



SUSTAINABLE DEVELOPMENT POLICY ON WATER RESOURCES UNIVERSITY (MAXIMUM REUSE OF WATER)



The preamble

Sustainable water management is necessary to ensure the quality supply of our vital water resources in the face of increasing human demand for water, high levels of pollution and increasing spatial and temporal variability associated with climate change. An integrated approach to water resources management is recommended to solve current water problems, which are often interrelated with other environmental, economic and social problems.

The concept of sustainable development for water resources of the Al-Farabi Kazakh National University aims to ensure a balance between economic growth, social justice and environmental sustainability in relation to water resources, both at the regional and global levels. Education is a key dimension of the international response to the global water crisis and can stimulate behavioral changes to create a more sustainable society in terms of economic viability, social equality and protection environment. Water education is often linked to poverty eradication, adaptation to climate change, basic human rights, gender equality and indigenous culture, among other key issues.

The contribution of the Al-Farabi Kazakh National University to achieve sustainable development in water resources is reflected in two main directions:

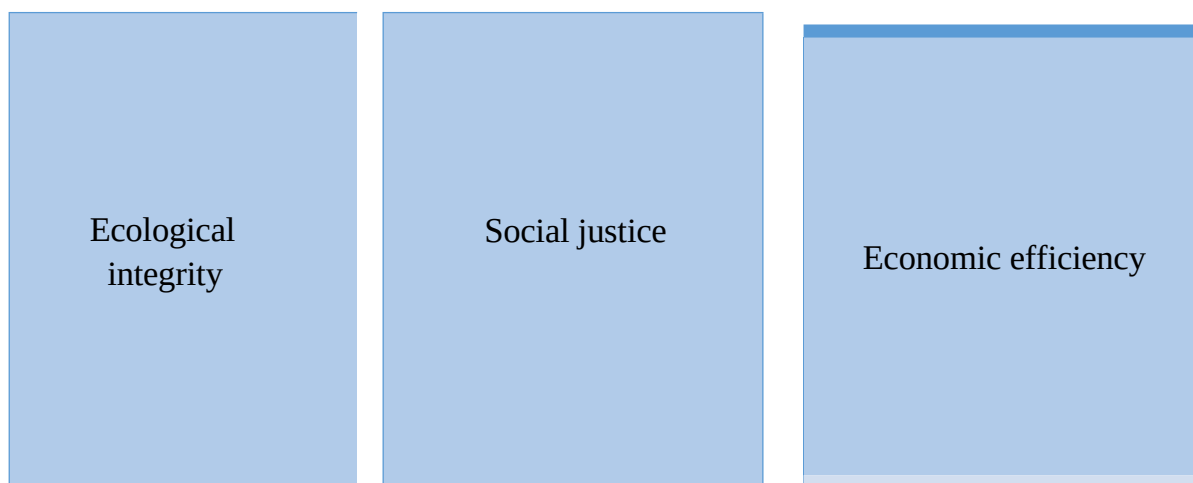
1. Training of highly qualified hydrologists at bachelor's, master's and doctoral levels, competitive in the domestic and international labor market, which It involves the integration of research activities and learning in the educational process, the implementation of the educational process using credit technology based on the principles of interdisciplinarity and a competence-based approach.

2. Carrying out research works in the field of rational use of natural resources, including water resources. In the world practice, training of hydrological specialists is determined by the tasks of scientific and industrial activity and economic needs of the country.

At Al-Farabi KazNU, in addition to the recommendations of domestic and foreign specialists based on the experience of training specialists in hydrology, the choice of directions and the list of disciplines is made taking into account the applications of major employers for specialists and priority studies in the field of hydrology and water resources, determined by the National Academy of Sciences and the Ministry of Education and Science of the Republic of Kazakhstan for the future and the curricula of foreign countries



Sustainable development concept on water resources of the university



is based on three principles:

- preservation of natural hydrological cycles and biodiversity
- equal and equitable access to water resources for all segments of the population
- utilisation of water resources in such a way in a way that (maximises) their economic value without compromising the for ecosystems

Political and legal aspects

1. *Standardisation and regulation:* implementation of water quality standards, regulation of wastewater and water supply.
2. *Water law:* establishing an effective system of water rights that ensures an equitable distribution mechanism and excludes conflict situations in the field of water allocation and water allocation.

Technological aspects

1. *Clean technology:* application of technology for efficient use and purification of water.
2. *Infrastructure:* construction and modernisation of water and wastewater infrastructure on campus, incorporation of sustainable materials and technologies.

Environmental aspects

1. *Protecting and restoring ecosystems:* exploring the restoration of degraded aquatic ecosystems and the conservation of sustainable ecosystems.
2. *Monitoring and research:* systematic collection of data on the state of water resources and ecosystems.



Social aspects

1. *Education and enlightenment*: training of personnel on educational programme "Hydrology", "Ecology", "Geoecology and Nature Management", preparation of innovative educational programme "Water Diplomacy" and "Water Security"; dissemination of information on the significance of sustainable water use among the population.
2. *Community participation*: activation of local communities in decision-making processes on water use.

Economic aspects

1. **Economic incentives**: creating economic mechanisms for efficient and sustainable use of water resources.
2. **Investment**: attracting investment in sustainable water projects and research.

Implementation and monitoring

1. **Pilot** projects: implementation of scalable pilot projects to address water security, transboundary water management to test the effectiveness of different approaches to water allocation.
2. **Monitoring and reporting**: regular data analysis to assess the effectiveness of current measures.

This concept is iterative and should be regularly revised to take into account new data, technologies and socio-economic conditions.

Basic principles of sustainable development on water resources

1. Ecological integrity

This principle is to preserve the natural hydrological cycles and aquatic ecosystem on the campus.

2. Social justice

Equal and equitable access to water for all, including vulnerable groups.

3. Economic efficiency

Maximising the economic value of water resources without compromising ecosystems and social well-being. This principle includes actions to apply modern technologies to reduce water losses in water supply systems.

Each of these principles requires a balanced and in-depth approach that promotes the long-term sustainability of water resources on campus.

The political and legal dimensions of sustainable development by water resources

1. Standardisation and regulation

Implement and maintain strict water quality standards and regulate wastewater and water supply for sustainable use of water resources.



2. Water rights

Establish an efficient and transparent water rights system that ensures equitable distribution of water resources and takes into account environmental and social factors.

Technological aspects of sustainable development on water resources

1. Efficient water supply

Application of modern technologies to minimise water losses in water supply systems and improve distribution efficiency.

- Actions:
- Introduction of "smart" systems monitoring and management of water supply.
- Application of low leakage materials for pipework. The use of low leakage materials for pipework.
- Metrics:
- Level of water losses in water supply systems. -Energy savings in water supply systems.

2. Sustainable use and recycling of wastewater

Wastewater treatment technologies should be energy efficient and allow for water reuse.

Environmental aspects of sustainable development on water resources

This aspect includes scientific-innovative and educational integration in the field:

- protection and restoration of aquatic ecosystems;
- development of measures to protect rivers, lakes, reservoirs from pollution and destruction,
- rational use of water resources taking into account the needs of all ecosystems;
- adaptation of water systems to climate change, including the risk of droughts, floods and sea level rise;
- developing and implementing plans for sustainable water management under climate change.

Each of these environmental aspects is necessary to create a sustainable, balanced and efficient water management system that takes into account the needs of man and nature. This system must be flexible to adapt to changing conditions and challenges.



Social dimensions of sustainable development on water resources

1. Access to clean drinking water

Ensuring sustainable and equitable access to clean drinking water for all segments of the population, including remote and low-income areas, through training programmes

"Hydrology." "Ecology." "Geoecology" и Nature Management.

2. Public participation in water resources management

Involvement of citizens and communities in decision-making process on water resources management. Organisation of conferences, forums, round tables, blitz reports at international and national level, as well as development of advanced training courses on the topic of water resources management.

3. Education and awareness

Raising the level of education and awareness of the population on sustainable use of water resources by integrating sustainable water use issues into HEI educational programmes, information campaigns through mass media and social networks.

Implementing these social aspects requires an integrated approach, including close co-operation with the technological and environmental aspects of water management. Only through joint efforts can sustainable and equitable use of water resources be achieved.

Economic Aspects of Sustainable Development on Water Resources

This aspect includes:

- assessing the current status of the water supply and creating a long-term modernisation plan;
- implementation of technologies to improve efficiency water use in all spheres of economy;
- optimising the use of water resources to meet economic needs without damaging ecosystems;
- preparation of application for competition of republican grant financing, international funds and organisation for funding of scientific projects on water resources issues.

Economic aspects play a key role in ensuring sustainable development of water resources. They should be integrated with technological, environmental and social aspects to create an integrated and sustainable water management system.



Implementation and monitoring of sustainable development on water resources

1. Phases of realisation

Identification of key stages in the implementation of the sustainable development strategy, from planning to implementation and performance evaluation.

- Actions:
- Develop a detailed implementation plan with clear timelines and responsibilities.
- Conducting pilot projects to test the applicability of solutions.
- Metrics:
- Compliance with deadlines. - Level of achievement of stated goals and objectives.

2. Monitoring mechanisms

Establish an indicator tracking system to measure progress and effectiveness of implementation.

- Actions:
- Creating a database to collect and analyse information.
- Regular reports and audits.
- Metrics:
- Accuracy and timeliness of data. -Consistency of results with original projections and plans.

3. Adjusting the strategy

Making changes to the concept based on data and feedback.

- Actions:
- Analysing monitoring results to identify weak points.
- Adapting the strategy to meet changing conditions.
- Metrics:
- The effectiveness of the changes made.
- Relevance of the changes to the needs and real situation.

Planning, implementation, monitoring and adjustment are the key elements of successful implementation of the concept of sustainable water resources development. This process requires an integrated approach and active co-operation of all structural units of the university.