



NJC «Kazakh National Agrarian Research University»

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Policy for sustainable development and use of water resources in KazNARU

Concept

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Concept

PREAMBLE

Rational environmental management in the Republic of Kazakhstan implies that withdrawn natural resources are used efficiently, and a policy is being implemented to reduce the volume of their consumption; restoration of renewable natural resources is ensured. All production waste, and especially water resources, should be reused.

Efficient management and utilization of water resources are crucial for the sustainable development of societies. In Kazakhstan, the optimum use of water resources necessitates a planned and integrated approach that takes into account both the short-term and long-term requirements of all stakeholders. The sustainable use of water resources is not limited to environmental concerns but extends to economic and social issues as well. The utilization of water resources should therefore be guided by a principle of achieving the Sustainable Development Goals (SDGs). The needs of all stakeholders, including those of the environment, must be considered in an equitable and sustainable manner. Furthermore, the prevention and reduction of water-related hazards must be given due consideration in the planning process, and these factors must be fully integrated into the overall socio-economic development planning process.

The role of the Kazakh National Agrarian Research University: the university can contribute to the process of planning, development and rational exploitation of water resources as a resource whose reserves are not so large in Kazakhstan and which is susceptible to the influence of external factors.

The Kazakh National Agrarian Research University can mobilize research capacity to plan public spending and private investment, plan and implement environmental and operational costs, and develop and master new technologies that reflect the most valuable alternative uses of water.

Water resources of Kazakhstan

According to data for 2024, the total water resources of the rivers are approximately 101 km³, of which 57 km³ are formed on the territory of Kazakhstan. The rest of the volume comes from neighboring countries: Russia—8 km³, China—19 km³, Uzbekistan—15 km³, and Kyrgyzstan—3 km³.

Among the reasons cited was a reduction in external water inflow, which is aggravated by its ineffective use. The characteristic problems include four reasons: climatic factors, highly deteriorated infrastructure, wasteful water consumption, and lack of legal framework.

According to World Bank forecasts, the volume of water resources in Kazakhstan will decrease from 90 km³ to 76 km³ per year by 2030. This means that - if the necessary measures are not taken for the rational use of water resources - the water deficit in the country in just a few years will be about 12-15 km³ per year by 2030, that is, about 15%.

Water resource assessment, including the identification of potential sources of freshwater supplies, involves an ongoing determination of the sources, size, dependency and quality of water resources, as well as the human activities affecting those resources. This assessment serves as a practical basis for their rational exploitation and a necessary precondition for assessing the possibilities of their development. The main difficulties are the lack of financial resources for conducting water resource assessments, the fragmented structure of hydrological services and the lack of qualified personnel. At the same time, developing countries' access to advanced data collection and management technologies is becoming increasingly

difficult. However, the establishment of national databases is essential for assessing water resources and mitigating the effects of floods, droughts, desertification and environmental pollution.

Ways to solve fresh water shortage in Kazakhstan

The Kazakh National Agrarian Research University can mobilize research potential for planning public spending and private investment, planning and implementing environmental and operational measures to work on water saving technologies. For example, these measures could include the following steps:

- 1) Development of a program for the efficient use of water resources.
- 2) Attracting scientific potential to develop the most effective approaches and master the latest technologies.
- 3) Preservation of fresh water reserves in reservoirs.
- 4) Technologies for water processing.
- 5) Desalination of salt water.
- 6) Breeding techniques for agricultural crops.
- 7) Drip irrigation.
- 8) Rational processing and use of wastewater.
- 9) Mass planting of forests.
- 10) Wells and glaciers and so on.

Principles of rational water use

The Kazakh National Agrarian Research University can mobilize research potential for planning public spending and private investment, planning and implementing environmental and operational measures. For example, these measures could include the following steps:

1. “Zero level” of water consumption
2. Compliance with the anthropogenic load of the natural resource potential of the university
3. Preservation of the spatial integrity of natural systems in the process of their use
4. Preservation of the naturally occurring circulation of water resources
5. Coordination of production and natural rhythms
6. Priority of environmental optimality for the long term when determining the economic efficiency of current environmental management

These principles are taken into account in the following measures at the university:

The Kazakh National Agrarian Research University is working to mobilize the research potential of faculty and students to implement environmental and operational measures within the framework of the Green Campus project and several other initiatives. For example, these measures could include the following steps:

- First of all, monitoring of taps and toilet flushes (economy mode).
- Universal water meters.
- Using water after washing vegetables and fruits to water plants.
- Reuse of water (recycling), use of process water for water supply to university activities.
- Introduction of a management system for the rational use of water resources and their protection from pollution, clogging, and depletion; management of operation of water management systems; management of prevention and elimination of harmful effects of water.
- Water savings can be achieved through the use of recycling and reuse water supply systems.

Conditions for Rational Water Use within the University

The Kazakh National Agrarian Research University is working to mobilize the research potential of teachers and students to achieve a state of sustainable (environmentally balanced) development in the long term:

The University Concept “Green Campus” has been developed, capable of ensuring the participation of a wide range of the public in decision-making;

- An economic system (incentive system), which ensures technical progress on its own basis;
- social system (student projects on the rational use of water) and helping to relieve stress that arises in conditions of inharmonious economic development;
- a system of efficient production focused on preserving the environmental resource base;
- a technological system that could stimulate the constant search for new solutions;
- international (partnership) system for scientific and educational projects on water resources.

The Concept of “University’s Sustainable Development Strategy” was developed in accordance with the legislation of the Republic of Kazakhstan, the Charter of NJC "Kazakh National Agrarian Research University" to regulate the main relations to ensure sustainable development of KazNARU and it was prepared by the International Office of NJC "Kazakh National Agrarian Research University”.