

CURRENT SITUATION OF WATER SUPPLY AND IMPROVEMENT OF SANITARY CONDITIONS IN REPUBLIC OF TAJIKISTAN

I. Sh. Normatov, N. Karomatulloeva, I. M. Rakhimov

Institute of water problem, Hydropower and Ecology Academy of Sciences Republic of Tajikistan, 12, Parvin str., 734002, Dushanbe, Tajikistan - normatov58@mail.ru

KEY WORDS: water consumption, drinking water, rural, pollution, hygiene

ABSTRACT:

Abstract. Now, water supply and sanitary in Tajikistan are neither safe, nor adequate. There are some reasons of bad condition of water and sanitary services in Tajikistan. As well as in other sectors, the difficulties caused by the post Soviet transition to market economy and civil war, have worsened an infrastructure of water supply. A low level of official budgetary appropriations and difficulties with gathering payment at water-users has strongly limited internal financing, which has appeared insufficiently to execute essential requirements of capital investments. Even if financing would be increased, it is doubtful, that bodies of water supply could effectively to distribute resources in sector with account of its many urgent needs. In addition to investments structural reforms are necessary for increase efficiency of maintenance services and strengthening of stimulus of rational water consumption. Achievement planned PMD for maintenance with water will demand providing of access to safe water in addition for 3 million peoples for the period from 2005 till 2015. According to estimations, hardly more than 1 million from them will be born in areas, where the improved water systems have been already the New infrastructure of water supply should be constructed to provide access for other 2 million people, overwhelming majority from which live in rural areas. As it is marked by Government of the Tajikistan in National Strategy for Reduction of Poverty (NSRP) as city areas already have more expanded access to an infrastructure of water supply, the policy should be concentrated on improvement on service for agricultural population. Unfortunately, by present time small progress in this direction has been reached. If the situation soon and essentially will not change hardly Tajikistan can reach planned for it PMD in sphere of maintenance with water.

WATER SUPPLY AND IMPROVEMENT OF SANITARY CONDITIONS OF TAJIKISTAN CURRENT SITUATION AND TENDENCIES

Now, water supply and sanitary in Tajikistan are neither safe, nor adequate. According to Ministry of Health (November 2004) from 699 centralized systems of water supply available in the country 113 do not function, 358 do not meet the sanitary requirements, operating systems submit water with faults and are not guarantee of stable and steady access to safe potable water.

With mid-annual prepossessed water resources in volume more than 13000 cubic meters of water per capita, Tajikistan - one of the richest states with water resources in the world, and still the country can provide only 59 populations with access to safe drinking water (Table 1).

	Tajikistan	Cities	Villages
Percent			
Safe	59.0	92.9	46.9
Dangerous	41.0	7.1	53.1
Total	100	100	100

Table 1. Access to sources of drinking water Villages

In rural regions where less than half of inhabitants have access to the improved water sources, the most part of the population uses water on the further current from channels, ponds, reservoirs the rivers and other dangerous sources.

Concerning sanitary conditions, almost all households have access to dug lavatories in the form of a hole, but the majorities of them is badly constructed and are risk for public health.

The majority of rural schools and medical institutions lack appropriate public health services and systems of water supply.

So, for example from 3694 schools (546 city and 3148 rural schools) the water pipe is available only in 1718 of them, at other schools there is no access to safe drinking water. At 140 rural schools of the country there are no lavatories.

The same situation takes place in some part of 3352 units of medical institutions. Owing to deterioration of water-distributive networks and other basic constructions of water systems the tendency of decreasing in percent of population security is observed by safe water from water supply system.

There are some reasons of bad condition of water and sanitary services in Tajikistan. As well as in other sectors, the difficulties caused by the post Soviet transition to market economy and civil war, have worsened an infrastructure of water supply. A low level of official budgetary appropriations and difficulties with gathering payment at water-users has strongly limited internal financing, which has appeared insufficiently to execute essential requirements of capital investments. Even if financing would be increased, it is doubtful, that bodies of water supply could effectively to distribute resources in sector with account of its many urgent needs. In addition to investments structural reforms are necessary for increase efficiency of maintenance services and strengthening of stimulus of rational water consumption.

Achievement planned PMD for maintenance with water will demand providing of access to safe water in addition for 3 million peoples for the period 2005-2015 years. According to estimations, hardly more than 1 million from them will be born in areas, where the improved water systems have been already the New infrastructure of water supply should be constructed to provide access for other 2 million people, overwhelming majority from which live in rural areas. As it is marked by Government of the Tajikistan in NSRP as city areas already have more expanded access to an infrastructure of water supply, the policy should be concentrated on improvement on service for agricultural population. Unfortunately, by present time small

progress in this direction has been reached. If the situation soon and essentially will not change hardly Tajikistan can reach planned for it PMD in sphere of maintenance with water.

In the program document of the European regional bureau of WHO "Tasks on Health achievement for everybody" (Copenhagen, 1991) the most important place is given to the problem of water quality. By 2000 all people should have access to adequate systems of drinking water supply, and the pollution of earth waters, rivers, lakes and seas should not represent threat for health of the man".

Priority of this task is caused by that in accordance with the data of CART, 80 % of all illnesses in the world are caused by the use of substandard water and infringement of sanitary - hygienic norms of water supply. To the water factor is connected incidence of about 2 bln. man. The access to water pipe line water in Tajikistan never was absolute. According to UNICEF water pipe-line water uses about 57 % of all population (3.7 mln. man), switching 93 % urban and 47 village population. Little more than 10 % (650 thousand man) uses spring water, 3.7 % (235 thousand the man) river water and almost 25 % (1.52 mln. man) consume water from channels, hauzes and reservoirs. The access to water pipe-line water not necessarily means access to safe drinking water. On the data World Bank (WB) in Dushanbe 16 % of water acts in system of urban water supply from the river without clearing. About 65 % of systems of water supply of republic of water-supply and water-division network are in a semi-destructive condition.

The shortage of water especially hardly has an effect for a rule of schools and other public institutions. The joint research which has been carried out by UNICEF and ACTED, in many respects spills light on the given situation: the estimation of the projects on a sanitary condition 600 of schools of Khatlon and Sogd areas has shown, that more than 45 % of schools has no access to safe drinking water.

Low skill level of the employees and significant reduction of financing have resulted in 50 % to decrease of clearing ability - with 245 mln. m³ in 1990 up to 120 mln. m³ in 2000. Less than 10 % of water of the basic network of water supply is exposed to clearing. In portable account on all population having access to water it means 44 liters of safe water on soul of the population per day. In Dushanbe 16 % of river water gets in distributive networks without clearing. On village water pipes in failure condition contain public of a water inlet column, there is no industrial laboratory control, submit water 2-3 hours per day, that results in fall of pressure in networks and infiltration of pollution. So for example, on 35 waterpipes which provide in the basic population of the regional centers, from existing 270 deep pumps 47 % do not function and in areas of republican submission from 285- 42.8 % do not function, to a Kurgantube zone of Khatlon area from 127 -67 % do not function.

In sewer of a cleaning network in 1999 there were 480 failures, from them 460 in of Sogd area.

The pollution of water resources communal-household and industrial wastes is the disturbing factor requiring urgent intervention. The experts assert, that in the rivers of Tajikistan at 40-45 times more bacteria getting there with a household waste, than in the rivers the industrially advanced countries. In 1998 the dump of the polluted waters in the Vakhsh river has made 8 %, in Kafirnigan -60 %, in Syrdarya -23 %. On a slide pollution of water resources has made more than 6 m³ on one inhabitant.

In areas of irrigated agriculture, where the most part of the population uses mainly arik water, morbidity in 3-9 times is higher.

Strong dependence of Tajikistan on an agriculture and, as a consequence, influence of the chemists used in cotton-planting, and also presence others agricultural wastes render negative

influence on health of the people. Such illnesses, as typhoid, diarrhea, dysentery, diphtheria and hepethite are caused by the use of the polluted water, while marsh-ridden sites provoke distribution malaria. Water as one of the basic and most dynamical components is especially vulnerable to the factors of influence of anthropogenesis character.

In conditions of Tajikistan in connection with high concentration of the population on valleys of the rivers and accommodation of the basic industrial objects in this zone the factors of influence of anthropogenesis character get the special outline and urgency.

The choice of technology of qualitative drinking water, at which the probability of formation mutagen-active connections during processing is shown to a minimum, depends, first of all, on physical-chemical and microbiological structure of natural water, which is defined by climatic and hydro chemical conditions, character of water vegetation, anthropogenesis loading on natural sources.

The deterioration of drinking water quality following its collection from a community well or standpipe and during storage in the home has been well documented. However, there is a view that post-supply contamination is of little public health consequence. This paper explores the potential health risk from consuming recontaminated drinking water. A conceptual framework of principal factors that determine the pathogen load in household drinking water is proposed. Using this framework a series of hypotheses are developed in relation to the risk of disease transmission from re-contaminated drinking water and examined in the light of current literature and detailed field observation in rural Honduran communities. It is shown that considerable evidence of disease transmission from re-contaminated drinking water exists. In particular the type of storage container and hand contact with stored drinking water has been associated with increased incidence of diarrhoeal disease. There is also circumstantial evidence linking such factors as the sanitary conditions in the domestic environment, cultural norms and poverty with the pathogen load of household stored drinking water and hence the risk of disease transmission. In conclusion it is found that re-contaminated drinking water represents a significant health risk especially to infants, and also to those with secondary immunodeficiency (Travett, Carter and Tyrrel, 2005). National strategy on supply by potable water includes five elements:

1. Increase in financing. The important priority of the Government is the increase in investments for restoration of water systems. Now, investment is carried out basically at the expense of international financial help on development and concentrated in large and small towns of republics. As it was marked in (SRPR), authorities recognize necessity of direction investments into rural areas.
2. Improvement of management of the municipal companies. A part of National Strategy of Reduction of Poverty is increase of abilities municipal enterprises -service providers on operation and technical maintenance of water supply systems. The low wages and emigration within the last decade have decrease personnel potential, both at the level of management, and on technical level. Reforms of managements also are necessary for strengthening management of organs of water supply at national and regional levels.
3. Realization of legal and normative-legal reforms. Legal and normative-legal reforms for increase of an overall performance of water system, especially concerning regulation and tariff policy are required. Strengthening of potential for the control and

regulations also is necessary to separate function of supervision from operational function. Amendments to the legislation on the enterprises of public service are aimed at the further division of the organs, engaged on development of policy and strategy of sector and regulation, from service providers.

4. Increase of compensation level of production costs. To achieve "compensation of all production costs" which SRPS allocates as the final purpose for services, some time it is required, and it will demand large modernization of the technical and administrative resources necessary for the control of water distribution, definition of the size of payment for using water and its gathering from users. The strengthened tariff reforms and gathering of payment will help to strengthen stimulus for rational use of water. The government knows influence at increase in tariffs for water and how the level of their gathering will be reflected on poor households, and hopes to work with the international partners on development of the program on mitigation of influence price increases on poor households.
5. Rationalization of water consumption. In addition to reduction of physical outflow from getting old system of water supply, the Government should strengthen stimulus for consumers to reduce their prodigal consumption. It is necessary to improve gathering of tariffs and the tariff policy. Some limited tariff increases are planned in 2004, but at the same time it is necessary to estimate, whether organs on water supply can reach higher level of gathering tariffs as they raise the prices.

Considering potential benefits for social development, the investment in development of water services should be a high priority for Tajikistan. The volume of resources necessary for expansion of access to safe water and adequate sanitary conditions in Tajikistan, much less, than in sectors of education and public health. The greatest needs are in rural areas where construction, development and functioning of water supply systems is rather cheap. Expenses for restoration of urban systems of water supply, however, is high and considerably add the problems, facing to sector in aspect of financing demands. Tajikistan, hardly, will execute PMD on water supply and sanitary without joint efforts from national authorities, local communities and the international partners. As a whole, cost of achievement PMD 7 on water supply and maintenance of sanitary conditions is estimated in US\$992.5 million (Table 2). Separate, greatest clause of charges for achievement PMD 7 restoration of the urban systems of water supply which have come to a bad condition (603.0 million US dollar). Without essential investments in this sphere the growing urban population of Tajikistan, most likely, more and more faces danger of the illnesses caused by quality of water. Outbreak of typhoid in the capital in autumn of 2003 and in summer of 2004 once again demonstrated potential consequences not investment the investments into services of water supply.

The level of water consumption per capita in towns is extremely high. Without installation of counters of consumption water in households and improvements of gathering payment for it, it will be extremely difficult for Tajikistan to lower prodigal consumption of water and use internal resources for investments into operation and development of urban systems of water supply. The basic investments for restoration of urban systems of water supply are for a water-distributive network, stations of water-preparation, pump stations, and for installation of

	2005	2010	2015	Total	2005	2010	2015	in average
	US\$ mln. (2003)				Pro person US\$			
Capital expenses	59.0	63.6	68.2	700.9	8.5	8.3	8.1	8.3
Current expenses	19.6	26.2	34.4	291.6	2.8	3.4	4.1	3.5
Water supply	57.8	61.6	64.1	675.6	8.4	8.1	7.6	8.0
Sanitary and purifying construction	20.0	27.5	37.6	307.4	2.9	3.6	4.5	3.7
Population possessing of information	0.8	0.9	0.9	9.5	0.1	0.1	0.1	0.1
Totally expenses	78.6	89.9	102.6	992.5	11.4	11.8	12.2	11.8

Table 2. The General expenses for water supply and improvement of sanitary conditions

hydrometers.

Improvement of gathering incomes - key aspect of water supply strategy sector of Government of the Tajikistan and a primary factor supporting long-term stability of granting of services on water supply. If the level of a collecting tariffs will increase up to 95 and tariffs will increase up to 0.15 US dollars for cubic meters of drinking water then urban organs on water supply could receive up to US\$155 mln. for the period 2005-2015 and these incomes would be sufficient to pay both expected current working costs, and needs for regular investments in the basic means of infrastructure of water supply.

From nearby 2.9 million people in Tajikistan, living without regular access to improved water sources, 2.8 million lives in rural districts.

There are three basic variants for expansion of access to the improved water sources in rural areas: the new centralized systems of water supply based on drilling of chinks and installation of electric pumps, deep manual pumps and springs. It is necessary to emphasize, that in some rural areas (Kharasan, Danghara and some others) are not available in nearby settlements sources of water supply (not neither no superficial underground). Water supply of such settlements should be made from the crown sources transfer of water on a long distance.

Now, about 1.7 million countrymen are connected with rural operating central systems of water supply. These networks require large restoration at all levels-withdrawal (fence) of water, its processing and distribution. Expenses per capita on rehabilitation of rural systems of water supply make US\$7 (US\$5 for the networks providing access through public water-folding columns instead of inside domestic column).

Other means of maintenance with water (for example manual pumps, springs and the protected wells) have lower expenses for restoration on unit and are rather cheap for repair. All charges on repair existing rural systems of water supply in Tajikistan are estimated approximately in US\$10 million.

Calculations show, that full volume of the main investments necessary for construction of new central systems of water supply in rural areas where there are sources of water supply (superficial and underground) vary approximately from US\$16 up to US\$26 per capita. It depends, by the way, on quality of material resources and from, whether cranes in a court yard will be established or to be limited only with street water-folding column.

Research of UNICEF offers, that cost on unit of installation the deep manual pump, capable to provide 300 people with pure water, makes nearby US\$3.000. If to be realistic, only manual pumps cannot execute planned PMD. They are the best

approach as expansion means of the improved access to water the remote communities, providing reliable deliveries of water for schools and hospitals, and for maintenance of temporary service of communities which, finally, will receive the central systems of water supply.

Annual working costs are insignificant; maintenance service and expenses for replacement are necessary only when naturally calamity or actions of the person destroy water system. When it is necessary, expenses for repair are usually paid by local units. The official statistics shows, those sewer constructions are accessible only approximately for 23 percent of population, almost all of which live in town districts. Expenses for sewage treatment are insignificant in rural areas where a little household have access to the water drain and where there is no necessity to build clearing stations (table 3).

	2005	2010	2015	Total	2005	2010	2015	in average
	US\$ mln. (2003)				Pro person US\$			
Capital expenses	11.5	14.9	19.1	165.9	1.7	2.0	2.3	2.0
Urban sewage purify construction (SPC)	3.7	5.5	7.7	61.1	1.8	2.1	2.3	2.1
Urban sanitary units	5.0	6.5	8.4	72.5	2.4	2.5	2.5	2.5
Rural SPC	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Rural SPC (bath and lavatory)	2.8	2.9	3.0	32.3	0.6	0.6	0.6	0.6
Current expenses	8.5	12.5	18.4	141.5	1.2	1.6	2.2	1.7
Urban SPC	4.4	5.5	7.5	61.6	2.2	2.1	2.2	2.1
Rural on SPC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Totally expenses	20.0	27.5	37.6	307.4	2.9	3.6	4.5	3.7

Table 3. Expenses on sanitary and purify of sewage

Rise of a level of public education concerning sanitary conditions and hygiene is the important element of strategy of improvement of parameters of health in Rural areas. The analysis considers cost of maintenance of training at a level of communities, for an explanation the question of necessity investments in sanitary means of households.

National campaigns on assistance of raising of health, by estimations can approximately cost US\$32 000, they can offer model for campaigns on water and sanitary conditions. The UNICEF has suggested leading wide informational-explanatory campaign on hygiene at schools. Cost of the program on the average makes 1000 dollars on school which includes expenses for lectures, materials of the basic literature on hygiene.

Prospective total financing of all expenses on sector "Water supply and Sanitary" is resulted below in Table 4.

Source	US\$ mln. (2005-2015)
Urban households	265
Rural households	22
Government	33
International	85
Total	405
Shortage (break) of financing	587

Table 4. Supposed financing

REFERENCES

- Global Population and water (№6, 2003) "Population and Development Strategies".
- United Nations (2001) World Population Prospects: *The 2000 Revision. Vol. I: Comprehensive Tables*. Department of Economic and Social Affairs, Population Division, New York.
- United Nations (2002a) *World Urbanization Prospects: Department of Economic and Social Affairs, Population Division, New York*.
- Ahmed, K. A. "Serious Environmental and Public health impacts of water related diseases and Lack of Sanitation on Adults and Children: A. Brief Summary". North American Council on Environmental Cooperation Comment Paper.
- United Nations (2002). "Johannesburg Summit 2002 Fact Sheets: Facts about water".
- UNEP, UNICEF and WHO (2002) "Children in the New Millennium: Environmental Impact on Health".
- UNFPA (2001a) *The State of world Population 2001 – Footnotes and Milestones: Population and Environmental Change*. New York.
- DFID, EC, UNDP and World Bank (2002) "linking Poverty Reduction and Environmental Management: Policy Challenges and Opportunities", Discussion document prepared for World Summit on Sustainable Development.
- WHO (2001). "Water for Health: Taking Change", WHO World Water Day Report.
- WHO, UNICEF and Water Supply and Sanitation Collaborative Council (2000) *Global Water Supply and Sanitation Assessment, 2000 report*. Geneva/New York
- Begin, F. (2000). "Improving Nutrition and Reproductive Health: The importance of Micronutrient Nutrition; The Futures Group International, Working Paper Series №5.
- Millennium Development Goals. Tajikistan Sector: *Water Supply and improvement of Sanitary Conditions/*
- Travett A.F., Carter R.C. and Tyrrel S.F. "The importance of domestic water quality management in the context of faecal-oral disease transmission". J. Water Health. vol. 03, 2005, pp. 259-270.
- Rangel J.M., Lopez B., Mejia M.A. and et al. "A novel technology to improve drinking water quality: a microbiological evolution of in-home flocculation and chlorination in rural Guatemala". J. Water Health. vol. 01, 2003, pp.15-22.