

REGIONAL REVIEW

WATER SUPPLY AND SANITATION IN THE COUNTRIES OF CENTRAL ASIA AND SOUTHERN CAUCASUS



August - 2009

Contents:

INTRODUCTION	5
1. SUMMARY INFORMATION ABOUT THE COUNTRIES OF CENTRAL ASIA AND CAUCASUS	6
1.1. <i>Geographical specifics of the regional countries</i>	6
1.2. <i>Climate</i>	7
2. WATER RESOURCES	7
2.1. <i>Surface water</i>	7
2.2. <i>Ground water</i>	8
3. PRESENT SITUATION	11
4. NATIONAL POLICY AND THE LEGAL AND REGULATORY FRAMEWORK	18
5. INSTITUTIONAL ASPECTS AND HUMAN RESOURCES POLICIES	23
6. PRIVATE SECTOR PARTICIPATION	27
7. PUBLIC INVOLVEMENT	29
8. FINANCIAL SITUATION OF WSS ENTERPRISES	31
9. DEVELOPMENT AND REHABILITATION PROGRAMS AND PROJECTS	34
10. MILLENNIUM DEVELOPMENT GOALS – PROGRESS ASSESSMENT	39
11. ROLE OF GWP	41
CONCLUSIONS AND RECOMMENDATIONS	42
REFERENCES	45

Contributors:

**Regional Expert
The overall Editor**

Eduard Mesropyan
Vadim Sokolov

Republic of Kazakhstan:

Prof. E.B. Jumartov
Prof. N.K. Kipshakbaev
Valery Syundyukov

Kyrgyz Republic:

Abdybay Djayloobaev
Taisia Neronova

Republic of Tajikistan:

Prof. Ya.E. Pulatov
G. Sharipov

Turkmenistan:

Guldjamal Nurmukhamedova

Republic of Uzbekistan:

Iliya Mirolyubov
Mansur Abduraimov

Republic of Azerbaijan:

Mammed Asadov
Akhmed Mamedov

Republic of Armenia:

Arevik Ovsepyan
Ashot Malkhasyan

Georgia:

Mariam Makarova
Georgy Dzamukashvili
Nino Chkhobadze

Photos included into Review:

Eduard Mesropyan, Arslan Berdyev, Vadim
Sokolov, Bjorn Guterstam

Editor of the English version

Bjorn Guterstam

LIST OF ABBREVIATIONS

WUA	Water Users Association
ADB	Asian Development Bank
APWF	Asia Pacific Water Forum
BWO	Basin Water Organization
WB	World Bank
WMS	Water management system
WTF	Water treatment facility
GWP	Global Water Partnership
WSS	Water supply and sanitation system
GEF	Global Environmental Facility
EBRD	European Bank for Reconstruction and Development
EurAsEC	European-Asian Economic Cooperation
IRBMP	Integrated River Basin Management Plan
EC IFAS	Executive Committee of the IFAS
IWRM	Integrated Water Resources Management
CPSR	Committee on public services regulation
STP	Sewage Treatment Plant
CACENA	Caucasus and Central Asia
IFAS	International Fund for Aral Sea Saving
ICWC	Interstate Commission for Water Coordination
MLR&WR	Ministry for Land Reclamation and Water resources
DRWS	Department of Rural Water Supply
NGO	Nongovernmental organization
WUO	Water Users Organization
JSC	Joint stock company
TSHVS	Tajikselkhozvodstroy
UNDP	United Nations Development Program
FAO	United National Food and Agriculture Organization
MDGs	Millennium Development Goals
UN ESCAP	United Nations Economic and Social Commission for Asia and Pacific
GWP	
CACENA	Global Water Partnership for Caucasus and Central Asia
TACIS	Technical Assistance to the Newly Independent States
SDC	Swiss Development and Cooperation Agency
CIDA	Canadian International Development Agency
USAID	United States Agency for International Development

INTRODUCTION

This review has been developed within the framework of activities of the Global Water Partnership of the Central Asian Region (Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan and Tajikistan) and the Southern Caucasus (Azerbaijan, Armenia and Georgia) in accordance with the Goal 1 of the Regional Strategy for the period of 2009-2013: **Promote water as a key part of sustainable national development.**

In all of the eight countries the water supply and sanitation systems used to be actively built and developed. Despite of certain differences in the scope of construction, operation and development of those systems, in general they were providing the population of those countries with sufficiently good quality potable water by disposing and adequately treating the waste waters. All aspects of the activities of the water management authorities (technical, financial, managerial, etc.) used to be governed by the State, that set the tariffs, subsidized the WSS sector, financed its development, etc.

During the post-Soviet era, in the period of significant economic difficulties and in the beginning of the market economy formation, the existing governance structures and mechanisms of the WSS bodies had proved to be inefficient. Low level of the payment collection rate and insufficient state subsidies in the majority of countries had caused a drastic drop of the repair and maintenance works, which in its turn had caused increase of the wear-and-tear rate of the water supply and sanitation systems and the failure of some of their sections.

Recently, as far as the economies are stabilizing, the potable water supply to the population and disposal and treatment of waste waters is gradually becoming a priority trend in the national sustainable development programs over the region. At that, reforming of the WSS systems is being done differently in different countries.

Objective of the present review is to conduct an expertise of the need in rehabilitation of WSS systems on the basis of current situation analysis, in order to provide people with quality and accessible potable water and sanitation.

It should be noted that within the last few years all of those countries have conducted a similar analysis of the potable water and sanitation problems in the region with assistance of a number of international organizations (OECD, WB, ADB and others). Present review is based on information, which was published in various sources, as well as in the expertise and assessment reports of the experts involved. Some assumptions from this review may not coincide with the official positions of the governmental authorities.

The Summary Conclusion of the available reviews is rather pessimistic: even though the sub-regions of Central Asia and the Southern Caucasus are rich in water resources in general, there could be observed a high wear-and-tear rate of national water supply and sanitation systems, inefficient water use, low operation level, undeveloped economic tools and ineffective governance the countries do not provide sustainable WSS services for their populations.

Global Water Partnership intends to make an additional contribution to the analysis of the problems and to propose to the countries of the region a modern approach in implementation of the IWRM principles and tools to ensure supply of the quality potable water for people, and disposal and treatment of the waste waters. In particular, it can be recommended an obligatory participation of the WSS sector operators in those activities through local government authorities within the organizational system of IWRM (public bodies that coordinate all stakeholders of the water management and use vertically – by levels of governance hierarchy, and horizontally – by the economy sectors).

1. SUMMARY INFORMATION ABOUT THE COUNTRIES OF CENTRAL ASIA AND CAUCASUS

1.1. Geographical specifics of the regional countries

The Central Asian states (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) are located in the center of the Eurasian Continent. Neighbors of those countries are Russia, China, Iran and Afghanistan. Western borders of Kazakhstan and Turkmenistan are being washed by the Caspian Sea. South-East borders of those countries stretch over the Tien Shan and Pamir Mountains. Republics of the Southern Caucasus (Azerbaijan, Armenia, and Georgia) are typical mountainous countries with a specific complex mountain terrain, which are situated to the south of the Caucasus Range between the Black Sea and the Caspian Sea. Southern borders of those states (Armenia, Azerbaijan) are being defined by Araks River. Countries of the Southern Caucasus have borders with Russia, Turkey and Iran (Figure 1.1).



Picture 1.1. Geographical location

Major part of the territories of Tajikistan, Kyrgyzstan, Armenia and Georgia are covered by the mountains (from 70% to 93%), in Azerbaijan, mountains cover almost 50% of its territory. About 79% of the territory of Uzbekistan is plain land, the remaining 21% are represented by mountains and intermountain valleys, about 80% of the territory of Turkmenistan is covered by desert. Territory of Kazakhstan starts from the downstream of Volga River and stretches eastwards to the Altai Mountains, and from the Tien Shan Mountains to the Western Siberian Valley on the north. The data on the territories and population of the regional states are given in the Table 1.1.

Table 1.1. Summary information on the regional states

Country	Total square, thous.km ²	Capital	Population number, million people			Population density, person/km ²
			Total	Urban	Rural	
Central Asia						
Kazakhstan*	2724.9	Astana	15.5	8.52	6.98	5.6
Kyrgyzstan*	199.9	Bishkek	5.2	2.29	2.91	26.0
Tajikistan*	143.1	Dushanbe	7.3	2.0	5.3	51.0
Turkmenistan*	491.2	Ashgabat	6.04	2.74	3.3	12.3
Uzbekistan*	448.8	Tashkent	26.9	9.68	17.22	59.9
Southern Caucasus						
Azerbaijan	86,6	Baku	8,6	4,2	4,4	99,3
Armenia	29,8	Yerevan	3,2	2,1	1,1	107,4
Georgia	69,7	Tbilisi	4,6	2,4	2,2	66,0

*) Source: www.cawater-info.net (2007)

1.2. Climate

Climatic conditions of the Central Asian states vary from arid (Turkmenistan) to continental (Kyrgyzstan) and sharply continental ones (Kazakhstan). Climate of Tajikistan is being determined by its situation at the border of subtropical and moderate climatic belts, while the climate of the most part of Uzbekistan is sharply continental, hot and arid. The states of the Southern Caucasus – Azerbaijan, Armenia and Georgia are being characterized by a great variety of climatic zones, which range from subtropical to arid.

2. WATER RESOURCES

In general, available resources of fresh water in the countries of the region are being formed out of the surface and ground waters representing the rivers water, ground water aquifers, as well as the water of the glaciers, lakes, water reservoirs and swamps.

2.1. Surface water

Rivers in the countries of the region mainly have features typical for mountain rivers: highly ranging gradients and slopes, temporary flood/mud water in small rivers and river beds, snow and rainfall and ground water feeding of the rivers, spring high waters. Rivers are being mostly fed by the glaciers, atmospheric precipitation and ground waters. Water in the majority of the mountain rivers is fresh and adequate quality for supply of potable water.

Distribution of the surface water resources on the territory of **the Republic of Kazakhstan** is uneven with significant multi-year and annual dynamics. Kazakhstan accounts for about 85.000 rivers, 90% of them have the length of over 100 km, there are over 48.000 lakes, 21 of them have the surface area of more than 100 km². Moreover, in the country there are around 4.000 water reservoirs and ponds.

One of the major rivers of the region – Naryn – flows across the territory of **the Kyrgyz Republic**. During the average water yield year, summary of water resources make 2458 km³, out of that volume 47.23 km³ fall to the river's surface water flows. Volume of fresh water reserves in the glaciers of the Kyrgyz mountains 12 times exceeds the water resources of the

country's river flow. There are 1923 lakes, 12 artificial water reservoirs in Kyrgyzstan (which capacity is over 10 mln. m³).

River network of **Tajikistan** is divided into three systems: Syrdarya, Zaravshan and Amudarya systems. Nineteen rivers of the country have the length over 100 km. About 75% of the territory of Tajikistan is located in the Pandj – Amudarya Basin. Rivers of Tajikistan provide 55.4 % of the average multi-year surface water flow of the Aral Sea Basin. Mountain part of the country is the most important feeding source of the major watercourse of the Central Asian Amudarya River.

For the two largest oases of the east and north of **Turkmenistan** Amudarya is virtually the only water source. Other surface fresh water resources are being supplied by the rivers of Murghab, Tejen, as well as a lot of small mountain rivers, which water flow is being almost completely taken for the needs of local populations.

Uzbekistan to great extent depends on its neighbors in the matter of uninterrupted supply from surface waters, since only 10-15% of all water resources used in the country are formed on its territory. The share of water resources being formed directly on the territory of Uzbekistan makes 6% in the Amudarya River Basin, 16% in the Syrdarya River Basin, and all over the country it makes about 8 % out of the total water yield of the Aral Sea Basin.

In **Azerbaijan** 26 rivers are more than 100 km long. Kura and Araks are the largest rivers of the Caucasus and they are the main sources of irrigation and hydropower generation. River of Samour is the largest river on the north-west of the country. There are around 250 lakes of fresh and salty water on the territory of Azerbaijan.

Rivers of **Armenia** are the tributaries of Araks and Kura. Watershed line of those rivers divides the territory of Armenia into two unequal in size parts. Division of the water resources of the country both territorially and time-wise is unequal. Four rivers of the country have the length of over 100 km. The largest lake of Armenia is Sevan Lake, with a water storage capacity of 35.8 km³.

Georgia accounts for over 26.000 rivers with total length of about 60.000 km. There are about 860 lakes and 43 water reservoirs in the country. Glaciers cover about 1 % of the total surface of the country and accumulate about 23.8 km³ of water.

2.2. Ground water

Kazakhstan possesses considerable resources of ground water, however their highly uneven distribution over the territory of the country and varying water quality do not allow fully use of them. As result, out of the total forecasted and explored resources of the ground water only 16.04 km³ are considered available.

During the average water yield year the potential ground water resources of **Kyrgyzstan** are about 13 km³.

Ground water in **Tajikistan** can be found almost everywhere. Waters are highly varying and differ by their chemical and taste properties. Reserves of the fresh water of good quality are being formed mainly in the mountain areas. Ground water reserves of the country are being estimated at 18.7 km³.

Forecasted resources of the fresh ground water of **Turkmenistan** are less than 8 million m³/day, while confirmed operational resources make about 3.5 million m³/day.

Total reserves of the ground water of **Uzbekistan** are being estimated at 7.6 million m³/day. Total average annual intake of the ground water out of the approved reserves makes 6,5 million m³/day, and out of the non-approved resources – 9.2 million m³/day. Resources of ground fresh water are mostly concentrated in Fergana Valley, Tashkent, Samarqand, Surkhandarya and Kashkadarya Provinces.

According to preliminary calculations the identified resources of ground water on the territory of **Azerbaijan** make about 6.5 km³, and actually not more than 1.3 km³ is being used.

Armenia possesses a tangible volume of the renewable ground water resources that play an important role in the total water balance. Ground water resources make about 4.2 billion m³, 1.6 billion m³ out of which emerge to the surface as springs.

Forecasted operational resources of the ground water in **Georgia** are being estimated to the volume of 17.2 km³.

Data on supply of the regional states with surface and ground water resources are given in the Table 2.1. below.

Table 2.1. Availability of water resources*

Country	Surface water flow, km ³		Ground water reserves, km ³	Provision with water, m ³ /person
	Total	incl. outside sources	Total	
Central Asia				
Kazakhstan**	100.5	34.2	16.0	6485
Kyrgyzstan	44.1	0.00	13.6	8480
Tajikistan	80.2	16.2	18.7	13500
Turkmenistan	24.7	23.4	0.4	4089
Uzbekistan	50.4	34.1	8.8	1874
Southern Caucasus				
Azerbaijan	28.2	22.2	6.5	3279
Armenia	7.8	1.5	4.2	2438
Georgia	62.1	5.2	17.2	13500

*) Source: FAO Water Report 23, 2003

***) Water resources of Kazakhstan in new millennium. Review of the UNDP, 2004

The analysis shows that the region on the volume of the water resources being formed within it (302.9 km³, or 5057 m³/person for the Central Asia; and 98.1 km³, or 5980 m³/person for the Southern Caucasus) has no scarcity of water, however those resources are being highly unevenly distributed all over the region and are prone to significant seasonal fluctuations. Moreover, in the six states of the region the water demand is being covered out of their own water resources, while in two other states (Turkmenistan and Uzbekistan) there is a shortage of domestic water resources.

Demand for water by the economy sectors of the regional states is given in the Table 2.2. below.

Table 2.2. Demand for water by economy sectors for 2010, in million m³/year

Country	Potable water supply	Rural water supply	Industrial water supply	Fishery	Irrigated agriculture	Other	Total
Central Asia							
Казахстан**	650	220	4000	550	15000	80	20500
Кыргызстан*	175	150	550	70	9500	55	10500
Таджикистан*	700	900	800	150	13550	300	16400
Туркменистан*	400	200	900	30	20000	0	21530
Узбекистан*	2700	1400	1390	1320	52400	0	59200
Southern Caucasus							
Azerbaijan	650	100	3400	30	9200	20	13280
Armenia	300		170	200	2850	30	3550
Georgia	500		30100		900		31500

*) Source: Report on SPECA Project, 2003

***) Water resources of Kazakhstan in new millennium. Review of the UNDP, 2004



Picture 2.1. Water-tank tower in the rural area (Fergana Valley)

3. PRESENT SITUATION

3.1. State of the water supply sector

Majority of the water supply systems in the countries of the region were built in 1950-1980. During Soviet era the authorities due to the low prices for electric power and the relatively low cost of process equipment, construction of the water supply systems that did not require significant capital investment, but which required a considerably high operational cost, was prevailing. According to the experts' opinion, development of the water supply systems was mainly aimed at the use of new water sources, extension of the pump stations' capacity and the water treatment facilities (WTF), as well as the maximum flow capacity of the main water pipelines, etc. Problems of the efficient development of the water distribution systems, their zoning and rational water use, water metering and typical administrative issues actually used to lie outside of the operators' sphere of interest.

Table 3.1. Technical indicators of the water supply systems

Country	Water intake facilities*, number	Chlorination stations	Pump stations	WTF	Water ducts and distribution system, km	Average age of the WS systems
Central Asia						
Kazakhstan	> 5000	> 300	> 500	> 300	23 500	> 30 years
Kyrgyzstan	> 830	> 260	> 540	> 30	> 9600	> 30 years
Tajikistan	> 2500	364	> 400	> 100	6060	> 25 years
Turkmenistan**	1200	n/a	n/a	17	12 600	>30 years
Uzbekistan	> 30000	> 1000	>20000	>200	>30000	>30 years
Southern Caucasus						
Azerbaijan	> 600	20	164		35000	45 years
Armenia	> 400	130	80	16	16 500	>35 years
Georgia	999	156	>90	15	38 000	30 years

* River water intake facilities, catchments, deep and artesian wells.

** There are no data on actually functional chlorination plants and pump stations. Besides the information extracted out of the text of the Review, here and further on the materials prepared to the end of 2005 by the Public Utilities Development Research Institute of Turkmenistan are being used. Materials on the state of the WSS sector have been developed for the workshop on learning the experience of the EU states on introduction of the water safety plans.

Throughout the last 10-15 years of independence the quality of the services being provided by the WSS sector has dramatically deteriorated. This had been caused by considerable reduction of the WSS funding due to the general economic recession, decrease of the actual income of populations and the budget entering, lack of professional skills of the staff and other reasons. Consequently, by year 2000 a considerable part of the infrastructure was out of operation. High rate of wear-and-tear had led to the fact that instead of the preventive repair and maintenance, the WSS entities were forced to carry out the emergency and rehabilitation works.

Water supply systems in **the Republic of Kazakhstan** cover, on average, 78% of urban population, among which the share of the people being supplied by potable water 24-hour a day and conforming to the sanitary norms does not exceed 80%. In 68 cities and settlements the water supply is being scheduled: from several hours of water supply interruption to complete water supply shutoff during the night; 6.3% of the total number of urban population uses the water of the court-yard and public water pits, wells and surface sources, the transport of water is also being used.

Presently, coverage the people of **the Kyrgyz Republic** with the centralized water supply systems reaches 81%. Water supply systems are available in all cities and in 1.279 out of 1750 villages of the country. Majority of the water supply systems have exceeded depreciation

term of their equipment, water treatment and water disinfecting facilities; they need immediate major repairs and reconstruction. Rate of physical wear-and-tear of the rural water supply systems is more than 40%, which contributes to their microbe and chemical contamination. 206 water supply systems (19.2%) do not comply with the sanitary norms, 24 systems do not have water treatment facilities, 18% of the water takeoff pipes are out of order. There is no disinfection of water being delivered to the people at 59 water supply systems. More than 600.000 people, who live in 482 villages, do not have access to the technically equipped sources of potable water and they use the water right out of the irrigation canals, network of ditches (aryks) and rivers.

In the major cities and urban-type settlements of **the Republic of Tajikistan** 93% of people, and not more than 49% of rural population have access to the potable water. Only 52 out of 62 cities and urban settlements have centralized water supply systems, while 80% of rural population use water out of various sources, which do not have adequate sanitary and hygienic conditions.

In **Turkmenistan** it is not always possible to deliver water of the required quality and quantity to the water users. About 60% of urban population gets water out of the centralized water supply systems round-the-clock. Other consumers have an opportunity to get water 6-8 hours a day, and, for example, in the town of Magdanly the water is being supplied to almost 80% of population twice a week during 2 hours only.

In **Uzbekistan** there are 265 cities, towns and settlements, 11.844 villages, including 903 in the hardly accessible small villages. In certain provinces of the country (Bukhara, Khorezm, Karakalpakstan) coverage of population with water supply systems is only 20-25 %. Water ducts and water supplying pipelines in the cities and settlements of the country are made out of the steel pipes. During the last 20-25 years of their operation, their wear-and-tear rate has reached 50%. Water pipelines are not being to their full capacity, thus water losses reach the rate of 40%. The oldest and the most developed system in Uzbekistan is the potable water supply system of the city of Tashkent. Water supply of Tashkent is being effectuated out of two sources: surface and underground located in the basin of Chirchik River.



Picture 3.1. Over 40% of rural population in Fergana Valley use untreated water for household needs out of the wells and aryks (open ditches).

Forty eight out of sixty towns of **the Republic of Azerbaijan** are being supplied with water from the underground sources, while for thirty five cities such sources are the only ones of

water supply. Water supply of other cities, including Baku, Gandja, Sumgayit and Minchegaur is effectuated using the surface water sources. Waters of the rivers of Kura and Araz (Araks) have become hazardous for human health due to the high level of contamination. Only 25% of people of the country are covered with centralized water supply systems that foresee water use out of the water pumping wells.

In Armenia centralized water supply is being provided in all cities and towns and in 35% of the rural settlements (80% of population). In 65% of the rural settlements the water supply is provided by the local systems. Water accessibility for urban population is on average 97%, while in the rural settlements being supplied with water out of the centralized WS systems is 53%.

At present, the centralized water supply systems are available in all 85 cities and towns and 20% of the rural settlements of **Georgia**. In the majority of the settlements in Georgia, the local people get water with interruptions; there is no metering of the produced and consumed water.

Table 3.2. Indicators of the water supply systems' operation

Country	Accessibility of water for population, %		Average actual water consumption, l/day per person	Average duration of water supply, hour/day		Water loss, %	Tariff rate* \$/m ³	Payment collection rate, %	Equipment rate with water meters, %
	Urban	Rural		Urban	Rural				
Central Asia									
Kazakhstan	78	> 35	50-220	18	9	20	0.16-1.2	85	60
Kyrgyzstan	82	58	50-125	16	6	55	0.02-0.24	65	< 50%
Tajikistan	93	49	30-180	18-24	4-24	30	0.03-0.7	80	нд
Turkmenistan	85.4	42.1	323	18	6	75	0	N/A	0
Uzbekistan	90	71	100-700	18	8	45	0.15	80	85
Southern Caucasus									
Azerbaijan	85	25	105	7	10	55	0.2-0.85	42	30
Armenia	97	53	115	8	17	85**	0.26-0.49	80	≈70
Georgia	96	67	180 - 850	4-24	2-10	30-60	0.06-0.18	45	<50

*Tariff does not include the share for systems' development.

** Water loss includes both technical and commercial aspects of water loss.

From analyzes of data received from the national experts it can be noted that the state of the water supply systems in all of the countries does not vary much and is being characterized by the following common problems:

- High level of degradation of the water supply systems which is being proved by the worn-out and obsolete pipelines and equipment with damaged leak-proof insulation;
- High levels of water losses;
- Insignificant share of the round-the-clock water supply. High rate of the interrupted water supply under the fixed or unregulated schedule;
- Low level of accessibility of population to the potable water, especially in the rural settlements;
- Unsafe drinking water in rural areas
- Low tariffs for potable water and low collection rate of the water use fee, which does not allow coverage of the operational costs, as well as maintenance of the water supply systems and professional staff;

- Inadequate equipping of the water consumers with the water meters especially in the households) that have adverse impact on the optimal metering of the supplied and consumed water, as well as to the water fee collection rate;
- Inadequate management of the water supply systems, insufficient number of the skilled specialists, especially in the remote areas and territorial subdivisions;
- Significant difficulties with supply of the required quality potable water to the population;
- Generally low level of the technical equipping of the WSS sector.

3.2. State of the sanitation sector

Starting from the 1960s of the past century a considerably wide-scale construction of the sanitation systems commenced in the countries of the region. Urban water drainage systems, collectors and the sewage treatment plants have been built, and by the end of the 1980s almost 70% of the cities and about 20% of the villages had their own waste water drainage systems. Treatment plants used to be designed and built using the technologies on the sewage water treatment adopted in the USSR: mechanical and biological treatment scheme. Starting from the 1990s due to the common economic hardships the operation of the majority of the water treatment plants were stopped. Owing to the economic and power generation crises, lack of funds for resumption of operation, repair and maintenance of the sewage treatment plants, the process equipment and facilities of the treatment plants were in the state of physical and moral wear-out. Today degradation rates of the majority of the sewage treatment plants is so high that reconstruction of those plants had become more expensive than building the new plants.

Presently, the major part of the facilities is not operational or does not operate efficiently, since their technical state is inadequate, they do not have required equipment, chemical reagents and skilled personnel. Practically everywhere there is no functional biological treatment stage, while the mechanical treatment functions to the full only at the treatment plants of several cities.

Centralized sewage drainage systems on average are available for 62% of the population of **the Republic of Kazakhstan**, 84% of that share is population of the major cities and 10% - population of the urban-type settlements. Technical conditions of the one third of the existing 86 urban sewage treatment plants (STP) are inadequate. There are no sewage treatment facilities in 39 cities and villages. Untreated sewage is being discharged directly to the filter beds or into the terrain. STPs in the cities of Almaty and Astana are in a relatively satisfactory condition. In Almaty the sewage treatment facilities operate according to the complete biological treatment and the treated sewage water is being discharged into Sorbulak accumulation pool, which is located 60 km away from Almaty. Sewage water of the majority of the rural settlements is being discharged into accumulation ponds basically without treatment, where the treated sewage of the urban STPs is being discharged as well. Sewage accumulation ponds very often get filled up to the limit notches, thus creating a constant threat to the water bodies and the human settlements, as well as the risk of the breach of the protective dams.

140 sewage treatment plants (belonging to certain sectors and municipalities) operate in **the Kyrgyz Republic**, out of that number only 84 plants comply with the sanitary norms, and 56 plants absolutely do not perform their functions. Sewage discharge into the water bodies is being effectuated by 41 STPs, while 71 STPs discharge water for irrigation purposes, and 25

STPs drain into facultative ponds. Centralized sanitation systems are available for less than 30% of the country's population. More than a half of the small towns and district administrative centers of Kyrgyzstan do not have the centralized sanitation systems. Untreated sewage water that makes over 27% of the total waste waters is being accumulated in the absorption or cesspits and being utilized in the water-collection areas (low land relief, collector-drainage networks, dry ravines and river beds, etc.) or being discharged into the water bodies. As a result, the soil and water get contaminated, the flora and fauna experience an adverse impact, and the risk of bacterial infection of people grows as well.

In **the Republic of Tajikistan** out of 62 cities, district administrative centers and the urban-type settlements only 28 have sanitation systems. Unsatisfactory quality of the household and potable water supply to the population of the country, as well as unfavorable sanitary and environmental situation is caused by contamination of the water bodies.

Sewage systems in **Turkmenistan** are available only in the major cities. Due to the fact that the rural population used to receive water out of the street water-pumping pipes, the lack of sanitation systems did not considerably affect the sanitary situation of the villages. However, the wide use of the pit latrines by rural population and discharge of the waste water directly into the courtyards still remain serious constraints in the fight against the diseases being caused by poor quality of water and sanitation. The amount of sewage water being drained by the sanitation systems makes only about 35% of the water volume being delivered by the centralized water supply systems. Only in the administrative center of Murghab Oasis a sewage treatment plant was built during the Soviet time. In other settlements the sewage is drained and discharged directly into the natural terrain. Apart from the damage to the desert ecology, the sewage waters represent a breeding pool and spreading of various infections, including malaria.

In **Uzbekistan** centralized sanitation systems exist mostly in the major cities. In the Capital of Tashkent there is an incomplete divided sanitation system, when the sewage is being drained from the territory of the city to the city's sewage treatment plants. Sewage water of the city is delivered to 3 treatment plants, with a total capacity of 1.9 million m³ per day (two-step treatment, i.e. mechanical and biological steps).

Until 1990 in **Azerbaijan** 17 sewage treatment plants were built, and partly performing completely with mechanical and biological treatment. Other STPs used to execute only mechanical treatment. However, due to inadequate operation and major repairs those facilities are in need of significant reconstruction. Sewage water of other settlements that do not have treatment facilities are being spilled over directly to natural surface water bodies. Presently, in the built-up areas of the Absheron Peninsula (incl. the Capital of Baku) construction of 11 sewage treatment plants is going on.

In the cities of **Armenia** the existing sanitation systems ensure sewage drainage of 60-90% of their square. Sewage and water drainage system of the city of Yerevan provides discharge of sewage on 97% of the capital's square. Rural settlements, basically, do not have sewage systems.



Picture 3.1. Newly constructed chlorination plant for drinking water in Azerbaijan

In Soviet period about 20 sewage treatment plants used to operate in Armenia, they used to cover the capital city of Yerevan, 25 other cities and towns and 55 rural settlements. Out of the number of existing STPs at present only the Yerevan Aeration Plant is operating, effectuating only mechanical treatment of some portion of the sewage. Starting from 2004 decisive steps have been taken in order to rehabilitate the sanitation and sewage treatment plants of Armenia.



Picture 3.2. The Ararat Pump Station: prior and after reconstruction

In **Georgia** the coverage of centralized sewage system on average ranges from 28,7% in small settlements to 93,2% in major cities. However, in some urban settlements there is no centralized sewage system. Sewage systems are available in 45 cities of Georgia, but the state of those systems is very poor. STPs have been built in 33 cities. Those plants were put into operation during the period of 1972-1986. At present, none of the biological treatment steps of the plants is functioning. Mechanical treatment of sewage is being operated to some extent only in the STPs of Tbilisi and Rustavi, however the major part of the facilities is virtually out of operation. In settlements, where there are no treatment plants, sewage discharge directly into the natural surface water bodies. In recent years one sewage treatment plant with complete biological treatment has been built in the city of Sakhchere.

In Summary, it can be concluded that in all of the eight states of the CACENA region the sanitation and sewage treatment systems are in an extremely poor condition. The lack of adequate operation and repair practices, as well as a permanently low or often no funding of their maintenance has brought the sanitation sector into a crisis. It is obvious that the

problems of the sanitation sector's urgent need of rehabilitation and development is not given enough priority in the respective budget lines at national and local levels.

Table 3.3. Typical indicators of the sanitation systems

Country	Coverage with sanitation system, %		Length of the sanitation network pipelines, km	Number of Sewage Treatment Plants		Settlements covered with sanitation systems	Average age of sanitation systems
	Urban	Rural		Total	incl. existing		
Central Asia							
Kazakhstan	84	10		90	60	220	>30
Kyrgyzstan	68	28	>1600	20	-	88	>30
Tajikistan	20	5	650	74	36	270	>20
Turkmenistan	61.8	2	>2200	1	1	1	>50
Uzbekistan	85	40	>10000	>100		197	>30
Southern Caucasus							
Azerbaijan	40-45	5	8600	17	7	41	30
Armenia	60-90	15	6400	20	1	81	>30
Georgia	93.2	28.7	4600	26	1	85	30



Picture 3.3. Debris filter of the treatment facilities in Fergana, Uzbekistan



Picture. 3.4. Actual state of some of the treatment plants in the Southern Caucasian countries

4. NATIONAL POLICY AND THE LEGAL AND REGULATORY FRAMEWORK

4.1. National policy

In general, countries have developed their own national policies of water supply and sanitation, however not all have clearly defined such policies.

National policy of **the Republic of Kazakhstan** in the sphere of water supply and sanitation, first of all, is stipulated in the supreme law – the Constitution of the Republic of Kazakhstan, and also in the following documents: the Water Code of the Republic of Kazakhstan dated 09.07.2003, the Concept of Environmental Safety of the Republic of Kazakhstan for the period of 2004-2015 dated 03.12.2003.

In **Kyrgyz Republic** for the purpose of addressing the problems of the potable water supply to the country's population a number of the legislative documents have been adopted: the Laws on "Water", on "Potable Water", the Water Code and others. The National Water Council has been established under the Government of Kyrgyz Republic. However, there is no a single governmental body that would have implemented the national policy and coordinated the activities of the sectoral authorities and territorial state governments and local self-government bodies in the sphere of the WSS. Tariffs for water supply are being set up by the Antimonopoly Committee.

In **Tajikistan** the issues of WSS are being addressed by the Water Committee, according to which the State and the local executive authorities are responsible for water supply. The legal and regulatory framework of the water supply system sector regarding its operation and maintenance should be improved.

In **Turkmenistan** increase of the people's access to safe potable water has been officially recognized as priority national policy. This policy is being implemented through development and extension of the centralized water supply and sanitation systems. Taking into account the compact location of the settlements inside the oases the optimal solution would be construction of large water treatment plants with further transport to the settlements using "group water ducts".

The basic law that regulates the water relationships in **Uzbekistan** is the Law of the Republic of Uzbekistan on "Water and Water Use" of May 6, 1993, according to which the water is a state property. The Law is aimed at the rational use of water resources for the needs of population and the national economy; it envisages protection of water from pollution and depletion, and protection of the water users' rights, etc.

In **Azerbaijan** the objective of the national water policy is provision of humans with safe and valuable environment for living and satisfaction of their needs. Strict measurement of the water consumed and introduction of the program on water loss reduction within the urban water supply systems is the issue of top importance. Measures on safeguarding the water quality and water resources management should be included into the strategies of all sectors of Azerbaijan's economy.

In **Armenia** the national policy is targeted on addressing the following major issue in the WSS sphere:

- Improvement of the WSS services,
- Provision of all service users with reliable and safe water supply of the required

- volume and quality,
- Reforms of the structure and methods of the water supply entities' governance,
- Creation of the metering system all over the entire "source – consumer" chain,
- Detection, elimination and control of the water loss,
- Inventory, operation efficiency increase and preservation of the main assets of this sector,
- Complete transfer of financial and economic activity of the water supply entities to the commercial basis,
- Ensuring the timely and full payment of the services rendered,
- Implementation of environmental measures.

Starting from the 1990s, there was practically no national system of the water management sector in **Georgia**, as well as no unified water management policy due to the profound political and economic crisis. There is no practice of the long-term strategic and financial planning at both the national scale and the enterprises' level. There is no clearly defined WSS sector policy, even though in 2009 the Ministry for Regional Administration has been created, including competence on the water supply and sanitation sector.

4.2. Legal and regulatory framework

National legislation

After independence all states of the region have developed and adopted appropriate laws and subordinate legal documents on water sector regulation. Majority of the states of this region has a Water Code as the basic law regulating the water relationships. In **Uzbekistan** the basic law that regulates the water relations is the Law on Water and Water Use. In **Georgia** it is the Law on Water. In **the Kyrgyz Republic** the Laws on "Water" and on "Potable Water" have been adopted as well. In **Kazakhstan, Kyrgyzstan** and **Armenia** the new standards of potable water have been developed and are in force now (GOST and SanPin): "Potable water. Hygienic requirements to the water quality of the centralized water supply systems. Quality control," "Potable water. General requirements to the arrangements and methods of quality control."

In general in **the Republic of Kazakhstan** 10 laws and over 200 subordinate legal documents are in force. They are aimed at the environmental safety and similarity with the environmental law of developed countries incl. introduction of international standards as well. The Water Code serves as the basic legal document for the water supply and sanitation enterprises. Main shortage in the legal regulation of the WSS sector is the lack of a sectoral law on water supply and sanitation that would have established the status of the WSS enterprises as the entities supporting the life activities, regulating the legal relationships among the water supplying enterprises, state authorities, akimats and consumers, main principles of the WSS enterprises' functioning. Such a law could document the technical requirements on the water supply and sanitation systems. One of the main legal documents in the WSS sector is the Law of the Republic of Kazakhstan on "The natural monopolies and the regulated markets", since the WSS enterprises are the subjects of the natural monopoly. This Law sets up the principles of tariff regulation of the WSS enterprises, and a great number of subordinate legal documents has been adopted for development of this Law. Water supplying enterprises' activity is being regulated by a series of codes, laws and subordinate legal documents, - all of them requiring a constant update. Evidently, the WSS sector needs a Concept of the water supply and sanitation development – a program document that unfolds the sector's development prospects. In the March 2009, amendments to the Water Code have envisaged assignment of the authority responsible for water supply and sanitation – that is the Committee on Water

Resources under the Ministry of Agriculture. However, re-elaboration of the Law on “Water supply and sanitation” and a number of the subordinate legal documents, methodologies and regulations is necessary.

In **Tajikistan** there is a need for urgent development and adoption of a Law on “Potable water and water supply,” “Regulations on water pipeline use on the territory of the Republic of Tajikistan,” “State standard of potable water” and other regulatory documents.

In **Turkmenistan** the following laws and regulatory documents relate to the water supply sector: the Code of Turkmenistan on administrative law violations (17.12.1984); the Law of Turkmenistan on Nature Protection 12.11.1991; the Sanitary Code of Turkmenistan 19.05.1992; the Law of Turkmenistan on Subsoil 14.12.1992; the law on the state environmental expertise 15.06.1995; the Criminal Code of Turkmenistan 12.07.1997; the Law on licensing of certain business activities 12.06.1999; the Water Code of Turkmenistan 01.11.2004; the Law of Turkmenistan on Hydrocarbon Resources 06.12.2005; the Law on Dayhan Farms 30.03.2007; the Law on Dayhan Associations 30.03.2007.

The Water Code of Turkmenistan was enacted on November 1, 2004. This subordinate legal enactment has legally vested the system of the water resources management that has been formed in the course of the gradual reforms of the state power and redistribution of functions and authorities. The Water Code sets up the borders of competence among the different levels of water resources management – the Cabinet of Ministers, specially assigned state institutions on water use regulation and protection of the water resources, local executive power bodies, public organizations and common citizens. The Water Code has also confirmed the principles of the water consumption and water use regulation on the territory of Turkmenistan as follows:

- Water for household and drinking purposes shall be delivered to the public free of charge, cost for construction, reconstruction and operation of the water supply systems shall be covered at the expense of the municipal and state budgets;
- Water for industrial use shall be delivered for fees according to the established tariffs;
- An enterprise that exceeds the water withdrawal limits or the limits of discharge of the untreated industrial waste water shall be a subject to the legally envisaged penalties;
- Use of water for land irrigation not exceeding the established limits shall be free of charge;
- Maintenance cost of the inter-farm systems shall be incurred by the water users, whom those systems belong to;
- Financing, reconstruction and operation of the water management facilities of the national, inter-basin, inter-district (inter-“etrap”) and inter-farm significance shall be done at the expense of the state budget.

Introduction of the Water Code marks a commencement of the work on streamlining of the subordinate legal documents in compliance with modern requirements.

In **Uzbekistan** a number of the resolutions of the Cabinet of Ministers have been adopted as well. Those resolutions are the basic legal documents regarding the issues of the public utilities’ use, and they are aimed at the ensuring due measurement and saving of the energy carriers’ (water and gas) consumption.

Azerbaijan had adopted its Water Code (1997), the Law on “Water supply and sewage water” (1999), the Law on “Water supply and sanitation” (1999) to ensure development of the water supply and sanitation systems. In 2003 the government of Azerbaijan has adopted the

National Program of Sustainable Socio-Economic Development of the Country (18.02.2003), according to which until 2015 every citizen of the country must have access to clean and quality water. The program foresees the mechanisms ensuring the stimulation of the rational use of the natural resources, improvement of the potable water quality in accordance with the relevant standards, improvement of the laws that regulate the ecosystems, protection of the transport rivers from pollution, and involvement into the regional use of water of the water basins of the neighboring countries, and other measures.

Armenia has developed a new Law on Potable Water, which is now under consideration by the relevant authorities.

Georgia has adopted a number of the legislative documents regulating the water relationships, namely: Resolution of the Government of Georgia No.30 of 15.02.2007 on “State Commission on the development of the safe water supply and sanitation state policy” and the Resolution of the President of Georgia (No. 98 of 30.01.2003 r.) on “State consulting committee on protection and rational use of the water resources of Georgia.”

International agreements

All countries of the regions have signed the UN Millennium Declaration in 2002 by that undertaking the responsibilities on integration of the Millennium Development Goals into the national development strategies and the regular reporting on the state of the development goals achievement. In order to regulate the issues relating to the transboundary watercourses all countries either have recent agreements and covenants concluded with the neighboring countries or use the old ones that were concluded during the Soviet time.

Practically all regional states have ratified the following international conventions on the environmental issues:

- UN Convention to Combat Desertification (1998);
- International Convention for the Prevention of Marine Pollution from Ships (MARPOL Convention) (1998);
- Convention on Environmental Impact Assessment in a Transboundary Context (1999);
- Convention on Information, Public Participation and Access to Justice in Environmental Matters (1999);
- Convention on Biological Diversity (2000);
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1999);
- Convention on the Preservation of the Wildlife and the Natural Habitats in Europe (2000).

Situation with the legal framework in the sphere of water supply and sanitation is given in Table 4.1.

Table 4.1. Situation with legal framework in the sphere of water supply and sanitation

Country	Availability of basic laws, regulations, standards and norms	Need of improvement	Development of new laws, standards and norms
Central Asia			
Kazakhstan	available	necessary	necessary
Kyrgyzstan	available	necessary	necessary
Tajikistan	not available	necessary	necessary
Turkmenistan	available	available	necessary
Uzbekistan	available	available	on-going
Southern Caucasus			
Azerbaijan	available	available	on-going
Armenia	available	available	on-going
Georgia	available	available	in progress

Regardless of the fact that almost all states of the region after declaration of their independence had developed their own national policies in the sphere of water supply and sanitation, the sphere of the new economic conditions development and the adopted IWRM mechanisms should be reassessed and re-elaborated. On the other hand, even though in many countries the basic laws regulating the water supply and sanitation sector have been adopted, they can not function to the full due to the lack of a number of the subordinate legal documents that would allow their efficient application. Many countries intend to mainstream the legal and regulatory frameworks of their countries in accordance with those of the European Union.

5. INSTITUTIONAL ASPECTS AND HUMAN RESOURCES POLICIES

5.1. *Institutional aspects*

In many countries of the region the functions on WSS regulation in the settlements are shared among several ministries, which often impede the efficient management of the systems and achievement of the required level of services.

In March 2009 a resolution of the Government of **the Republic of Kazakhstan** assigns the Ministry of Agriculture (Committee on Water Resources) the functions of the body authorized to regulate the water supply and sanitation. Owners of the public water supply and sanitation systems are mainly local executive bodies. Urban water supply and sanitation systems are under supervision of the local city, village or provincial administrations (Akimats) and are being operated through the water supply enterprises (vodokanals). Rural local water supply systems are accountable to the local administration, and group systems – to the district and provincial administrations, while the major group water supply systems are being operated by the state-run enterprises.

In **Kyrgyzstan** the Department of Rural Water Supply under the Ministry of Agriculture, Water Management and Processing Industry of Kyrgyzstan is in charge of the issues water supply in rural areas. Currently, it is under supervision of the National Agency on Local Self-Government, since the water supply issues, according to new edition of the Law on “Local Self-Government...” is the competence of the local governments. Water supply of the city of Bishkek and the district administrative centers of the country is under supervision of the municipal authorities, except the Department of “Vodokonal” (water supplying enterprise) in the city of Cholpon-Ata, which belongs to the state-run enterprise “Kyrgyzjilkommuncoyuz”, created at the beginning of 2009 under the Ministry of Industry, Power Generation and Fuel Resources of the Republic of Kyrgyzstan.

In **the Republic of Tajikistan** water supply in rural areas is being managed by “Tajikselkhozvodoprovodstroy” under the Ministry of Land Reclamation and Water Resources. Design, construction and operation of the water supply and sanitation systems of the cities and villages of Tajikistan are being done by the WSS sector. The State Geological Administration is responsible for survey and control of subsoil resources, including the ground water reserves.

In **Turkmenistan**, special public utilities agencies, mostly subordinate to the local self-government bodies, are in charge of provision of the centralized water supply and sanitation services until the distribution networks. There are also small systems, belonging to certain enterprises, which are used to supply potable water to the neighboring villages. Officially the in-house maintenance of the water supply and sanitation systems is responsibility of the housing operation offices that remain since the Soviet period. However, their human resources and technical capacities do not meet the present day requirements.

In **Uzbekistan** starting from 2001 the “Uzkommunkhizmat” Agency under the Cabinet of Ministers of the Republic of Uzbekistan is the state authority that governs the public utilities sector. “Uzkommunkhizmat” Agency comprises four inter-regional water pipelines: Tuyamuyun-Nukus, Tuyamuyun-Urgench, Damkhoja and Dekhkanabad, Khojaipak inter-district water pipeline and the main pipeline of Chimgan-Charvak recreational zone. Need in construction of the inter-regional water pipelines in Uzbekistan was caused by the fact that in certain areas of the country there are no sources of water meeting the standards of water

quality. The structure of the Agency comprises the National Training and Research Engineering Center “Uzkommunukuvtashkilotchi.”

State governance in the sphere of use and protection of water bodies in **Azerbaijan** is being executed by the Committee on Land Reclamation and Water Management under the Cabinet of Ministers of the Republic of Azerbaijan and the Ministry of Environment and Natural Resources. Management of the use and protection of the water bodies belonging to the municipal property is being performed by the municipalities. Open joint-stock company “Azersu” is in charge of water supply to the cities of Baki, Sumgayit and Absheron Peninsula. All enterprises of water supply and sanitation of the country’s regions have been transferred to “Azersu” public enterprise since 2004. “Azersu” also includes the Research and Design Institute “Vodokanal.”

In **the Republic of Armenia** the State Committee on Water Management under the Ministry of Territorial Governance of the Republic of Armenia is in charge of the management, operation of the water supply and sanitation, and coordination of the water supplying enterprises. As a result of the Committee’s activity it became possible to integrate all authorities related to the state management of this sector in one institution and to put an end to the inter-departmental disputes that used to happen before. The Committee comprises five special-purpose companies – “Yerevan Djur,” “Armvodokanal,” “Nor Akunk,” “Shirak-Vodokanal” and “Lori-Vodokanal” – perform operation, maintenance and development of the WSS systems, providing services to all cities and over 360 rural settlements of Armenia (about 80% of country’s population). In 560 villages the water supply and sanitation issues are the competence of the municipalities. All specialized enterprises of WSS sector are being managed by private operators. Municipal networks and structures of WSS sector are municipal property and have been transferred to free-of-charge use to the water supply enterprises on the basis of the appropriate contracts. State, represented by the State Committee on Water Management, owns 51% of shares, other 49% are owned by municipalities.

In **Georgia** the water supply and sanitation systems until recently have been managed basically by enterprises with limited liabilities. Small part of the water supplying enterprises is the open Joint Stock Companies (JSCs). In both cases 100%- owner of those enterprises is the State. Engineering infrastructure and other fixed assets of the water supply and sanitation in small and big cities of Georgia, normally, used to belong to municipalities. Starting from 2008 JSC “Rustavivodokanal,” JSC “Mtskhetavodokanal,” JSC “Tbilisi Water” and JSC “Gruzvodokanal” have been transferred to private owners.

In **Uzbekistan** and **Armenia** special state bodies regulate the water tariffs, i.e. in Uzbekistan State Committee on Antimonopoly Control and Support to Entrepreneurship under the Ministry of Economy and Trade of the Republic of Uzbekistan and in Armenia a similar body is the independent Committee on Regulation of Public Services.

Institutional aspects of the WSS systems in CACENA countries are given in the Table 5.1.

Table 5.1. Institutional aspects of WSS systems

Country	Property of the fixed assets, %			Enterprises performing functions of operation and management of WSS systems			
	State	Local self-government bodies	Privatized	State	Local self-government bodies	Private sector	Independent water supply enterprises (vodokanals)
Central Asia							
Kazakhstan	70	25	5	70	25	5	0
Kyrgyzstan	5	95	-	10	90	no	no
Tajikistan	100			100%			
Turkmenistan	100	0	0	100%			
Uzbekistan	40	60		available	available	no	no
Southern Caucasus							
Azerbaijan	90	8	2	91	5	-	4
Armenia	40	60	0	-	+	+	-
Georgia	<50	-	>50		+	+	-

5.2. Human resources policies

In all countries of the region training of human resources for water management, water supply and sanitation is delivered by the higher education institutions on civil engineering professions. Higher education institutions of the regional states are providing training on the bachelor degrees in water supply and sanitation, and water resources, as well as master degrees, candidate of sciences (post-graduate studies) and doctors of sciences (doctor degree studies). However, in all countries of the region there is a growing need for training of the intermediate level staff and technical staff for operation within enterprises.

In **Kyrgyzstan, Azerbaijan and Armenia** retraining and skill upgrading of the staff is being done within the framework of the implemented projects of the national and regional scale, such as ADB and WB projects and JICA project on “Water supply of small and medium size cities and regions of the Central Asia.”

In **Tajikistan** and **Turkmenistan** the shortage of skilled specialists on design, construction and operation of the water supply and sanitation systems is still a critical issue. There is an urgent need for plan development of the target program for on-job professional training of the young staff members of WSS enterprises.

In **the Republic of Uzbekistan** the training and methodological engineering center “Uzkommunikuvtashkilotchi” under the “Uzkommunkhizmat” Agency conducts training on technical professions for the servicing of the public utilities facilities. Retraining and skill upgrading of the water sector operation engineers, chemical engineers for water analysis and other specialists is also provided.

In **Armenia**, owing to the water supplying companies’ activity, investments under the loans and the WSS companies’ own funds, the human resources situation has improved in recent years. Water supplying companies conduct staff briefings, training courses and retraining for various professions. For that purpose “Armvodokanal” has built a special training center in the city of Echmiadzin. The center has modern equipment, technical means, hardware and software. It also has a water quality control laboratory, trial stands for testing, repair of water metering devices, and appropriate training of staff.

In **Georgia** staff capacity is still at the sufficiently high level. WSS enterprises are basically staffed with the specialists having secondary education, as well as with older experienced personnel. Staff retraining and skill upgrading issue is not that much developed – there is a shortage of appropriate training institutions in Georgia, e.g. no courses on skill upgrading for the staff of the intermediate and higher levels.

Distribution of the WSS regulation functions among various ministries and state authorities that have different priorities does not facilitate achievement of the required level of functioning, operation and the overall and equal development of WSS systems. Institutional structures for regulation, management and development in many countries of the region still need reforms depending on the national policies and strategies in each of the regional states.



Picture 5.1. Azeri colleagues explain to GWP CACENA delegation their plans of reconstruction and development of the water supply system in the areas surrounding Baki at the expense of the state budget of Azerbaijan (2008)

6. PRIVATE SECTOR PARTICIPATION

Not all countries of the region were able to abandon the Soviet management style; therefore, in some countries the state institutions govern the WSS sector. In a number of countries the State, still keeping the fixed assets of the WSS systems and the right to elaborate and implement the state policy in this sector, has transferred the functions of the management, operation and maintenance of the WSS systems to the private sector.

At present, in **Kazakhstan** a process of the small and medium businesses (SMB) development is going on. Once SMB will get developed and will start to have sustainable and stable profits, it would be possible to expect private investments into development of the water supply and sanitation systems. There are water supplying enterprises in some provincial centers of Kazakhstan with private type of property, namely Shimkent (78%), Pavlodar (20%), and Karaganda (49%). In small towns and settlements there are also private enterprises that operate the water supply and sanitation systems. There are instances, when private operators were not able to fulfill their obligations. Water supply enterprise of the city of Kizilorda were prosecuted by the local executive body. Company managing the water supply enterprise of the city of Ustkamenogorsk was dismissed from that role. Private sector's participation is limited by the Water Code of the Republic of Kazakhstan and the Decree of the President of the Republic of Kazakhstan, which stipulates the list of facilities having a special strategic importance and purpose. Legislation envisages a form of concession. The issue of private participation is topical and at present is being intensely studied by the Government of the Republic of Kazakhstan.

In **Kyrgyzstan**, significant participation of the private sector in the maintenance and development of the water supply and sanitation systems is not expected. Partial involvement in maintenance and development is demonstrated in the shared participation in the amount of 5% in cash out of the cost of the project on rehabilitation of the water pipeline systems and 15% of labor force participation in the projects under the Program "Taza-Suu" (Clean Water).

Water Code of **Tajikistan** prohibits privatization of the water supply systems, thereby ensuring ownership by the State. Rural and agricultural water supply systems, which once used to belong to the former sovkhoz and kolkhoz farms, should be transferred to the ownership by the local municipalities and be managed by them.

In **Turkmenistan** private sector's participation is extremely limited. Partly, it is related to the fact that people still have a Soviet-era mentality. However, there are other internal and external factors. Private sector participation is limited to biddings for new construction and execution of repairs inside the dwelling buildings by persons licensed with certificates for individual entrepreneurial activity.

In **Azerbaijan** participation of private sector in the maintenance and development of the water supply and sanitation systems at the moment is problematic. First of all, it is related to the low profitability of the old systems (need for constant repairs, low tariff rates and low fee collection rate, inadequate water metering, etc.).

One of the main objectives of the national policy in the WSS sector of **the Republic of Armenia** is private sector's involvement into the management of WSS systems. In this regard the broad legal framework enabling that process has been created. As a result of the above mentioned policy, "Yerevan Vodokanal" after termination of the management contract foreseen for 2000-2004 with an Italian company has signed a new contract with French

company “Veolia” for a ten year period of management of the WSS systems of Yerevan. In 2004, under the loan program of the World Bank, a contract with French company “Saur” has been signed for the management of “Armvodokanal” company, which is effective until the end of 2010. Similar contracts have been signed with the German bank - KfW – for implementation of the program on operation, maintenance and development of the WSS systems in other regions of Armenia. As a result of the private operators’ involvement, the state of WSS in the inhabited localities serviced by the water supplying enterprises (vodokanals) was considerably improved and continues to get better.

The process of WSS transfer to private owners began in **Georgia** in 2008. That year the State has sold to the firm “Multiplex Energy Limited” the following entities: “Rustavivodokanal,” “Mtskhetavodokanal,” “Tbilisi Water” and “Gruzvodokanal,” the latter owns the regional treatment facilities in the cities of Tbilisi and Rustavi. According to the contract the Firm should modernize the existing water supply and sanitation systems and to improve the water supply in the cities of Rustavi, Tbilisi and Mtskheta.



Picture 6.1. Aparan Pump Station in Armenia – prior and after reconstruction



Picture 6.2. Rural water supply in Aparan District of Armenia

7. PUBLIC INVOLVEMENT

All countries of the region to a certain extent have a developed legal framework to ensure public involvement into the process of decision-making on environmental issues. The countries have also ratified a number of international Conventions that require ensuring of the public awareness and participation in decision-making. However, in every country the process of public involvement is evolving differently.

In **Kazakhstan** prior to approval of new tariffs for water supply and sanitation services the territorial department of the Agency on Regulation of the Natural Monopolies have to arrange public hearings, where the public organizations and common people are invited and where the activity of the water supplying enterprise, technical and commercial water loss rates, expenses of the WSS enterprises, raise or reduction of tariffs are discussed.

In **Kyrgyzstan** the projects on implementation of the rural water supply systems' rehabilitation involves only the state governance bodies and the rural public associations of the potable water users. However the activity of those public associations is not effective yet.

Tajikistan needs to raise the awareness of its population in order to ensure sustainable water supply services and community participation in operation and maintenance of WSS systems. A number of international organizations and NGOs help to involve Centers of Healthy Lifestyle Formation (under departments of the Ministry of Healthcare) into conduction of the campaigns on raised public awareness on sanitary and hygienic issues.

Up to now **Turkmenistan** does not have any mechanisms of public involvement into the decision-making process on the issues related to water supply and sanitation. Limited efforts towards that end have been made within the framework of pilot projects of some international and donor organizations. On one hand, due to the lack of understanding of the significance of public involvement from the side of the state officials, and on another hand, due to the public's ignorance of the importance of their participation in those processes. Key reason of the lack of public initiative is a low level of people's awareness.

At present **Uzbekistan** faces a need to find the ways for addressing, minimizing and, if possible, prevention of the water-related and environmental problems. In this regard it is also important to find the methods of public involvement into the processes of planning and decision-making, which would help to prevent future conflicts and achieve stability in the region.

In **Azerbaijan** a number of non-governmental organizations implement projects on the public informing about existing problems in the water sector by publishing newsletters, brochures, publications in the printed media and conduction of trainings. People can get environmental information also via electronic mail of the Information Center "Aarhus" (ecoforum@yahoogroups.com), the Regional Environmental Center (info@rec-caucasus.org), via the network of Caucasian environmental NGOs (info@cenn.org) and other channels. Unfortunately, the governmental organizations that are in charge of the management and preservation of water resources do not efficiently use the NGOs' capacity in informing and broadening involvement of public into the decision-making on water issues.

In recent years, **Armenia** concurrently with involvement of public operators in the WSS sector, a great importance is given to the need of public involvement in certain stages of programs' implementation. Public participation has been secured both in the national laws and resolutions, and in the international conventions ratified by Armenia. In order to involve

people into the structure of water supplying entities' management, new units have been created (in large companies – public relations departments, in smaller companies – press-service officers). With the help of media they provide information on the companies, therefore ensuring transparency of their activities. Public organizations are also involved into the process of water tariffs fixing. Information on activities of “Armvodokanal” and Commission on Regulation of Public Services can be found in the following web-sites (<http://www.armwater.am/>, www.psrc.am).

Democratization in **Georgia** has fostered intensified public activities. Public organizations represent the most organized and conscious part of society. Since the water supply and sanitation problems have immediate impact on the level of human well-being and health, and environmental state, nowadays, various public organizations play an active role in tackling those problems. A wide range of tools and procedures of public involvement in decision-making process in the WSS sector have been introduced with through national legislation and international conventions ratified by Georgia .

Table 7.1. Situation with public involvement

Country	Availability of the laws and enactments on public involvement	Extent of application of the laws	Expert assessment of the extent of public involvement
Central Asia			
Kazakhstan	available	normal	average
Kyrgyzstan	available	initial	low
Tajikistan	not available	low	unsatisfactory
Turkmenistan	none	none	none
Uzbekistan	none	none	none
Southern Caucasus			
Azerbaijan	3	normal	average
Armenia	available	satisfactory	low
Georgia	available	60%	50%

In general “Public involvement” is understood in all countries of the region as the right of public to access of information, while public participation in the decision-making process is put to the background. The reasons are:

1. Incomprehension of the importance of public involvement into the decision-making processes from the side of the government officials and their unwillingness to involve the public,
2. Low level of comprehension by the public.

In this regard it is necessary to reform the perception and behavior of both state officials (decision makers) and the public.

8. FINANCIAL SITUATION OF WSS ENTERPRISES

Financing of the water supply and sanitation sector (the systems support and development) in the states of the region is being, mainly, done out of the following sources:

- service fee collection,
- state and local budgets,
- loans, grants, and technical assistance of the international financial institutions and organizations.

In **Kazakhstan** the current tariffs do not cover the systems' operation needs. WSS services deteriorate in the urban areas due to that fact, and in rural localities the water supply is scheduled.

In **Kyrgyz Republic** decentralization of responsibility for provision of WSS services and their delegation to the level of local self-government bodies (municipalities and rural settlements) have created a number of problems. Due to the insufficient local budgets, low local capacity in the WSS infrastructure management and low tariffs, financial situation of the WSS systems operators has worsened. Virtually all of them, except Bishkek Water Supplying Enterprise, during the last decade are unprofitable, while the quality of services is declining. Tariff policy in the country is politicized: province governors and city mayors (akims) prefer not to raise the tariffs in order to prevent the people's discontent with local and national governance.

In **the Republic of Tajikistan** there is a serious problem of quality water supply. Tariffs for potable water supply do not cover the operation costs of WSS enterprises (that include the cost of electricity, materials, wages, taxes, etc.). Lack of financial means of consumers, insufficient allocation of funds for rehabilitation of WSS facilities out of the state budget has brought the major part of WSS facilities into an extremely critical state. Work on rehabilitation of WSS systems in Tajikistan can be implemented only with investors' participation.

Turkmenistan annually allocates dozens of millions of USD for new construction of the large-scale projects in the sphere of centralized water supply and sanitation. Operational costs of WSS sector is subsidized by the State in the area of WSS services rendered for population. The extent of such subsidies is defined without application of any norms and methodologies. Water supply and sanitation services in Turkmenistan are free of charge. However, according to the results of the WB surveys, people are willing to pay a considerable share of their family budgets for provision of quality services of water supply and sanitation.

Uzbekistan conducts a targeted work on economic reforms:

- Practice of cross financing is abandoned, i.e. a single tariff for all consumers is introduced;
- Water losses in the water supply networks are detected and eliminated;
- Pipelines in the state of emergency and worn-out pipelines are replaced;
- Water metering devices are widely installed;
- Strict tariff policy is under implementation; its purpose is to ensure self-repayment and development of production capacity using the measures on social protection of the poor and those of immediate need;
- Use of tap water for irrigation and other purposes is reduced.

The independent body for tariff regulation in Uzbekistan is the Antimonopoly Committee departments under the provincial and city governments (khokimiyats). Thus, for instance, in

Tashkent the tariffs for tap water and sanitation are approved by the State Finance Department of Tashkent City Khokimiyat.

To date, WSS sector of **Azerbaijan** is subsidized by the State since current tariffs implementation of the principle of “cost recovery” is impossible. Tariffs for potable water and sanitation services in Azerbaijan are established by either suppliers of potable water or local self-governed bodies. Those tariffs are non-justified. Basic criteria of the market price fixing for water is evaluation of the actual payment capacity of the water users. Collection of even low tariff rates represent significant difficulties, since there is no mechanism to ensure complete collection of taxes and fees. Low tariff rates do not cover operational costs and low payment capacity of people contribute to the low profitability of WSS enterprises.

In **Armenia** the main reason for WSS sector’s improvement was the Law on “Preferences to the payment of accrued indebtedness for water supply, sanitation and irrigation water supply” that provided an opportunity to repay completely the debts on service fees accrued until the year 2000. By paying 15-20% of the debt in 2000-2002, the service user was exempted of the remaining part of the debt. About 90% of the water users took advantage of those preferences and concluded agreements with the water supplying entities. As result of this, more than 42.000 new users have been identified. Along with improvements in the water supplying companies operation, stabilization of their financial situation is evident. In recent years it became possible to slow down the indebtedness accumulation rate, while the expenses are made out of the actual revenues, not creating new accounts payables. Tariffs for provided WSS services, the WSS companies are calculating themselves and submit them to the Committee on Public Utilities Regulation (CPUR) for their duly approval. A majority of the Armenian residents pay for the actually consumed water (provision with water meters make about 80%, they pay almost 100% of water fee). Average fee collection rate ranges from 67% (Shirak-Vodokanal) to 92% (Yerevan-Djur and Nor Akunk). The rent agreements and management contracts include incentives for improvement of the service quality, full reimbursement of cost and capital investments out of the cash flows. Installation of water meters by water users of all WSS companies is the major component of the reform. Funds provided by donor organizations and the allocations from the state budget of Armenia presently are used for financing of the above mentioned reforms..

In **Georgia** the fees paid by consumers constitute the principal source of income of the WSS operators. However, the current level of tariffs in the sector, with some exceptions, does not allow compensation of all costs. Every water-supplying entity calculates its own tariff rate, which are then approved by the local municipal councils. Tariff rates differ with settlements. Due to the lack of water meters, the actual fees for public used to be flat rates. Water fee collection makes 45% of the rate. The State subsidizes the water supplying enterprises by allocating funds to cover operation and maintenance cost. WSS sector is financed out of the funds of the investment projects being implemented by international financial institutions.

Table 8.1. WSS sector cost recovery percentage*

Country	Out of the state budget	Out of the local self-government budget	Out of the water supply enterprise's budget	Foreign investments
Central Asia				
Kazakhstan	> 45	45	10	0
Kyrgyzstan	50	25	25	0
Tajikistan	10	10	80	0
Turkmenistan	>75	0	<25	0
Uzbekistan	25	25	0	50
Southern Caucasus				
Azerbaijan	20	0	80	0
Armenia	12	7	81	0
Georgia	30**	0	70	0

*Only operational and maintenance costs have been estimated since financing of the infrastructure investments is separated from the budgets of the operating entities.

**Including local budget.

In many countries of the region the tariffs for potable water, sewage drainage and treatment have been established by the state or state-dependent bodies. In all countries of the region, where the functions of regulation, management (operation and maintenance) and development are performed solely by the state institutions, the tariffs for potable water supply, sewage drainage and treatment are established by the state bodies as well. Normally, such tariffs are subsidized in order to alleviate the load on family budget and mitigation of the possible social tension. Consequently, application of such mechanisms, and, moreover, the lack of the water meters (or extremely low level of equipment with water meters) at consumers, it is very hard to achieve a high collection rate of the water fee and to stabilize the financial situation of WSS entities. Subsidies being allocated out of the state budget were supposed to cover the costs of the WSS sector; however, in most cases they are not sufficient. As a result, WSS enterprises are unprofitable, unattractive for private sector and not performing their basic functions well enough.

Among CACENA countries only in Uzbekistan and Armenia the tariffs have been set up by independent enterprises. The basis for tariff fixing in those countries is the principle of self-repayment. owing to which the financial situation of the WSS enterprises in Armenia has considerably improved.

9. DEVELOPMENT AND REHABILITATION PROGRAMS AND PROJECTS

During recent years a whole range of the programs and projects aimed at the rehabilitation and development of WSS sector were implemented in the states of the region. The share of project financing out of the state budgets and at expense of the foreign investors vary from country to country.

In 2002 **the Republic of Kazakhstan** has adopted the Sectoral Program on “Potable Water” for the period of 2002-2010. Objective of the Program is sustainable delivery of potable water in the required quantity and of the adequate quality to the country’s population. The program mainly is targeted on rural residents and is funded by national and local budgets, and out of the foreign loans and grants, as well as other sources. Cost of program is 1.2 billion USD. Provided the full financial support of the Program, 77.2% of rural population of the country will be supplied with tap water in the required quantity and adequate quality by the end of 2010. Starting in 2004, the National Program of Rural Development until the year of 2010 is under implementation. Within the framework of that Program the work on construction and reconstruction of the water supply systems is performed.

In **Kyrgyzstan** the Asian Development Bank financed the project on “Provision of infrastructure services in the settlements” for rehabilitation and construction of the water supply systems in 730 villages and 7 towns of Chu, Osh, Jalalabat and Batken Provinces, covering about two million people. The Rural Water Supply and Sanitation Project of the World Bank, which was implemented in 2002-2007, was also aimed at the rehabilitation and construction of rural water supply systems in 270 villages of Issyk-Kul, Naryn and Talas Provinces, covering more than 864.000 people. Since the projects were co-financed by the Government of Kyrgyzstan their total amount reached about 70 million USD. In order to support implementation of those projects in the northern areas of the country the British Government jointly with the World Bank has allocated an additional grant to the amount of 4.4 million USD for implementation of a sanitation and hygiene program. For the purpose of the infrastructure improvement in the inhabited localities of the country, the Asian Development Bank has decided to allocate an additional grant to the amount of 30 million USD.

Recently, within the framework of the Water Initiative of the European Union and the grant aid of EU TACIS, a grant for elaboration of a Financial Strategy for urban and rural WSS of Kyrgyz Republic has been allocated.

In **the Republic of Tajikistan** in 2006 the Program on “Improvement of clean potable water supply to the people of the Republic of Tajikistan for the period of 2007-2020” was developed and adopted. Water supply development greatly depends on foreign assistance. Financial assistance is expected from the World Bank and EBRD.

In **Turkmenistan** for meeting the needs of three major cities of the country, four large potable water treatment plants were built. Their total capacity is 610.000 m³/day at a cost of over 70 million USD. Implementation of another investment of more than 60 million USD almost thirty smaller projects has been completed. Some of the projects included installation of water desalinating facilities at the Caspian Sea coast and in the area of the Aral Sea disaster, where there are no sources of water with salt levels less than 1 g/l. It is planned to build five sewage treatment plants (STP) of high capacity until 2010. In 2004, construction of a STP with a capacity of 300.000 m³/day for the city of Ashgabat and the neighboring settlements has begun. The following year construction of treatment facilities for the city of

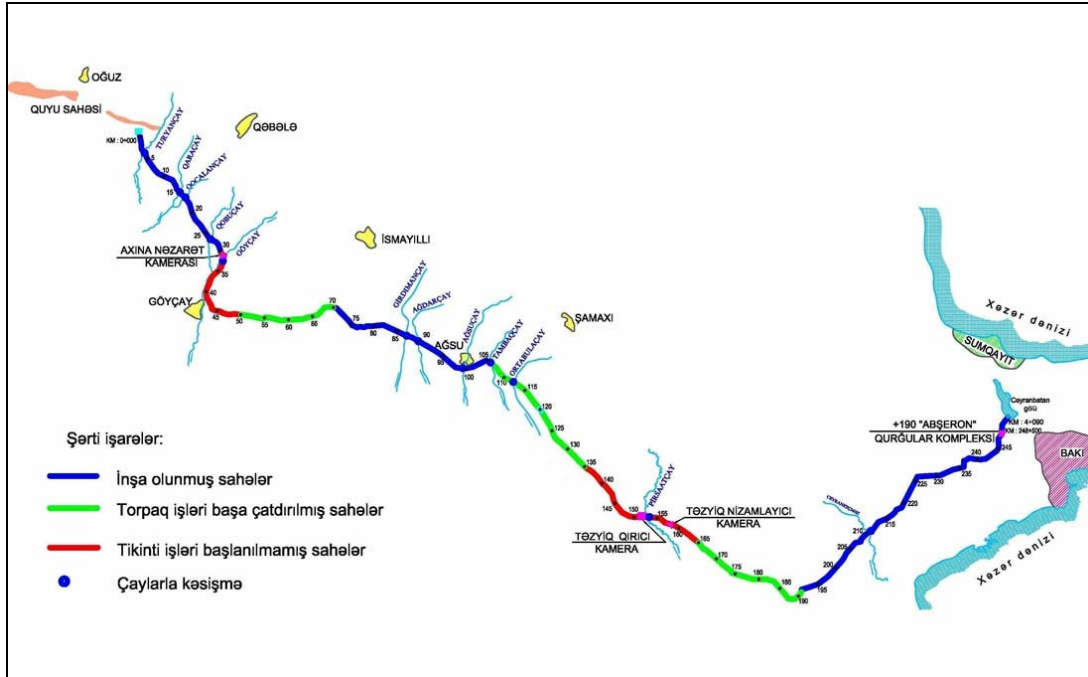
Turkmenabat of 100.000 m³/day capacity commenced. After completion of the next stages of the Program all five administrative centers of the country will have their own STPs.

In **Uzbekistan** in 1999 the design institutes “Uzbekkommunloyiha” and “Suvtaminoti” on the basis of all previous programs have developed the “Adjusted structure of water supply development of the Republic of Uzbekistan based on the new regulatory and technological foundation until 2010.” This structure has been reviewed and agreed by the relevant local authorities in all provinces of the country and has been approved by the Ministry for Public Utilities (Directive No.157 of 09.11.1999). Since that moment, it is the essential document for management of the design and development of the urban and rural water supply in the country. Foreign investments to Uzbekistan are attracted in the form of soft loans provided by foreign banks, international financial institutions, and foreign governmental financial organizations against the guarantees of the Government of the Republic of Uzbekistan, as well as the grants and technical assistance. The following projects are under implementation in Uzbekistan:

- “Water supply of cities of Bukhara and Samarqand,” “Clean water, sanitation and human health,” World Bank for Reconstruction and Development and International Development Association.
- Improvement of the water supply system of the cities of Gulistan, Djizzak and Qarshi,” Asian Development Bank.
- “Improvement of the potable water supply system in the Republic of Karkalpakstan and Khorezm Province,” ADB and Iranian Export Development Bank.
- “Improvement of the water supply of the cities of Nukus and Urgench,” Kuwait Economic Development Fund.
- “Improvement of the water supply system of the city of Tashkent,” European Bank for Reconstruction and Development.
- “Reconstruction of the sewage treatment plants in the city of Qarshi with their additional purification and treatment of sediment,” Islamic Development Bank.
- “Improvement of water supply in Bukhara Province,” French Government and the Kingdom of Spain.

In 2003 the Government of **the Azerbaijan Republic** adopted the National Program on Sustainable Socio-Environmental Development, according to which until 2015 every citizen of the country should have access to clean and quality water. Several other national programs are under implementation in Azerbaijan as well: the National Program on Poverty Reduction, the National Program on Socio-Economic Development of the Resources of the Republic of Azerbaijan for 2004-2008. In all of those programs a special attention is paid to the water policy issues. In order to implement the “Project on reconstruction of the water supply systems of Greater Baki,” a loan of 94.5 million USD has been allocated. Next stage of the water supply system development of Baki is the “Project on reconstruction of Kura and Jeyranbatan treatment facilities.” In recent years the project on reconstruction of the treatment facilities of Govsan Aeration Plant has been completed. That project will enable increase of Govsan Plant’s capacity from 400.000 to 640.000 m³/day. At present, 11 treatment complexes with capacity of 550.000 m³/day are under construction at the Absheron Peninsula. Treatments facilities of the urban-type settlements of Buzovna and Shuvelian, with capacity 10.000 m³/day each, are already in operation. Reconstruction of WSS systems of the cities of Geokchay, Agdash, Gandja, Sheki and others are in progress. In general, the amount of the loan agreements concluded with the international financial institutions is estimated to the sum of 1193.2 million USD, with 253.2 million USD out of that amount to be provided by the Republic of Azerbaijan. Starting in 2006 at the expense of the National Oil Fund, financing of the water supplying pipeline to Baki from Oguz-Gabala District commenced. Completion

of this construction is expected in 2009. Supplies of the people living in various districts of the country with quality potable water is going on as well. For that purpose the settlements adjacent to the Kura River 100 module water treatment units have been installed and put into operation. Within the framework of the National Environmental Program implementation along the entire Caspian coastline of Azerbaijan after construction of the modern resorts the discharge of untreated sewage into the sea will be completely stopped. For that purpose construction of 80 STPs is foreseen. They will be rendering harmless more than one million m³/day of sewage and will allow tackling the sanitation problems.



Picture 9.1. Plan of the route of Oguz-Gabala-Baki water pipeline

In **Armenia** for development and rehabilitation of WSS sector the following programs have been implemented and are ongoing:

- 1997-2005. “Program of community development” (35.5 million USD), rehabilitation of the water supply systems of the city of Yerevan and 33 villages adjacent to Yerevan (WB),
- 2003- 2006. “Urban water supply management on the condominiums basis” (2.022 million USD), rehabilitation of the water supply systems of the multi-storey buildings (Japan),
- 2004-2008. “Water supply and sanitation of communities” (25.56 million USD, out of which 2.56 million USD are co-financed by the Republic of Azerbaijan), improvement of the water supply system, provision of 24-hour water supply in 37 cities (except Yerevan) and 208 rural localities of Armenia (WB),
- 2006-2011. “Water supply and sanitation of the city of Yerevan” (22 million USD, out of which 2 million USD has been co-financed by the Government of the Republic of Armenia), improvement of the water supply system and provision of 24-hour water supply in the city of Yerevan and 33 rural localities (WB).
- 1999-2006. “Rehabilitation of the water supply and sanitation systems in Armavir district (marz)” (14.1 million USD, out of which 1.4 million USD is a co-financing of the Government of the Republic of Armenia), Improvement of the water supply system, provision of 24-hour water supply in the cities of Armavir and Metsamor and 10 villages (KfW).
- 2004-2008. “Improvement of the water supply and sanitation systems in Lori and Shirak districts (marzes)” (25.99 million USD, out of which 2.62 million USD Are co-financed by the Government of the Republic Armenia, 7.8 million USD grant), provision of 24-hour

- water supply in the cities of Wanadzor, Gyumri and Maralik and 51 rural settlements (KfW).
- 2008-2011. “Environmental Preservation of the Lake of Sevan” (12 million USD, out of which 5 million USD are grant aid), rehabilitation of 3 treatment plants and reconstruction of sewage system in 5 cities in the Basin of Sevan Lake (EBRD).
 - 2007-2010. “Improvement of the water supply and sanitation systems in rural communities”, rehabilitation of water supply and sanitation systems in 147 villages of Armenia (40 million USD (ADB) out of which 9 million has been co-financed by the Government of the Republic of Armenia).

Over the last years in **Georgia** a financing activity by foreign sources has considerably increased. Presently a number of projects on reconstruction of water treatment facilities are going on, while several more projects are under development. Funding of all projects at the expense of the loans is unacceptable for Georgia; that is why, significant efforts are made to attract the foreign grant financial aid. Schemes of financing out of the state and local budgets are elaborated as well. Presently, the projects on water supply of the cities of Poti and Kutaisi are under implementation. The project on water supply of the city of Kobuleti has been approved as well. All investment projects in the rural areas, with some exceptions, are implemented within the framework of IFI funding. During the last 4-5 years about 32 large-scale investment projects to the total amount of 40 million Lari (Georgian currency) have already been implemented. In general, the average cost of water supply and sanitation services in Georgia is 1.4% of the average per capita income (incl. water fee, sewage collection and treatment).

Expert assessment of the need in investments to the development of WSS sector is given in the Table 9.1.

Table 9.1. Assessment of the investment required for WSS sector development until 2015

Country	Required amount, billion USD			Availability of investments as of 2009
	Total	Including		
		for water supply	for sanitation	
Central Asia				
Kazakhstan	>4	2.5	1.5	25%
Kyrgyzstan*	In the process of assessment	In the process of assessment	In the process of assessment	About 15%
Tajikistan	1.0	0.64	0.36	
Turkmenistan	≈0.7	≈0.3	≈0.4	≈15%
Uzbekistan	4	2.5	1.5	50%
Southern Caucasus				
Azerbaijan	1.3	0.6	0.7	15%
Armenia	2.0	0.8	1.2	about 10%
Georgia	4.0	2.5	1.5	less than 10 %

* At present, the work on elaboration of the Financial Strategy for Urban and Rural WSS of Kyrgyz Republic is going on, after completion of which the amount of the required investments will be clear.

In the regional states, unfortunately, there are no efficient tools of monitoring and accounting that can give a clear picture about the results of the investment programs implementation. This hinders the evaluation of the projects’ effectiveness in achievement of the set up goals.

Table 9.2. Information on the WSS systems' development programs and projects

Country	Projects implemented until 2009		Project type		
	Quantity	Cost, mln USD	Development of the laws and regulatory documents	Construction	Technical assistance
Central Asia					
Kazakhstan	1 ¹	≈1000	+	+	+
Kyrgyzstan	6	>100	2	3	1
Tajikistan	3	>70	Draft project	Draft project	
Turkmenistan	38	180	0	35	3
Uzbekistan	26	>2.5	2	25	23
Southern Caucasus					
Azerbaijan	150	750		150	
Armenia	25	≈80.0	+	+	+
Georgia	>100	6.0	+	+	+

¹ Governmental sectoral program "Potable Water" for 2002-2010

10. MILLENNIUM DEVELOPMENT GOALS – PROGRESS ASSESSMENT

All CACENA countries have signed the UN Millennium Declaration in 2002, where Goal 7 covers “Sustainable environmental development.” This Goal includes the target 10 “Until 2015 the number of population not having sustainable access to the quality water supply and the improved (permanent) sanitation should be reduced twice as compared to the basic year of 1990.”

UN Report on MDGs in **Kazakhstan** (2002) assesses the achievement of the goals on water supply and sanitation until 2015 as “Probable.” Therefore, given an efficient international support, Kazakhstan is able to accomplish the objective on water supply and sanitation that significantly facilitates achievement of other MDGs. The sectoral program on “Potable Water” for the period of 2002-2010 has defined seven top priorities, based on which Committee on Water Resources, with the help of a UNDP project, will develop the strategy on achievement of the water supply and sanitation targets in Kazakhstan.

Process of MDG implementation in **Kyrgyzstan** is going at an uneven pace. It is obvious that Kyrgyzstan, most probably, will be able to ensure access to clean potable water to its population by 2015. Up to now the actual distribution of ADB loans did not ensure a considerable improvement of water supply in the most problematic areas of the country, which, first of all, refer to the Provinces of Batken, Jalalabat and Osh. Due to the increase of the per capita cost of the rural water supply component from 20 to 80 USD and after adjustments of the ADB and WB projects, it is planned to include 300 villages in Osh, Jalalabat, Batken and Chu Provinces, and 200 villages in Naryn, Issyk-Kul and Talas Provinces.

Cost of rehabilitation and new construction of water supply and sanitation systems in order to achieve MDG-7 in **the Republic of Tajikistan** is estimated to 998.3 million USD. The estimates show that the investment volume required for construction of new centralized water supply and sanitation systems makes 19-26 USD per citizen. In total the deficit of funding makes 595 million USD or 60.7%. This means that without foreign capital Tajikistan will not be able to achieve the Millennium Development Goals. The Capital of Dushanbe is already exercising the practice of attracting investments by the World Bank, Islamic Development Bank and the grant aid of the Japanese Government for rehabilitation of the water supply network.

Turkmenistan will achieve the water supply and sanitation targets, given that by 2015 the centralized water supply systems will cover 92.7% of urban and 71.0% of rural population. This means that today, at least, 89% of urban and 57% of rural population of the country should have access to safe potable water. Under the circumstances, when there are no statistical data on access of people to the services of the centralized water supply, it is only possible to make an expert assessment of the progress. Given the most optimistic assessment, the access of population to safe potable water has increased less than to 5%. Therefore, it can be presumed that there is actual achievement of the planned progress in rural areas and the lagging behind from the set up goals in provision of the centralized water supply to rural population is no less than 10%.

In order to achieve MDGs in **Uzbekistan** in the nearest future, it is necessary to improve the technical condition of the existing water supply pipelines, develop and implement measures on accelerated transition to the water-saving technologies and economic use of the water resources. Particular importance in this regard has the water metering and automation of the

technological processes. These will allow a water-saving, thus increasing capacity of the water sources and the water utilization ratio, which in turn will contribute to the labor productivity growth.

In **Azerbaijan**, according to the adopted National Program of Sustainable Socio-Environmental Development of the country until 2015, every citizen should have access to clean and quality water. Analysis of the programs and projects on rehabilitation and development of the water supply systems that had been implemented and are under development in the country demonstrates that in many cities and settlements of Azerbaijan the projects of the water system improvement are already going on. Agreements with the International Financing Institutions on funding of the design and construction works regarding WSS development in other inhabited localities of the country have been concluded. All of the above mentioned makes us hope for the accomplishment of the undertaken obligations on provision of every citizen of Azerbaijan with quality water by 2015.

Approving the Strategic Program on Poverty Elimination in 2003 **Armenia** has become a participant of the MDGs program implementation. This means that by 2015, the centralized water supply should become accessible for 86% of the country's population, which requires investments to the amount of 400 million USD. This program foresees to make water supply accessible for 98% of urban population and for 70% of rural population by 2012, as well as average duration of water supply for urban and rural people to be 24 hours a day. Presently, all cities and towns and 36.5% of rural settlements of Armenia are provided with centralized water supply systems. This means that 71% of the people of the country have access to centralized water supply. Even though it is not a low indicator, existing water supply systems are not highly reliable. Supposed investments will be allocated for both extension of the centralized water supply network and increase of the reliability of the existing systems.

In **Georgia** the Dutch company COWI conducted analysis and made a forecast of MDGs achievement of the water supply and sanitation target by finalizing the financial strategy. According to their estimates 68% of urban and 60% of rural population were provided with potable water in 2003. By 2015 those indicators should, accordingly, make 90% and 84%. According to the same estimates the sanitation systems were available for 36% of urban and 89% of rural population in 2003, consequently those indicators should make 80% and 97% by 2015*. According to expert assessments such achievements are questionable, in spite of official data claiming goals on urban and rural water supply and sanitation were achieved already in 2004.

Although all countries of the region have signed the Declaration of Millennium Development Goals, and work is done on their achievement, none of the countries can firmly state that by 2015 the Goals will be achieved. Regional countries need foreign investments for achievement of those Goals.

* Source: Information on MDG 2007 - <http://www.devinfo.info/mdginfo2007/>, and assessment of COWI in EF 2005

11. ROLE OF GWP

At present, GWP CACENA is a well-organized regional network that assists in addressing the complex inter-state water management issues and supports the countries of the region to develop their strategies and techniques of the practical implementation of the integrated water resources management. Provision of a neutral platform for dialogues got a significant development from the moment of the regional network's creation in 2002 and in 2006 the Regional Water Partnership was completely formed. To date, the National Water Partnerships have been created almost in all states of the region (with exception of Turkmenistan), while their networks are continuing to develop.

According to the Charter of the Global Water Partnership, its objective is promotion and development of IWRM principles, including assistance to the integration of water supply and sanitation into IWRM. During the new five-year strategy period 2009-2013 the regional water resources issues will be in focus of the strategy programs of the countries. They include complex challenges of the socio-economic development and the threats associated with climate change, global economic crisis and other factors.

As we can see from the present review, the needs of the countries regarding the integration of the water supply and sanitation sector into the system of IWRM vary from one country to another, depending on the scope of measures, funds and political commitments. That is why the activity of the regional partnership's network should be directed towards accomplishment of the following tasks:

- Support to awareness raising campaigns in on issues of basin management both at the national and transboundary levels;
- Technical and methodological assistance to the efforts on promotion of IWRM approaches of national and international agencies;
- Development and implementation of pilot projects in the sphere of water supply and sanitation by implementing the advanced, acceptable and affordable the sewage treatment technologies, modern approaches of the potable water quality monitoring, fulfillment of measures on the effective management and use of the water resources;
- Translation into and publication in national languages of guidelines, practical experiences and methodological instructions given in the Toolbox, as well as conduction of trainings and workshops for the specialists of WSS sector;
- Public awareness raising, ensuring public involvement into the decision-making processes and promoting new attitudes towards the WSS services;
- Elaboration of development strategies for the small centralized and decentralized water supply and sanitation systems;
- Technical and methodological assistance to the efforts on promotion of IWRM approach within the pilot projects made by the national and international agencies;
- Development of incentive mechanisms for attraction of specialists to work in the water sector;
- Enhancement of the role of water users in the water resources management;
- Assistance to creation and efficient functioning of the basin councils;
- Assistance to private sector involvement into the WSS management.

CONCLUSIONS AND RECOMMENDATIONS

1. Despite of the fact that by the formation volume of the surface water resources (on average 5057 m³/person in the Central Asia; and 5980 m³/person in the Southern Caucasus) the region cannot be considered as a water-shortage region, the water resources distribution is territory-wise unequal and is prone to considerable seasonal fluctuations. At the same time, the problems to provide quality potable water and sustainable sanitation are of extreme relevance and importance. All countries of the region agreed to use IWRM mechanisms, to ensure a balanced social and economic development taking into account the needs of all sectors.

2. All countries of the region face common problems and unaddressed tasks in the sphere of water supply and sanitation, namely:

- High rate degradation of the water supply systems and sewage treatment plants;
- High water loss rate;
- Insufficient level of accessibility of the potable water, especially in the rural settlements, incl. high rates of interruptions in the water supply;
- Low tariffs for potable water and low collection rate of the water fees, not covering the cost of operation and maintenance of the water supply and sanitation systems;
- Inadequate equipment of consumers with water-meters (basically, in the households) that have a negative impact on the actual metering of supplied and consumed water, as well as on the water fee collection rate;
- Inadequate governance of the water supply and sanitation systems, low qualification level of the specialists, especially in the remote areas and territorial subdivisions;
- Considerable difficulties with provision of potable water of the required quality;
- Low technical equipment level of the WSS sector;
- Incomplete legal and regulatory framework;
- Low awareness level and poor culture of the water use, undeveloped information database;
- Use of water for irrigation for household purposes in urban areas.

3. Virtually in all countries of the region the sanitation and sewage water treatment systems are in extremely poor state. Lack of adequate operation and repair, as well as the constantly insufficient and sometimes lack of funding for their maintenance have brought to the crisis of the sanitation systems.

4. Analysis of submitted data by experts on water resources and the needs of respective sectors shows that the regional countries, on average, are provided with water resources. However, the worn-out state of the systems, the low operation level and the lack of clearly defined economic mechanisms, as well as inefficient management do not allow ensuring the people with sustainable water supply and sanitation.

5. States of the region have developed their national policies in the sphere of water supply and sanitation after declaration of their independence. However, considering the current economic conditions and the recently adopted mechanisms of IWRM, they should be reassessed and re-elaborated. The regional states have adopted the basic laws regulating the water supply and sanitation sector; however they cannot function fully due to the subordinate documents to ensure their required application under today's circumstances. Some countries of the region intend to mainstream their legal and regulatory framework in accordance with the European Union standards.

6. In several countries the functions of the WSS sector's regulation are distributed among various ministries and state institutions that have different priority objectives, which do not contribute to necessary coordinated functioning, operation and overall and equal development of the WSS sector. Therefore, institutional structures in the majority of the states need reassessment and reforming depending on current national policies and strategies.

7. Not all countries of the region have abandoned the command governance system, resulting in management of the WSS systems by state institutions or local governments without involvement of stakeholders and the public.

In some countries the state has delegated the functions of management, operation and maintenance of the systems to the private sector at the same time keeping the main assets of the WSS sector. Whether such practice is efficient or not will become clear with time.

8. All states of the region to a certain extent have a developed legal basis for enabling participation of the public in the process of decision-making on environmental issues. The countries have also ratified various international Conventions that require public awareness raising and participation of public in decision-making processes. Very often under the term of "public involvement" is being understood as nothing more than the right of public to be informed. Actual participation of public in decision-making is put aside as second priority. The reasons of such approach are as follows:

- Incomprehension of the importance of public involvement into the decision-making processes from the side of the government officials and their unwillingness to involve the public,
- Low level of comprehension by the public.

It is necessary to reform the perception and behavior of both state officials and public. In this matter the network of the Global Water Partnership might play a significant role.

9. Almost in all of the countries the state provides subsidies to the water supplying entities, and allocates funds to cover operation and maintenance costs. The WSS sector is financed, basically, out of its own budget and at the expense of the investment projects as well. In many of the countries the tariffs for potable water, and drainage and treatment of sewage are established by the state institutions. Normally, those tariffs are deliberately lowered in order to alleviate the load on household budgets and to prevent possible social tensions. Application of such mechanisms and given the very low consumed water metering rate, makes it hard to achieve a high collection rate of the water fees and to stabilize the financial situation of the WSS enterprises. Subsidies provided by the State budget, normally, are not sufficient. As a result of this, the WSS enterprises are not profitable and unattractive for private sector. Consequently they are not fully performing their basic functions.

10. All countries have signed the UN Millennium Development Goals, and they implement certain activities in order to fulfill them. However, no country may firmly assure their achievement by 2015. For achievement of the MDGs the countries need considerable foreign investments.

At the same time, the regional states do not possess efficient tools for monitoring and assessment of the actual impact of investments allocated to address the water-related issues. In this regard it is impossible to identify the extent of progress towards achievement of the MDGs.

11. All countries have recognized IWRM as an efficient mechanism for addressing the tasks on the water resources management, including the issues pertaining to the water supply and

sanitation sector. Since 2002 Global Water Partnership promotes and supports introduction of IWRM in the states of the Central Asia and the Southern Caucasus. At national level the Country Water Partnerships need to work closely with state institutions, and other international organizations.

12. For the purpose of integration of the water supply and sanitation sector into IWRM the following measures should be arranged and implemented in the region (as a minimum):

- Elaboration of strategies for small-scale water supply and sanitation systems;
- Development and implementation of WSS pilot projects to introduce advanced, acceptable and affordable technologies on sewage treatment, and modern techniques for monitoring of potable water quality;
- Conduction of workshops and trainings for the specialists working in the WSS sector;
- Assistance to involve the private sector in the WSS development.

REFERENCES

P.O. Niyazkhojaev, N.P. Talipova, I.A. Parnitskaya. Water is a source of life. Problems of the potable water supply in the Republic of Uzbekistan and the way of their tackling. Tashkent, 2008. 181 p.

Gender aspects of the integrated water resources management. Report on survey conducted among the representative households in the following states: Azerbaijan, Armenia, Georgia, Kazakhstan, Kyrgyzstan, Turkmenistan, Tajikistan, and Uzbekistan. Tashkent, 2005.

Basic concepts of the water resources management strategy in the Aral Sea Basin. International Fund for Aral Sea and the World Bank. 1997. Report. Tashkent, p. 214.

Draft Program of the Integrated Water Resources Management (IWRM) and the water use efficiency increase in the Republic of Kazakhstan until the year of 2025 (under the UN project), Astana (2006) [http:// www.voda.kz](http://www.voda.kz)

Training manual and guideline on the use of the “Integrated Water Resources Management Plans.” CapNet, GWP, UNDP. March, 2005 (Russian edition GWP CACENA) 2005.

Water resources of Kazakhstan in new millennium. UNDP review. Almaty, 2004. 132 p.

Sustainable sanitation in the states of the Central and Eastern Europe. Responding to the needs of small and medium-size villages. Publication of GWP CEE under edition of Igor Bodik and Peter Ridderstolp, 2008. 97 p.

Capacity development. How to improve the water resources management in Tajikistan. National report on human development in Tajikistan. UNDP, 2003. 79 p.

Sustainable development indicators for the Central Asian states. Research Center of the Interstate Commission on Sustainable Development. Ashgabat – Bishkek. 2004, 79 p.

Towards the cooperation strengthening and efficient use of the water and energy resources of the Central Asia. UN SPECA 2004. 123 p.

Reform of the municipal water supply and sanitation in the countries of the Eastern Europe, Caucasus and the Central Asia. Report on the reforms progress from the date of the ministerial conference conduction in Almaty. OECD. 2003

OECD, ”Assistance in achievement of the MDG in the sector of water supply and sanitation (WSS) in Georgia through re-elaboration of the financial strategy for the WSS sector in rural areas and facilitation to the relevant Dialogue on the national environmental policy,” Interim report, December 2007

Catalyzing Change. A Handbook for Developing Integrated Water Resources Management (IWRM) and Water Efficiency Strategies. GWP Technical Committee. Stockholm, 2004 (in Russian translation, 2005).

IWRM ToolBox. Sharing Knowledge for Equitable, Efficient and Sustainable Water Resources Management. Version 2. GWP, 2003. 157 p.

Draft of National Development Program for Turkmenistan (Water Economy Sector) up to 2030

National Strategy on Social Economic and Cultural Development of Turkmenistan up to 2020

National Environmental Action Plan of Saparmurat Turkmenbashi, Turkmenistan President. Ashgabat, 2002.

National Report 2007 by Minister of Water Economy of Turkmenistan: http://www.cawater-info.net/5wwf/national_report_turkmenistan.htm

A. Berdyev. National water law of Turkmenistan and its correlation with the international water law. Priorities and challenges. Improvement trends (2005): http://www.cawater-info.net/bk/water_law/pdf/berdyev2005_rus.pdf.

Sustainable Development Program RA, Yerevan, 2008

Materials of the Ministerial Conference on the issues of financing of the water supply and sanitation sector in the countries of EECCA. Yerevan, November 17-18, 2005.

Annual report of the “Armvodokanal, LLC” (Armenian water supplying enterprise). Yerevan, March, 2009

Guidebook on the use of the result-based contracts concluded between the municipal and water supplying entities in the countries of EECCA, OECD/EAP Task Force, Paris, 2006

Guidebook on financial strategy for the sewage drainage and treatment in the large and medium cities of the Republic of Armenia. Final report. 2004.

Financing of the water supply and sanitation sector in the countries of EECCA, OECD/EAP Task Force , 2006.

Annual statistical book of Armenia, 2007, National Statistics Agency of the Republic of Armenia, 2007.

Financial strategy of water supply and sanitation in the rural settlements of Armenia. Final Report. OECD/DFID, 2007.

The Role of the Government to Facilitate the Development of Decentralized Water Supply and Sanitation Services: The Case of Armenia, Institute of Urban Economics, 2005