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Sanative Resources of Tajikistan Republic

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ABSTRACT

With every year, the interplay of the society and ambient nature becomes more intensive, various and complex. In these conditions, a problem of nature protection and production activity ensuring optimal interplay of the society with ambient environment is a significant one. Among all of natural resources the special place is giving to water that is widely used in all orbits of human activity and plays the relevant role in natural processes. Economic and cultural activities of the modern society are intimately connected with the usage of natural waters. A modern foresight of all changes in regime of water reserves became a prime necessity. It raises the need for the reliable protection of natural waters because in modern world the resource of water is one of the main economic factors determining advance of a national economy.

1. INTRODUCTION

The vernal and summer rains quite often shower the nature. They fill separate territories of settlements, overflow sewer headers, which results in copious impurities of the rivers, channels and irrigation systems, including streamlets. This situation is aggravated by some circumstances. The considerable proportion of the population permanently uses polluted water from opened basins, where frequently the pathogenic microorganisms are found, for every day necessities of life and for drinkable purposes. It conditions threat of widespread occurrence of diseases such as zymotic and non-zymotic etiology. This hazard is real even if the small amount of such water flows into the sewer. Also, water's impurities by organic matters and detergents are favorable conditions to reproduction of pathogenic microflora.

Thus, the unsatisfactory sanitarian state of the settled places is higher at the flow of the rivers. The drop of unrefined and undisinfected economic-households and industry cause the intensive impurity of the rivers' irrigation canals and streamblets, which are major sources of water supply.

For the centralized economic-drinkable water supply, the surface (rivers) and underground sources are frequently used

The rivers of Tajikistan take the beginning up high in the mountains with the largest flow of water being in May - June. In periods of boundary and high water, the flow is increased by 15-20 times, which is mirrored by sanitary-hygienic parameters of water. During the time of high waters, quantity of suspended matters (218-2380 mg/l) is sharply increased, which handicaps the operations of refining water collector facilities.

High speed (0.8-1.5 m3/second) and rough flow of the rivers promote the mixing, destructions, dispersion, dissolution and aeration of water. The low chromaticity (0-60) demonstrates that the mountain relief of basin territory of the river is the factor that conditions heightened entry to a pool of surface flows. The low transparency of water (3-13 cm) testifies the presence of finely divided suspended matter. The contents of oxygen in water reaches 96-100 %. This high scale of aeration of water limits the contents of carbon dioxyde and the acidity to 8.3, which creates favorable conditions for development of some pathogenic microbes, and the low temperature of water (2-130) promotes their long viability.

The contents of ammonia in the winter reaches 0.1-0.243 mg/l, and in remaining seasons it goes up to 0.09 mg/l. The concentration of nitrites in the winter, fall, spring, and summer is 0.136, 0.06, 0.041, 0.032 mg/1 respectively. The contents of nitrates during these four seasons are 6.1, 3.02, 2.4 and 1.37mg/l respectively, which shows the intensively going processes of a nitrification.

The qualities of water on a coli-index in the winter (1.0), spring (0.4), summer (0.4) and autumn (0.3) are practically identical except for the winter period. During this season entry of surface flows into the river is minimum. Thus, it is less infected, which is explained by land pollution that remains fixed. Whereas in remaining periods of year the microflora is flushed away into the river by precipitation.

The deterioration of water in the rivers is marked in the autumn because of the maiden rains and a set of infected economic-household flows from the mountain settled places. The indexes of sowing of water on saprophytic microflora exceed those on sowing by intestinal rods, entero-cocci, by 3-4 times. In summer period, small refinement of water (0.8-1.8 mg/l) is observed and only in the winter it becomes heightened (3.4 mg/l). On an index of biological consumption of oxygen, the rivers are moderately contaminated in winter, autumn and summer (2.0-2.1 mg/l).

Underground waters from artesian wells are also used as the supply of drinkable water. The specific production rate of each well is from 5 to 10 l/s with depth ranging from 18 to 120 m. The maximum position of water level happens in August – September, and minimum happens in March – April with the amplitude of level fluctuation of 4-5 m. Feed implements predominantly by sweet surface waters of the river and irrigation channels. Some settlements for the economic-potable purposes use water from spring sources with a production rate of 0.1-2 l/s. The laboratory researches of water samples from underground sources demonstrate, that the impairment of water merits (coli-index, ammonia, nitrites and nitrates) was during of 1992-2000 years, specially in autumnal and vernal periods, when the increase of a volume of sewages that were flowing through adjoining territory of water collectors facilities was observed. The measures of underground sources of water supply protection

were not conducted. There were cases of violation of a special zones of sanitarian protection. This resulted in the territory of the second belt of water collector facilities. Adjoining sites to the maiden belt were used by the population as the disposal of economic-domestic wastes and for the garden needs which is the main reason for deterioration of underground water sources

Sixty-three percent of the Republic's population is supplied by water-pipe (96% of the cities and 40% of the agricultural settlements), by wells without the distributing network: 1.3%, by springs: 9.6 %, by wells 1.8 %, by brought water: 2.5 %, and by opened pools and irrigation network: 21.8 %.

The centralized water supply in the Republic comes from 661 water lines, of which 90.6 % are underground waters. The total output of all water lines in the Republic is about 2 millions with m3/per day. From water lines, surface sources of water supply consists of up to 400 thousand m3/per day. The quality of water from water lines does not always respond to the sanitarian requirements. The absence of a zone of sanitarian protection, indispensable complex of refining facilities and disinfection are three factors that influence the quality of water.

Providing the population by good-quality potable water is a significant problem. In the countryside of Republic of Kurgan-Tube zone of Khatlon area and regions of republican subordination, water that is provided to the agricultural population is 38.5 and 42.2% respectively, in Kumsangir and Ghozimalik, it is 19.2 and 21,1% respectively, and in the number of regions such as Yavan, Bokhtar, Jilikul, Penjikent, it is even lower.

In the territory of the Republic of Tajikistan more than 200 mineral sources were detected. They differ on a physico-chemical composition and geographic situation. In northern zone of Tajikistan (Sogd area) the mineral sources are placed, basically, on plains and in foothills. In central and southern zones they are located in valleys, foothills and middle mountains. In Gorno-Badakhshan autonomous region, they are located in the Alpine mountains.

In the territory of Tajikistan in the lower hydrodynamic zone of basins of fissure waters and artesian basins, the thermal and subthermal waters enriched by balneological valuable components (of hydrogen sulphite, carbon dioxyde, iodine. bromine, silicon acid etc.) and introduced by two groups are widespread and are the following:

- water of a particular composition (hydrogen sulphite and iodine-bromine) of artesian basins;

- carbon and siliceous thermal waters of Central] Tajikistan and Pamir;

- radon waters of Northern Tajikistan;

- water of a nonspecific composition (thermal waters of neogene of the South-Tajik depression and Silurian formaions of Turkestan mountain range).

The hydrogen-sulphide waters such as Matsesta are advanced within the West-Fergana and South-Tajik regions. In Western Fergana at the depth of 250-300 m (chalkstones of paleogene, alay suite), with warmed (27.50C) by pressure (without the pouring out) water with salinity of 16-17 g/dm3 and hydrogen sulphite of 290 mg/l, well production was 0.6-0.8 l/s.

Building a health resort in valley of the river Isfara is possible.

In South-west Tajikistan such waters are available in Dushanbe and Vakhsh basins. In Luchob structure (depth 490-660 m) warm waters (35.50C) were pouring out (production rates of 1-16 i/s) with the contents of hydrogen sulphite ranging from 500 to 3000 mg/l and salinity ranging from 4-40 g/dm3, which allows the creation of a health resort at 1500-2000 places since one well gives up to 700 m/3/per day of a very strong sulphide water. The waters are dated to paleogenic chalkstones.

In Vakhsh basin (Kiziltumshuk structure), at depth of 400-610 m in alay layers (sandstones, the chalkstones) pouring out (production rate 0.75 I/s) warm (31.5°C) waters were opened with hydrogen sulphite of up to 150 mg/l and salinity of 28 g/dm3 and were used by hydropathic.

The carbon waters (cold and hot) are known in Gissar mountain range and in Pamir and are the concern to crack-vein waters of fractures zone. On a southern decline of Gissar mountain range, the water of a type Darasun-source Hojasangkhok (Ziddi) with salinity of 1.9-3.5 mg/drn3 contains 1700-2500 mg/dm3 of carbonei dioxyde. The mineral water "Anzob" was partially bottled. The cold carbon dioxide Pamir waters (13 sources) are situated in the valley of the rivers Pyanj and Aksu (altitude of 2100-4000 m) with quantities of carbon dioxyde of 400-1400 mg/l and salinity of 0.4-3.9 g/dm3.

In sources such as Darasun and Narzan, particular components are hydrogen sulphite of 12-51 mg/l and silicon acid of up to 82 mg/l. Production rates of sources range from 0.2 to 8 I/s.

The thermal carbon dioxide Pamir waters such as Borzhomi and Vishi have temperature ranging from 22-25°C to 67-77°C. The majority of sources are used only by local population, except for the Garm-Chashma source, where the hydropathic (treatment of cardiovascular and nervous systems, locomotorium and other diseases) operates. Total quantity of water is 600 m3/per day, but only minor part is used.

The siliceous therms are widely advanced in Gissar mountain range and in Pamir on the composition of spontaneous gases such as nitrogen. The hydrocarbonate-chloride of a sodium composition of a source Hoja-Obi-Garm (temperature of 64-980C with salinity of water 0.4 g/dm3 and of 140 mg/l silicon acid and of up to 20 mg/l of a fluorine) is a major concern. It is used in health resort Hoja-Obi-Garm.

Great number of a siliceous nitrogen therm (temperature of 45-77°C) is available in Pamir (Yashilkul, Jilandi, Jartigumbez etc.). Production rates of sources are 4-10 l/s with quantity of a silicon acid of 10-100 mg/l. It is used by a local population.

Iodine-bromine waters are connected with meso-cainozoic depositions of the Fergana and South-Tajik's artesian basins, where at depths of 720-870 m (structure Aktash) and 2500-2670 m (structure Kara-Tura) water with salinity 45 g/dm3 and 236 g/dm3 were opened inclusive of up to 10.4 mg/l of Iodine and with a great quantity of bromine. These waters are not used.

Medical waters are located in neogene depositions of Dushanbe basin and Silurian depositions of Turkestan mountain range. These waters are used in the health resort,

Shaambari, and also are bottled for the restaurant water. The reserves of 1200 rr per day are counted up. The similar waters are available in valleys of the rivers Khanaka and Luchob.

Waters of Silurian depositions (Havatag) opened at depth of 1182m (pouring out at 10 l/s, temperature of 54-56CC, salinity of 4.1 g/dm3, and nitrous chloride-sodium therms). Health resort "Havatag" uses these waters.

The waters of a hydropathic "Havatag" (with altitude of 600 m above sea level) consist of ardent mineral sources of a chloride-sodium type with salinity of 4.1 g/1, weak alkali and silicon. Except of basic elements in the water there are also biologically active microelements: bromine of 1.25 mg/l, iodine of 1.9 mg/l, iron, boron as a metaboric acid, molybdenum, and fluorine. From gases, there are: methane, ozone, hydrogen sulphite and etc. In this hydropathic, the treatment of eczema, neurodermite and psoriasis is conducted.

The water of a source "Hoja-Obi-Garm"- (altitude of situ-ation is 1790-1960 m) is alkaline, weak mineralized, rich by a silicon acid, contains a little hydrogen sulphite and has a moderate radioactivity. Temperature of water is in the limits of 45-96°C. In the health resort "Hoja-Obi-Garm", because of curative waters, fine climate, and the natural medical factor, the ardent radioactive vapor consists of radon, moderate quantity of carbon dioxide and nitrogen.

Physicochemical properties of the sources at health resort "Obi-Garm" (the altitude of situation is 1200-1380 m) differ from the sources at "Hoja-Obi-Garm. The water is mineralized, alkaline, and siliceous. The hydrogen sulphite is 2 times larger, and the radioactivity, on average, is 4 times less. Together with water, the nitrogen goes out. The major medical factor of a health resort is the terminal water with temperature at the exit being 37-40°C. The climatic conditions here are favorable and promote the strengthening of the health.

Large popularity of "Garm-Chashma" is in its treatment of dermatoses (altitude of situation is 2800 m). The water of a source by the physico-chemical properties consists of hydrogen sulphide-carbon, chloride-hydrocarbonate and sodium-siliceous therms. The contents of hydrogen sulphide in water is 170 mg/l. Temperature of water is not subjected to the special oscillations and is on average about 59C. Its salinity reaches up to 3.0-3.3 g/l. The source belongs to alkaline waters of the maiden class. The water roughly bubbles up, producing CO2 in outlet of up to 400-500 mg/I. Besides that, in water there are iron, aluminum, magnesium, strontium, fluorine and etc, which increase its medical properties.

The valuable medical factor of region, where the source is situated, is due exclusively to the purity of mountain air. The mineral water such as "Narzan" is unique, and is used by the patients during the stay, and positively influences the outcomes of treatment.