A CASE STUDY ON DRINKING WATER SUPPLY AND SANITATION IN UZBEKISTAN AND THEIR ROLE IN ACHIEVING SUSTAINABILITY OF HUMAN SETTLEMENTS

Uzbekistan Republic is successfully developing a democratic state based on development and strengthening of socially-oriented market economy. Reforms being undertaken in the country since gaining independence, ensure consistent progressing of the country towards achievement of sustainability, and this is proved by positive changes in the economy, social sphere, ecology.

In the process of formation of democratic state based on development of market economy, Uzbekistan assimilates norms of civilized attitude to nature and in accordance with Agenda-21 makes its adequate contribution to development of the new paradigm. The following are major goals of sustainable development of the Republic of Uzbekistan:

- ensuring of sound and fruitful life of each citizen along with progressive and consistent socio-economic growth and spiritual renascence of the nation;
- formation of socially-oriented market economy in well-established temporal lawful democratic state, integrated to the system of international economic relations on adequate conditions;
- overcoming consequences of ecological crisis of the Aral sea and improvement of ecological situation in the country in general;
- rationalization of utilization of land, water and other natural resources to conserve their reserves for the forthcoming generations.

National strategy of regional and local initiatives for transition to sustainable development is based on the principle of provision of overall socio-economic development of local and regional zones, contributing to achievement of sustainability of settlements.

The population of 15.6 mln. people resides in 11,844 rural settlements that makes 62,8 % of the total population. The rest of the population of 9,2 mln. people is concentrated in 120 towns and 114 urban settlements. Typical peculiarity of urban settlements in Uzbekistan is the fact that out the total number of towns of the republic 89 are referred to the category of small ones with the population up to 50 thousand residents, whose activities are mainly associated with traditional labor-intensive agriculture and processing of agricultural raw materials. 14 towns are referred to the category of medium size towns with the population between 50 and 100 thousand, 13 towns are referred to big ones with the population between 100 and 250 thousand, 3 towns are major ones with the population between 250 and 500 thousand, and Tashkent, capital of the Republic, is referred to the category of the biggest ones, with the population of about 2.5 mln. people.

The issue of social construction in rural areas is in the focus of attention of the state. Before gaining independence funding of improvement of material and technical base in social sphere of rural areas was performed on residual principle. The result is that independent Uzbekistan got from the previous regime both low level of covering of social needs of the population, and significant disparities in the levels of development of infrastructure between towns and villages, as well as territorial disparities between regions of the Republic. Thus, while the level of provision with centralized water supply in rural areas by the 1st of January 1990 was 52%, in Karakalpakstan Republic, Bukhara and Khorezm regions it was 21-23%, and in Sirdarya region it was 87.8%. In urban settlements level of water supply in the same period was 81.0%.

Within the years of independence qualitative changes took place in provision of rural population with services of social infrastructure.

State policy *in the area of housing construction* was based on the need of stimulation of individual housing construction through provision of land plots for construction and centralized arrangement of engineering services to the construction areas. Share of individual housing construction in rural area it raised from 86% in 1990 to 99.7% in 2003. The result is that average rate of provision with dwelling space in Uzbekistan in general increased from 12.0 m^2 in 1991 to 13.5 m^2 per person by 1.01.2004.

Availability of water supply networks in the Republic of Uzbekistan (km)

	Total length of water supply networks	Length of water supply networks in rural areas
By 1.01.1991	29,916	18,182
By 1.01.1993	32,869	23,020
By 1.01.1998	57,196	30,470
By 1.01.2000	61,345	34,270
By 1.01.2004	66,710	41,290

Drinking water supply in rural areas was being developed on the basis of special programs being consistently implemented. Within the years of independence 21,210 km of water supply lines have been built in rural areas, and their total length increased 2.3-folds as compared with that during the Soviet period of development. This resulted in increase of provision of rural population with drinking water from 56% by 1.01.1992 to 78.1% by 1.01.2003. Discrepancies between town and village reduced, and territorial disparities, as difference in the level of provision with water between the most well-to-do Syrdaria region and the least provided with drinking water Bukhara region reduced from 66.4% down to 34.3%. Within this period special attention has been given to the issue of establishment of acceptable social conditions in the zone of ecological crisis. In Karakalpakstan Republic and Khorezm region more than 6,500 km of water supply networks have been built, or in other terms, 28% of all water supply networks built in Uzbekistan, while the share of this territory in regards of rural population is 11.6%. At present level of provision of rural population with drinking water has been increased 3-folds.

Despite high rate of water supply network construction, there is a problem of water supply for remote and hard-to-reach rural settlements. In accordance with techno-economic estimations, more than 1,183 settlements (about 900 of them are located in desert and semi-desert areas characterized by the lack of sources of fresh ground water) are referred to the category of settlements, where due to economic and technical reasons it is impossible to arrange water supply with the use of traditional methods. It is impossible either to supply natural gas and electricity to these locations. Evidently, in these cases it is appropriate to seek alternative options for solution of the problems of water and electricity supply.

In these conditions Uzbekistan considers the opportunities for utilization of renewable sources of energy, taking into account the following factors: (i) to save mineral fuel, (ii) to generate clean energy, (iii) to improve social standards of living of rural population, in remote areas in particular; (iv) to reduce emission of greenhouse gas emission to the atmosphere. This will allow to solve a number of social problems of remote settlements, to improve sustainability of the regions development.

One of the possible ways for provision of rural population with drinking water in these conditions is installation of manually-operated pumps on shallow tables of low-saline water. Experience of installation of such pumps in Karakalpakstan Republic and in Khorezm region demonstrated feasibility of utilization of saline water for drinking purposes when water salinity level exceeds established rates significantly (about 3 g/l), if there are no accessible sources of water of better quality. No medical contraindications of

consumption of such water have been determined by World Health Organization, except taste characteristics.

Meanwhile, in some cases an opportunity was considered to use saline water used for technical needs for meeting the needs of the population in water of drinking quality, with the application of household desalters.

The following approaches are mainly used for water supply for remote rural settlements:

-installation of manually-operated pumps for pumping low-saline ground water from non-deep ground water tables with attraction of the funds of the population for their installation, arrangement of water intake and operation of the installations. Within 2000-2002 in Karakalpakstan Republic and Khorezm region, in the scope of the project Uzbekistan – clean water, sanitation of health of the population, 3,750 manually-operated pumps have been installed, and the result was that more than 131 thousand people got an opportunity to use water of acceptable quality. Manually-operated pumps are also successfully used in Bukhara region.

- construction of wellpoint (pipe) systems with installation of water pumps (gasoline, wind-operated engines, airlifts);

- combined application of manually-operated pumps with household desalters for utilization on ground water deposits with salinity level exceeding 1.5%.

- search and arrangement of springs (captations) within acceptable vicinity of the settlements for the needs of the population, and their arrangement to protect from pollution with surface runoff and arrangement of water quality control in mountainous and foothill areas;

- drilling water wells (preferably self-flowing ones), their arrangement and ensuring regulated regime of water utilization for small settlements. In the scope of the project Uzbekistan – clean water, sanitation and health of the population 43 wells have been revised and spare parts have been provided for desalters being out-of-service, and this allowed to supply qualitative drinking water for about 30 thousand people in Karakalplakstan Republic. 9 desalters were replaced in 2002, to provide 10.5 thousand people with drinking water, and in 2004 installation of 10 desalters is envisaged to provide water for 15 thousand people;

- arrangement of delivery of drinking water to limited number of remote and hard-to-reach settlements in various types of containers, including canisters of various capacity, provided that there are no other alternative sources and methods of water supply. In the scope of the project Uzbekistan - Clean Water, Sanitation and Health of the Population, 39 containers for water storage and distribution have been installed in remote settlements of Karakalpakstan Republic and Khorezm region and 57 special water transportation trucks and 52 special trailers are being used for water delivery, which allows to supply drinking water for more than 10 thousand people.

To select the most efficient methods for drinking water supply for the population, living in remote and hard-to-reach settlements, Goskomgeologiya State Geology Committee specified availability and quality of ground water reserves in the areas of location of these settlements.

Data presented in this paper demonstrate that in desert and semi-desert zones of Uzbekistan there is an opportunity for utilization of alternative sources of energy, energy saving and water pumping, including the use of Photovoltaic systems (PVC), manufacturing of such systems is being currently arranged by industrial plants in the Republic.

Development of *sewage systems* significantly lags behind housing construction and water supply: only about 61% of urban population and 4.5% of rural population are provided with such systems. Other methods of domestic sewage treatment, being used in rural areas and locations with individual housing in many countries of the world, are not common in Uzbekistan. This increases danger of bacterial infestation

of water and food in the households, and this is a significant factor of dysentery of children and other intestinal diseases, particularly in the areas with general deficiency of drinking water, such as Karakalpakstan, Khorezm, Bukhara and Kashkadaria regions. Government expects to solve the above mentioned issues in the scope of the Program for Rural Infrastructure Development – component for rural areas sanitation, being currently implemented.

Uzbekistan State Program on Provision of Rural Population With Drinking Water for the period 2000-2010 envisages construction of water-supply networks and improvement of the level of drinking water supply for the population up to 85%, provision of remote and hard-to-reach rural settlements with alternative sources of water and energy supply; in 2002-2005 it is intended to provide 1.2 thousand settlements with water of drinking quality, while in 2006-2010 it is intended provide that for 1.3 thousand settlements. More than half of these settlements are located in Bukhara, Navoiy regions and in Karakalpakstan Republic. By 2010 level of provision of rural settlements with water will be 79%in Bukhara region, 81%in Navoiy region, and 98% in Karakalpakstan Republic.

Measures on water saving and protection of water resources are being undertaken under the Governmental control. The scheme for water supply development for the period up to 2010 envisages reduction of estimated specific rates of water consumption in the cities (except Tashkent) from 600 to 180 l/day per capita, in rural settlements from 160 to 130 l/day per capita, increase of the length of aqueducts and water supply lines from 48 thousand km to 84.2 thousand km, growth of the coverage of urban population with water supply up to 100%.

High significance is given to development of works on improvement of management of drinking water supply with the purpose of drinking water saving (installation of metering devices, elimination of leakages and inefficient water losses, reduction of estimated specific water consumption rates, perfection of payment system for water use, etc).

Practical implementation of sustainable development strategy depends greatly on establishment of general conditions of the system, determining principle frameworks of ideological, political and economic nature. Depth of socio-economic and political problems, facing Uzbekistan, predetermined selection of a particular way of development, combining in itself all positive aspects of the accumulated world experience, considering specific economic and social conditions.

One of the most important components of the national model of reforming is refusal from any types of "shocking" impact on the population, consistent and phased formation of socially-oriented market economy.

Extent of sustainability of any settlement is determined by the condition of ecology, availability of consistent sources of decent income, provision with housing, available set and quality of social services, as well as by the extent to which the functioning systems of health care cover major needs of the population in drinking water, healthy food and sanitation. This means that mainly *sustainable development of settlements determines sustainability of the country development.* With the purpose of achievement of the tasks set forth in Uzbekistan, a number of State target programs are being implemented, which contribute to sustainable overall development of settlements. Funds of Republican budget, credits, loans and grants of UNDP, Asian Development Bank, International and European Banks for Reconstruction and Development, UNESCO, EC, US government, France, Germany, Israel, Great Britain, Japan, etc. are used for implementation of State Programs.

Pace of movement to sustainable development will be to a significant extent determined by that, how well the ideas forming its base will be accepted by the public, and how soon observation the principles of sustainable development will become a spiritual and moral requirement of the most population. Successful implementation of the Action Program of the Government, presented in Agenda-21 for the Republic of

Uzbekistan, will become an exclusively important prerequisite for that. Assurance in successful implementation of the Program is reaffirmed by determination of the Government to follow the course of reforms and transformations in the society.

It is anticipated that reforms, planned for implementation by the Government of the Republic of Uzbekistan on the first years of the current 21st century, will provide further spiritual renovation of the society, international and civil consent, sustainable progressive growth of well-being of the population, stability of economic development and achievement of ecological balance in the system "Nature – People", inviolability of borders and territorial integrity of the country.

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