DEVELOPMENT PROBLEMS OF THE AGRARIAN PRODUCTION IN THE SOUTH OF WEST SIBERIA

Valentina A. Vasilenko[1]

In the south of West Siberia (Republic of Altai, Altai Territory, Kemerovo, Novosibirsk and Omsk regions) with the largest Ob-Irtysh river basin there are territories with middle and low available water supply (Baraba and Kulunda steppes).

Baraba steppe (about 117 thousands square kilometers) is situated at the territories of Novosibirsk and Omsk regions. This is forest-steppe lowland with the branching network of minor water streams, fresh and salt lakes (Lake Chany, Lake Ubinskoye, Lake Sartlan, etc.) and numerous not so deep water reservoirs as well as swamp lands. Swamp lands are one of the dominating landscape complexes. According to the Decree of the Government of the Russian Federation, Baraba water bodies, first of all Lake Chany system, have been included in the List of Wetlands of international importance.

Kulunda steppe (about 100 thousands square kilometers) is situated in Altai Territory of Russia and Pavlodar region of Kazakhstan. Here, the steppe landscapes prevail; the large lakes (Yarovoe Lake and Lake Kulunda) are situated in the central part of the lowland. The climate is continental: hot torrid summer and cold winter.

Natural climatic conditions predetermine the existence of the extreme hydrological situations in the south of West Siberia: interchange of lack of water, high water, and flood water. These situations create unfavorable conditions for water use. In dry year the local water deficits arise: up to 155 million cubic meters in Altai Territory, 3 million cubic meters in Kemerovo region, and 8 million cubic meters in Novosibirsk region. Water deficiency is worsened because of the irregularity in distribution of water resources across the territory and throughout a year.

Lack of water causes financial economic damage and breaks conditions of human life and activities. Agricultural producers did not receive planned volume of revenue. For example, in 2012, in Altai Territory, where 70% of territory is used for agricultural production, 3 million hectares from 5.4 million hectares were damaged by severe drought and 749.000 hectares totally burned down. Actual damage of the agrarians amounted to 3 billion rubles, profit decreased by 40%. The similar situation also occurred in Novosibirsk region where agriculturally used area is equal to 48%. Here, 22 regions were recognized as drought affected areas, of which in 11 regions the emergency situation has been annunciated. Harvest failure caused by the unfavorable weather conditions amounted to 50%. People managed to gather only 1.5 million tons of grain. The damage resulted in 4 billion rubles.

The problems arise in a wet year, too; and they galvanize authorities to make adequate decisions. For example, the winter of 2010–2011 was snowy in Novosibirsk region, and the winter of 2012–2013 was one in the top ten of the snowiest winters of the last century: as of from November to January snow precipitation reached 137% of norm.

Abnormal wet May and early June of 2014 occurred in the south of West Siberia. The rivers were up in Altai Territory and in Republic of Altai because of the heavy rains. That resulted in the introduction of the emergency situation regime. Sixty five human set-

[1] PhD, Leading Researcher, Institute of Economics and Industrial Engineering, Siberian Branch, Russian Academy of Sciences (IEIE SB RAS), Novosibirsk, Russia.

tlements were underflooded, 915 houses, where 3527 individuals resided, occurred under the water. The partial road havoc took place: the length of the washed out parts of the road exceeded 50 kilometers. More than 30 bridges have been damaged. In the Republic of Altai 1576 individuals suffered in the flood peak, the water flooded 518 smallholdings, 22 road bridges were flooded, and water washed out 230 kilometers of the road and damaged electric power transmission lines.

For the first time, the water renovation of the south of West Siberian land began with the Trans-Siberian Railway construction. Its building has required the development of the production, providing the efficient railroading and the human migration from the European part of Russia. It was necessary to create favorable living environment, to clear the wetlands for the future action and to open access to fertile soils, to shape croplands and meadowlands and to provide the population with the drinking water. In 1895, the tsarist government has developed the project for Baraba Lowland draining as well as for its general melioration and water-economic practice. Land improvement has been carried out by means of hydrotechnical, erosional-preventive, cultural-technical (including burning top soil with the fertilization and deoxidization of soil with ashes), and other kind of works.

The essence of the approach referred to the minimal intervention into the environmental processes. Baraba Lowland is of ridged nature. Between ridges (along lows) the rivers run almost in-parallel, they provide the natural reflux of the excess water thus fulfilling a function of channels. It is known that fast runoff leads to the territory drainage, slow runoff leads to the mire formation. Ameliorators increased the steepness of slope at languid rivers, then the water flowed down faster and accretion of silt stopped, overgrowth of rivers decreased, too. People had to slow down rapid rivers. In such a manner main natural channels were formed, smaller (side) channels were led up to them, and then shallow leats have been added. Thus, a single melioration network has been formed. Water-economic practice has been implemented competently; the results of territory research were used (relief, soil, flora, etc.). The practice was tested onsite. It helped to improve sanitary and hygienic living conditions of indigenous people and incomers, to predetermine the agricultural territory development. Over a period of 1895-1916 only in Baraba 4 million hectares of lands were introduced in agriculture on the basis of drainage. Livestock husbandry was the most profitable business, and Baraba melted butter was considered to be the best one not only in Russia but also in Europe in prerevolutionary years. Alongside with livestock husbandry, development of the areas under grain crops has been expanded.

The economic policy in the Soviet period, based on the ideology of conquering the nature, opened the way for implementation of ambitious projects. The melioration projects in Baraba have been prolonged on a large scale with the use of powerful machinery. Unfortunately, the previous experience has been ignored. As a result, they have got soil salinization in one place, excessive dehydration, weathering, and burning of peats in the other places. So, the land «improvement» works had been practically stopped, and Baraba Lowland has been included into the category of deficit water areas.

The partial river flow transfer was carried out to improve the conditions for the development of agricultural production in Kulunda steppe. In 1983, Kulunda channel was constructed in Altai Territory with 396 million m^3 a year intake to irrigate 20,000 hectares of lands and to flood pastures. However, in the course of channel construction these works were not done at sections (more than 80 kilometers long) requiring waterproofing. This is largely responsible for substantial water losses, mire formation, soil resalting, and flooding of the settled lands. At the present day, the channel potential for systematic irrigation is used less than it planned in the project. The projected capacity of Aleisk canal system is not used in full. The intake of main channel (90 kilometers long) is from Alei River (left tributary of Ob River) near village Veseloyarsk. Of planned 50,000 hectares agriculturally used areas only 14,000 hectares are irrigated (28%).

Charysh group water supply line was constructed in 1982 to provide human settlements with drinkable water. Ground water transfer from the Charysh River basin (from 30 subsoil wells) into the Aleya River basin is carried out. Maximum drinkable water abstraction occurred in 1990th – up to 34,000 m^3 per day, at present – 13,700 m^3 per day to supply it to 73 settlements of the Altai Territory. The fact is that of 1167 kilometers of water supply line 499 kilometers are recognized as unusable for further service and are written-off. Meanwhile, groundwater storage is all-sufficient to provide all nearest inhabited localities and city of Aleisk with quality drinkable water [1].

In recent years, the problem was discussed to implement the project of local water importation of Ob-Irtysh basin into the republics of Central Asia and Kazakhstan. This project was rejected in 1986 for environmental and economic reasons. In particular, according to the decree of the Republic of Kazakhstan prime minister the commission was formed to evaluate the prospects of this ambitious project of transformation of nature. The researchers of the Institute of Hydrogeology and Geoecology took active part in commission work. The main results of the commission work came into the public domain in August 2011. The project supposing water abstraction from 27 up to 37 km^3 per year at the place of Ob River and Irtysh River junction, near city of Khanty-Mansiysk, and its water transportation to the south by open earth canal (2550 kilometers length, 6 meters wide, and и 15 meters deep) has been recognized as inexpedient. [2]. Nevertheless, in June 2013, the Regional Development Ministry of Kazakhstan presented General development scheme for Kazakhstan developed with Kazakh Scientific-Research Institute of Construction and Architecture. In this document, it was suggested to turn the part of trans-boundary Irtysh River flow, passing across the territory of East Kazakhstan, to Central Kazakhstan. It is expected to implement this project within the next thirty years [3].

Time will show the results of this remaking the nature. But the experience of hydrotechnical projects implementation (Kara Kum Canal, etc.) in Central Asia and Kazakhstan shows that these projects produce a short-term effect only, and then they lead to the worsening of problems (growth of external solonchak volumes, increase of water salinity, etc.). Irrigating-water supply Irtysh-Karaganda canal built in 1971 became the source of salting and acidification of vast areas while it was constructed primarily to irrigate these areas. Irrigation water use efficiency is very low today, 38% on the average.

What will be the consequences of the local water transfer of Irtysh River within Kazakhstan for the socio-economic development of Russian area? The question still remains open. Science still has no reliable basic data and methods of spatial forecast management for large regions for long-term perspective. People lack background knowledge of environment; it is not all that simple to include theoretical knowledge into the modeling of ecological processes, some of them have cyclical pattern. There are some other difficulties of ecological forecasting which is always associated with ambiguities and uncertainties of various kinds.

To prevent conflict situations Kazakhstan is ready to discuss this project with Russia. Will the bordering countries succeed to reconcile their interests and to avoid the environmental threats? At Security Council meeting in November 2013 President of the Russian Federation V.V. Putin set a task «to work out and adopt the Environmental Safety Strategy of the Russian Federation in the nearest time. It should contain assessments of external and internal threats in this sphere as well as threshold safety indicators». [4]

The internal threats exist in the south of West Siberia, and they are considerable. Agriculture is in a spontaneous mode: its effectiveness is determined by the weather conditions. The most effective way to provide the agricultural production stability in climate extremes is hydraulic reclamation, i.e. irrigation and drainage of lands. However, current melioration fund capacities do not allow addressing the unfavorable weather conditions because they are under unsatisfactory condition. Degree of the irrigation facilities depreciation comes up

to 77%. More than 70% of water measurement points fail to meet the requirements: they are not equipped with the means of water balance measuring. More than 80% wide-coverage sprinkler systems are in breakdown state [5]. Split of melioration systems and their transfer to private property has led to the fact that new owners failed to maintain sprinkler systems in a proper condition. Many of the new owners abandoned melioration. The drainage systems do not fulfill a function of diverter network. Melioration systems and capacities built more than a century ago and in subsequent years are in the growing process of destruction. The intake structures, collection and control networks are the most worn-out systems. The risk of emergency situations at waterworks has been increased. The main canals are silted, bushed, stopped by numerous earth cofferdams, etc. As a result, not only farmlands became bogged up and salted, removed from operation, but rural villages were drowned and overflowed. Thus, the ecological conditions grew worse in the large territory.

The Russian Federation government policies targeted to import relief actions relative to food products activated reclamation works (melioration). The federal agricultural melioration program has been adopted [6]. Subjects of Federation of the south of West Siberia are developing their regional programs of soil improvement.

Availability of hundreds of thousands hectares of fertile lands in Baraba and Kulunda steppes is a good base for organizing powerful agro-industrial complex for cultivating and processing agricultural products in the south of West Siberia. With this end in view, accumulated problems need to be resolved. First of all, technical re-equipment of the melioration (soil improvement) systems at work should be accomplished. Measures on the refusal to import certain types of agricultural products from the countries of the European Union could be the incentive for large-scale development of the national agricultural sector [7].

REFERENCES

1. **State-of-the-art** of the Water Resources and Functioning of Water Industry of Ob-Irtysh Basin / ed. Yu.I. Vinokurov, A.V. Puzanov, D.M. Bezmaternykh. SB RAN Publishing House, Novosibirsk, 2012. 236 p.
2. **Nazarbaev** changed his mind to reverse Siberian rivers / URL:http://Fantazin.ru/yekologiya/news_2011-08-03-22-20-30-326.html (date of access 19.12.2011).
3. **They** are ready to reverse Irtysh River in Kazakhstan. / URL:http://zvercorner.com/?p=12403 (date of access 10.10.2013).
4. **The environmental** questions were raised at Security Council meeting. / URL:http://www.kremlin.ru/news/19655 (date of access 07.06.2014).
5. **Kireicheva L.V.** Potential of Baraba Lowland for Integrated Land Reclamation for Agricultural Purposes // Reclamation and Water Management, 2014, No 1. – P. 31–34.
6. **RF Government** Regulation of 12 October 2013 No 922 «Concerning Federal Target Program "Reclamation Development of Russian Agricultural Lands for 2014–2020"». // RF regulation, 2013, No 43, article 5554.
7. **The Edict** of the President of the Russian Federation of 6 August 2014. No 560 «On certain special econo-mic measures to ensure economic security of the Russian Federation» // RF regulation, 2014, No 32, article 4470.