
Samur	75-76	2.36-2.40	2.36-2.40	-
Total	895-980	28.2-31.0	21.6-23.2	6.6-7.8

1.3. Ground Waters

18 ground water basins are separated within the boundaries of Greater Caucasus and Lower Caucasus mountainous - folding zones and Kura-Aras plain between them. 14 out of those basins are transboundary groundwater basins. Ground waters of mountainous zones are studied poorly.

Natural conditions were not favourable for generation of great resources of usable ground waters within the territory of Jeyranchol, Ajinohur plains, Shamakhi-Gobustan area and Absheron peninsula. Mughan-Salyan plain, as well as part of Shirvan, Mil, Lenkeran plains are characterized with unfavourable hydro-geological conditions.

Main resources of usable ground waters are collected in Gusar-Devechi, Ganikh-Eyrichay, Ganja-Gazakh, Karabakh, Mil, Jabrayil, Nachichivan, and partially Shirvan and Lenkeran foothill plains that are included to Kura-Aras lowland (Figure 3).

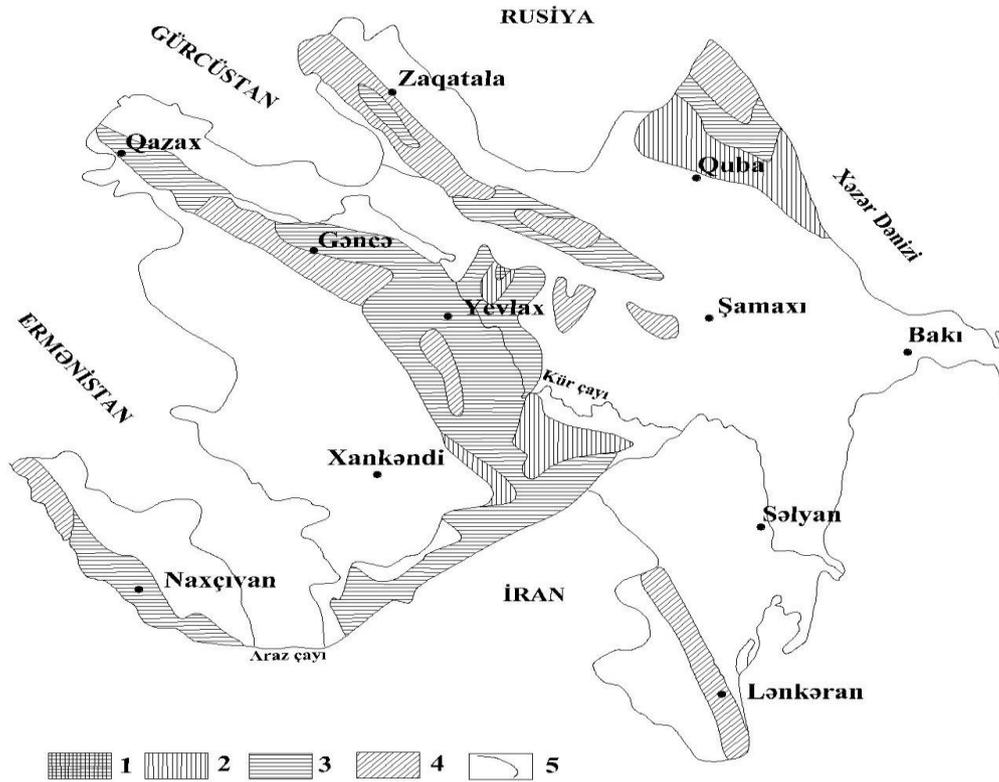


Figure 3. Module of groundwater resources: up to 1- 0,1 l/s.km²; 2-0,1-1,0 l/s.km²; 3- 1,0-10,0 l/s.km²; more than 4-10,0 l/s.km²; 5-boundaries between the areas of groundwater resources with different modules.

Ground waters in Azerbaijan are distinguished with high quality. Those waters are in most cases used in agriculture and widespread industrial sectors. Groundwaters Ganja-Gazakh and Karabakh-Mil in plains are mainly used for irrigation in various areas of the region. Total capacity of usable ground waters is calculated 8-9 km³ for one year, which could play significant role in sustainable water supply in Azerbaijan.

It should be noted that resources confirmed in 1970-1980 don't reflect present real resources in full capacity. This is mainly related to quantity and quality changes happened in status of ground waters and their feeding sources. According to the results of conducted surveys, utilization resources of ground waters in Azerbaijan are much more than confirmed ones (Table 2).

Table 3. Forecasted and confirmed utilization reserves of drinkable and less mineralized ground waters in Azerbaijan

Order №	Hydro-geological regions	Exploitation reserves of ground waters, thousand m ³ /day	
		Forecasted reserves	Confirmed reserves

1	Greater Caucasus mountain-folding zone	1242 (1251)	34
2	Lower Caucasus mountain-folding zone	Non-calculated (990)	33
3	Foothill plains	21523 (21524)	11953
Total:		22765 (23765)	12020

For drinking and farming - household needs, ground waters with mineralization level up to 1,0-1,5 g/l, for agriculture and industrial needs – ground waters with mineralization level up to 1,0-1,5 g/l, in several cases up to 2,0-3,0 g/l are used in Azerbaijan. Ground waters are used through water-exploitation wells, hand-wells and underground water supply pipes within the country. Numerous capped springs are used in mountains and foot hill areas. Depth of exploitation wells is mainly 120-200 meters.

While 2,5-2,9 billion m³ ground waters were used in 1970's and early 1980's when agriculture was intensively active, after change of social-economic relations, liquidation of collective farms and state farms and due to occupation of 20% of national territory by Armenia, use of ground waters have been significantly declined. This figure was further decreased by 0,7-0,8 billion m³ at the end of 1990's, and up to 0,4-0,5 billion m³ at the beginning of 2000's. Social-economic development of regions in recent years led to increase of demand to ground waters. Starting from 2009-2010, growth has been observed in use rate of ground waters and annual amount of extracted ground waters were again increased up to 2.5-2,8 billion m³.

Monitoring of ground waters within the country is conducted by the Ministry of Ecology and Natural Resources (MENR). Organisation of monitoring network started from years 1940-1950 for particular regions. Currently, monitoring network exists in boundaries of porosity-layer water basins of all foothill plains - Gusar-Devechi, Ganikh-Eyrichay, Ganja-Gazakh, Karabakh, Mil, Jabrayil, Nachichivan, Shirvan, Mugan-Salyan and Lenkeran (and Ganjachay basin (on the springs)). Monitoring is not conducted within the territory of Jabrayil plan and considerable part of Karabakh lowland since the beginning of 1990's because of Armenian occupation. Monitoring network consists of more than 800 wells, springs and underground water pipes.

4. Total water resources

In summary, the water resources of Azerbaijan are distributed as following:

- River waters: 28.5 to 30.5 km³ of which 9.5 to 10.0 km³ belong to internal rivers and rivers flowing into the Caspian Sea
- Freshwater lakes: 0.03 to 0.05 km³
- Water reservoirs: full capacity of 21.9 km³ and a useful capacity of 12.1 km³
- Exploitation capacity of ground waters: 8.0 to 9.0 km³
- Water resources of glaciers: 0.080 to 0.085 km³

ANNEX 2. ACTION OF AMELIORATION JSC PLANNED TILL 2015 IN ACCORDANCE WITH STATE PROGRAM ON SOCIAL AND ECONOMICAL DEVELOPMENT OF REGIONS OF AZERBAIJAN REPUBLIC

According to the State Program for Social and Economic Development of Regions of the Republic of Azerbaijan approved by Presidential Decree dated April 14, 2009, works, which are important for implementation by Amelioration and Water Economy Joint Stock Company are the following:

- Development and implementation of integrated water resources management plan;
- Water supply of winter pastures
- Improve structure of scientific research and design institutes on amelioration and water economy;
- Establishment of unique institute and strengthening its material-technical base;
- Establish water protection zones in water bodies and strengthen control over their use.

Amelioration and Water Economy Joint Stock Company has developed 10 years Action Plan for improvement of land use in agriculture:

- Construction of 8 new water reservoirs with total capacity of 545 mln m³
- Construction of new irrigation channels with 418 km length
- Put 350,000 hectare new irrigation lands into use
- Improve ameliorative conditions of 275,000 hectare land plot
- Construction of new collector-drainage network in 246.000 hectare area
- Construction of protective dams (89.000 m)

2. 1. Supply of agricultural plantations with irrigation water

Program identifies the works to be carried out towards the direction of sustainable development of amelioration and water farming as one of the leading sectors of national economy and envisaged implementation of following urgent measures:

-maintain existing amelioration and water farming funds and improve their operation;

-in order to further develop this field, continue construction works in amelioration and water farming facilities that are required to be constructed and reconstructed and start to implement new projects.

2.1.1. Maintain existing amelioration and water farming funds and improve their operation

15,5 thousand km out of 51,4 thousand km irrigation channels, 7,1 thousand km out of 32,4 thousand km collector-drainage networks, 42 min thousand km out of 131,5 thousand km various hydro technical facilities, 2100 out of 7436 sub artesian wells and 235 out of 927 pumping stations need repair and restoration and improvement of their working regime through reconstruction.

Implementation of following measures are envisaged in the Program in order to maintain existing amelioration and water farming funds, improve their operation and strengthen material-technical base of this field:

-repair and rehabilitation of irrigation and collector-drainage networks;

-strengthen material-technical base of industrial entities;

-transfer of pumping stations and sub artesian wells to automated management system;

-repair and restoration of existing dams to prevent flooding and torrent hazards, increase their sustainability, and carry out course regulation and cleaning:

-strengthen control over protective zones of hydro technical facilities, to increase their sustainability, take forest-ameliorative measures and increase efficient use of waters.

In order to implement the measures envisaged in the Program allocation of funds in relevant capacity each year.

2.1.2. Amelioration and water farming facilities that are required to be constructed and reconstructed for further development of this field

Implementation of wide-scale measures are envisaged in the Program to continue works in the amelioration and water economy objects where building and reconstruction has already started, protection of residential settlements, lands and infrastructure facilities against torrent and flooding and more efficient use of water resources.

Amelioration and water farming facilities that are required to be constructed and reconstructed for further development of the mentioned field include the following measures:

-Continue construction of facilities included to reconstruction project of Samur-Absheron irrigation system;

-Continue construction of facilities included to construction complex of reservoir on Shamkir River;

-Measures for supporting development of Water Users Associations (WUA), restoration and reconstruction of in-farm networks;

-Continue rehabilitation, reconstruction and building works in water reservoirs, amelioration and water farming facilities;

-Improve ameliorative conditions and water supply of irrigated lands;

-Enhancement of irrigated lands and reliable supply of population with foodstuffs;

-Ensure sustainability of hydro technical facilities and measures for preventing harmful impacts of torrent and flooding waters in the rivers;

-Enhancement of measures for efficient use of water resources.

2.2. Continue construction of facilities included to reconstruction project of Samur-Absheron irrigation system

Infrastructure for improvement of access of country population to high quality drinking water and advancement of wastewater treatment systems, protection and efficient use of water resources is being developed. Thus several large-scale amelioration and irrigation systems and facilities have been constructed and put into operation, multi-sector amelioration and water farming complex has been established. As a result of increasing state care for amelioration and water economy complex in recent years, construction of Takhtakorpu water reservoir together with Hydro-Power Station included to “Project for reconstruction of Samur-Absheron irrigation systems”, Velvelechay-Takhtakorpu and Takhtakorpu-Jeyranbatan channels, Shamkirchay and Tovuzchay water reservoirs have been successfully completed and achievement has been made in increase of water reserves collected in water reservoirs by 450 million cubic meters. This allows using more than 50 thousand hectare new irrigated lands and improvement of water supply of more than 200 thousand hectares existing plantations. Also, in order to improve water resources management in the country, develop

ameliorative conditions of irrigated lands and prevent harmful impacts of flows and flooding, several projects with great importance for national economy are being implemented.

As a result of reconstruction of Samur-Absheron channel and construction of Takhtakorpu water reservoir it is planned to increase water capacity transferred to Baku city 2 times, enhancement of agricultural plants productivity for the account of improvement of 150 thousand hectare irrigated areas in northern regions and increase harvest capacity by 1,5-2 times.

It is envisaged to transport additional 322 million cubic meter water to Takhtakorpu and Jeyranbatan water reservoirs by the water intake facilities and transfer channels in 6 northern rivers located in first 50 km part of Samur-Absheron channel, also increase culvert capacity of Absheron main channel from 9 cubic meter to 15 cubic meter per second by reconstructing its existing 73 km part, and enlargement of its starting part by 3 km in order to transfer water to the channel from Takhtakorpu-Jeyranbatan channel with its own flow. 15326 hectare existing irrigated land plots will reach 19320 hectare while being enhanced as a result of reconstruction works in Absheron channel. It is envisaged to improve water supply of 150 thousand hectare existing irrigated lands in Shabran, Siyazan, Khizi, Gusar, Khachmaz, Guba and Absheron regions included to reconstruction zone of Samur-Absheron channel, and to put new irrigated lands into operation within approximately 30000 hectare.

By reconstruction of Upper Zerkhur channel, additional water transfer to Samur-Absheron channel, increase water discharge capacity and protection of the channel from surface waters will be ensured, it will be possible to improve water supply of 8150 hectare plantations and to put 4730 hectare new irrigated lands into operation.

2.3. Continue construction of facilities included to construction complex of reservoir on Shamkir River

Construction works in “Construction complex of reservoir on Shamkir River” started in 2006, which was included into Action Plan approved by the President of the Republic of Azerbaijan dated October 14, 2005. The complex includes construction of water reservoir with general water capacity of 170 million cubic meter together with Hydro power Plant (capacity 24,4 Mwt), Shamkirchay mani channel (length 15,39 km, out of them tunnel part - 7,819 km), Nutrient (9,0 km), Shamkirchay Right Bank (10,89 km) and Left Bank (26,74 km) channels, restoration of distribution networks and reconstruction, etc.

By implementation of the Project water supply of approximately 50000 hectare land areas in Shamkir, Goygol, Samukh and Goranboy regions will be improved, irrigation of up to 2000 hectare new lands, also transfer of 1,6 cubic meter\sec. drinking water to Ganja city, Shamkir and Samukh regions will be ensured.

2.4. Measures for supporting development of Water Users Associations (WUA), restoration and reconstruction of in-farm networks

In-farm irrigation-drainage network constitutes more than 80% of present national irrigation-drainage system. Currently, relevant measures are taken for rehabilitation of in-farm networks for the funds allocated from state budget, however, these measures does not guarantee solving the problems in full.

It is envisaged in the Program to support development of Water Users Associations for the Project on “Support to Development of Water Users Associations” jointly implemented by World Bank and Government of the Republic of Azerbaijan, and continue rehabilitation and reconstruction works of in-farm networks.

2.5. Continue rehabilitation, reconstruction and building works in water reservoirs, amelioration and water farming facilities

It is envisaged in the Program to continue construction works in amelioration and water farming facilities implemented for the account of state budget, and complete construction works in Tovuzchay water reservoir with general water capacity of 20 million cubic meters until 2014.

By continuing those measures envisaged in the Program, there will be an opportunity for improvement of water supply of 43950 hectare existing irrigated lands, enhancement of ameliorative conditions of 43348 hectare irrigated lands and putting 1455 hectare new irrigated lands into use.

2.6. Improve ameliorative conditions and water supply of irrigated lands

Improvement of ameliorative conditions and water supply of irrigated lands is implemented for the account of rehabilitation of existing amelioration and irrigations funds, their reconstruction and building and handing over the new amelioration facilities for operation.

It is envisaged in the Program to rehabilitate and reconstruct Mil-Kharabakh collector, Upper Shirvan channel, as well as water supply systems of winter pastures.

As a result of improvement of ameliorative conditions of irrigated lands and lowering the level of ground waters, there will be favourable condition for cultivation of agricultural plants in 220 thousand hectare area.

As a result of reconstruction of Mil-Kharabakh collector, ameliorative conditions of lands in 141 thousand hectare will be improved by accelerating to remove ground waters from the areas served by this collector and production of agricultural crops will be significantly increased in these areas.

2.7. Enhancement of irrigated lands and reliable supply of population with foodstuffs

According to the execution of task given by the President of the Republic of Azerbaijan Mr. Ilham Aliyev regarding the meeting population demand for bread and grain products for the account of internal production, drilling of sub artesian wells in regions of the republic, including in the areas located in the line of contact with occupational area and construction of new irrigation channels and water reservoirs are envisaged in the Program.

By the completion of construction of Lower Shirvan channel included into the Program, water supply of the irrigated lands in 111 thousand hectare area of Shirvan region will be improved, 83 thousand hectare new irrigated lands will be put into use, and that will allow significant increase of production of agricultural crops in these areas. 171 existing pumping stations on the Kura River will be terminated and as its consequences, 7,3 million AZN electricity and 2,2 million AZN diesel fuel will be saved annually. Besides direct discharge of part of stream and flooding waters in Aras river into Caspian Sea through construction of Aras Rive new tributary, that will allow to use new irrigated lands of 40 thousand hectare in Imishli, Saatli and Bilesuvar regions, and 26668 hectare new lands in Sabirabad, Salyan and Bilesuvar regions accepting Kura River as irrigation source and implementing ameliorative measures in less productive winter pastures.

By the implementation of measures included into the Program, there will be favourable conditions for advancement of water supply in 161 thousand hectare area, and establishment of private farms for development of grain-growing and cattle-breeding in new irrigated 227 thousand hectare lands through implementation of comprehensive ameliorative measures in less productive winter pastures and state fund lands.

2.8. Ensure sustainability of hydro technical facilities and measures for preventing harmful impacts of torrent and flooding waters in the rivers

Azerbaijan is one of the regions of the world mostly exposed to natural disasters. There are 154 flooding rivers in the country. 61 out of these are most dangerous. Each year approximately 200 residential settlements from 30 administrative regions where more than half million population is inhabited, thousand hectares of plantations, hundreds km of railways and highways, electricity lines, gas pipelines, irrigation channels, hydro technical facilities are exposed to harmful impacts of flood and stream waters of mountainous and foothill rivers.

For preventing floods and torrents in Kura-Aras Rivers and other rivers flowing into them, strengthening and elevation of protection dams with the length of 870 km in Kura River, 120 km in Aras River, 140 km in the rivers flowing into those two ones, also removal of 178 pumping stations out of the protective dams, riverbed levelling works up to 5 km length in Aras River and other works are envisaged in the Program.

Following measures are planned in the Program for preventing harmful impacts of torrent and flooding waters:

- construction of 103 km length protection dams in mountainous rivers and stone casting works of 4,5 km length;

- carry out riverbed cleaning works with 90 km length in mountainous and lowland rivers.

2.9. Enhancement of measures for efficient use of water resources

Limited amount of water resources of the country requires enhancement of measures for more and economical use of those resources.

Implementation of following measures related to efficient use of water issues are envisaged in the Program:

- conduct reconstruction and repair-rehabilitation works in existing irrigation systems for preventing water losses;

- installation of water metering devices on irrigation channels;

- automatisation and transfer to computer control;

- continue inventory of water farming objects;

- identify water protection zones and strengthen control over utilization regimes in these zones.

All those measures that will be implemented will allow more efficient water use while decreasing water losses from irrigation systems.

OUTCOME

1. By implementation of measures envisaged in the Program it will be possible to realise operation of irrigation and collector-drainage networks in irrigated areas of the republic at required level and decrease water losses up to 30 percent. Resulting from that, groundwater level will be declined in those areas, ameliorative conditions of lands and their water supply will be improved. Allocation of required energy and fuel-lubricant materials will allow supplying 515 thousand hectare area with irrigation water that was irrigated by mechanical techniques.

2. As a result of realisation of construction and reconstruction works envisaged in the Program, construction of Shamkirchay (capacity 170 million cubic meter) and Tovuzchay (capacity 20 million cubic meter) water reservoirs will be completed, design of 8 water reservoirs with total capacity of 545 million cubic meter will have been developed and their construction will start,

rehabilitation works will be conducted in 3 water reservoirs while increasing their capacity, 675 km irrigation channels will be rehabilitated, reconstructed and built, 625 km collector-drainage networks will be rehabilitated, reconstructed and built, 330 thousand hectare new irrigated lands will be put into operation, water supply of 375 thousand hectare irrigated area and ameliorative conditions of 513 thousand hectare area will be improved, irrigation and collector-drainage networks in 410 thousand hectare area will be reconstructed, 1500 sub artesian wells will be drilled, residential areas and agricultural plantations will be protected against torrent and flooding waters by constructing 157 km protective dams, thus allowing to use thousands hectares of areas as arable lands.

As a consequence of conducted measures productivity of agricultural plants in our republic will be intensively increased, flow regulation will be ensured in the rivers and water volume flowing into Caspian Sea without using will be reduced.

Implementation of those measures are envisaged in the Program by main capital investments from state budget, loans of foreign financial institutions, funds of State Oil Found of the Republic of Azerbaijan and other funds.

ANNEX 3. PLANNED AND IMPLEMENTING MEASURES ON DRINKING WATER SUPPLY

“Azersu” Joint Stock Company (JSC) is the responsible organisation for drinking water supply and operation of sewage networks. Considerable investments have been contributed to the development of water supply and sewage systems in recent 10 years.

In 2013, a Master plan for water supply, sewage and rain waters, treatment and disposal of wastewaters of Absheron peninsula was developed. The Master plan proposes investment contribution program for water supply, wastewaters and rain waters infrastructure of *Greater Baku* until 2035, also provides recommendations for necessary actions for further success of its implementation and use. Project area is “the Project Area of Greater Baku Master Plan”. This area covers Baku and Sumgayit cities and Absheron peninsula, including Absheron region.

Main and district networks have been rehabilitated and their length has been reached respectively to 45553.73 km and 9907.83 km. Because of this factor, number of total population in the country receiving water reached 4144702 inhabitants in 2014. Water receiving percentage reached to 96.6% in Baku city, 93.6% in Sumgayit city, 71.1% in Ganka city, while 46.3% in country average. Number of population supplied with water increased, water amount supplied to the population decreased by 57.24% in 2014 compared to 2005 (from 497635.7 thousand m³ to 284859.87 thousand m³), while water losses have also been decreased. 156261 individuals received water for first time in 2014, number of population receiving 24 hour water reached to 2590281 inhabitants. Water provided to other users increased from 64455.2 thousand m³ to 72749.76 thousand m³ in 2014 compared to 2005; and portion pertinent to water users as raw material increased from 154.2 thousand m³ to 312.98 thousand m³, growth was respectively 1,13 and 2,03 times.

Currently there is more than 3115.9 km rain and sewage network (2943.6 km wastewater pipes and 172.3 km rain water pipes). 70% of population in Baku city (1643025 inhabitants out of 2328192) are provided with sewage system, while this figure is 8.6% (505712 inhabitants out of 5893615) for the regions.

123 pumping stations for total territory of the republic (69 for Baku city, 85 for Absheron peninsula, 38 for regions), 20 water treatment facilities (7 for Baku city, 8 for Absheron peninsula and 12 for regions) are functioning.

Volume of average daily generated wastewaters for total republic in 2014 was 1278 thousand m³, out of which 43%, i.e. 547 thousand m³ is treated. These figures are respectively 1278 thousand m³ for Absheron peninsula, out of which 46%, i.e. 538 thousand m³ is treated, and for Baku city it is 960 thousand m³, out of which 51%, i.e. 492 thousand m³ is treated.

Analysis of implemented and developed program and projects for improvement and rehabilitation of water supply in the republic shows that projects for improvement and development of water supply and sanitation systems are continued in many cities and towns of the republic. For the cities of the republic, works are completed in these cities: Ganja, Sheki, Aghdash, Nachichevan, and Shamakhi; design works are being completed for other cities. Constructino works have been completed in several cities and towns (Guba, Bilesuvar, Oghuz, Zaghatala, Aghstafa, Tovuz, Goranby, Goygol, Shabran, Siyazan, Goychay, Sabirabad, Naphtalan, Ismayilli, and Aghsu). Construction works are ongoing in Ganja, Sheki, Aghdash, Nachichevan, Shamakhi, Gabala, Gusar, Khachmaz, Gobustan, Khizi, Gedebe, Dashkesen and other cities and towns.

Commissioning Takhtakorpu water reservoir in 2015 with a useful volume 238,4mln m³, with simultaneous reconstruction of the Samur-Absheron channel, which is the main source of

water supply for Greater Baku, contributed to the improvement of drinking water supply in Absheron peninsula in 2 times.

Within the framework of the project of the National Water Supply and Sanitation for the population, works have been performed in 17 towns and regional centers on providing people with sustainable water and sanitation. Works are ongoing on the construction of the 5 volume of 40.500 m³ reservoirs in different regions of the country.

As a result of the construction and reconstruction of the Shirvan-Mugan group water pipelines in Aran economic region, population of five cities (Bilasuvar, Neftchala, Salyan, Shirvan, Hajigabul) and 121 nearby villages in the amount of 470 thousand people are provided with high-quality, uninterrupted water supply. In addition, water mains network were put into operation in 16 regional centers of the country.

As you can see, the above contributed to the implementation of commitments to ensure quality drinking water to the inhabitants of the country.

ANNEX 4. INDUSTRIAL WATER SUPPLY

Growth of country population, increase of their demands for foodstuffs, as well as growing raw material demand of particular spheres of economy requires implementation of measures for efficient use of water resources of the republic and improve existing situation of water supply.

As a solution for the current situation, advancement of the management of this field by implementing institutional measures, strengthening material-technical base of amelioration and water economy organizations, improve ameliorative conditions of irrigated systems and lands, carry out required urgent building and reconstruction works in order to ensure further development of mentioned sphere, realisation of water-bed regulation and dam construction works in Kura River delta, strengthen scientific provision of amelioration and water farming and additional investments are required to be involved for implementation of those measures.

Considering the special importance and leading role of amelioration and water farming sector in development of national economy, particularly in agriculture development, solution of food security problem and socio-economic development of the regions, there has been a necessity for development of «State Program on Sustainable Development of amelioration and water farming systems in the Republic of Azerbaijan for years 2006-2015» in order to ensure further development of this sphere and strengthen investment contributions to this field, also to perform the tasks assigned by the Decree of the President of the Republic of Azerbaijan dated February 23 2006 on measures for improvement of management in amelioration and water farming area.