ANNOTATION

Dissertation work on the topic: "Geoecological substantiation of the allowable-technogenic load of the catchment of the Tobyl river basin" by Baktygul Eldenovna Tastemirova for the degree of Doctor of Philosophy (PhD) in the specialty 6D080500 - Water resources and water use.

Relevance of the research topic. The water resources of river basins, as a necessary component of the existence of the biosphere and an irreplaceable element of the production and economic activities of human society, are influenced by anthropogenic factors of various origins and make a significant contribution to the formation of the ecological situation in the territory.

The watershed of the Tobyl River basin is located in a specific natural-economic region and, due to geopolitical, geographical, geo-ecological aspects, is of particular importance for the sustainable development of the northern regions of the Republic of Kazakhstan, which determines the need to comply with the regulations of any anthropogenic activity, including water use.

In this regard, assessing the regional specifics of the formation of water resources and the environmental consequences of their use, analyzing the changing socio-economic situation, and determining the level of anthropogenic load on the Tobyl River catchment area become important tasks for organizing sustainable and environmentally safe water use.

A review and analysis of previous studies show that the accumulated experience and large factual material make it possible to solve many geoecological problems in the field of environmental management. At the same time, it should be noted that the geo-ecological conditions and regional patterns of organizing water use in the Kazakh part of the Tobyl River catchment area have been insufficiently studied. The intensity of anthropogenic impact on the territory of the Republic of Kazakhstan in the Tobyl River catchment area has practically not been considered and has not been properly assessed, which requires further development of issues of natural economic zoning in the context of planning water management and water protection measures, taking into account the geographical location, climatic features, and priority water use goals. The anthropogenic load of water bodies with wastewater and pollutants has not been sufficiently studied.

At the same time, the variety of types and formats, significant volumes of documents on water management activities determine the need for their systematization in order to form a database and search and analytical systems, which is an urgent task of information support for assessing the state of water resources in the Tobyl River catchment basin. The introduction of geographic information technologies will automate the process of using this data, and the creation of a reliable methodological apparatus capable of storing and accumulating large volumes of spatiotemporal data, which will make it possible to analyze and promptly obtain reliable information about water use objects to improve the process of water resource management in the Tobyl River basin, which served as the basis for

conducting research in the field of geo-ecological assessment of water use, to determine the goals and objectives, object and subject of research.

The purpose of the dissertation research. The purpose of the study is to assess the geoecological conditions for the formation and use of water resources to optimize management decisions in the field of water use in the Tobyl River catchment area.

Research objectives. To achieve the goal, the following tasks were solved:

- analysis and generalization of conceptual approaches and principles for assessing water use and water availability, to develop an algorithm for assessing water resource provision for long-term regional development of the catchment area of the Tobol River basin;
- analysis and assessment of the influence of climatic and anthropogenic factors on the gyrological regime of the Tobol River basin in a changing climate;
- analysis and assessment of natural and anthropogenic factors in the formation and functioning of regional water use systems in the catchment area of the Tobol River basin, characterization of their features depending on the administrative-territorial division;
- development of mathematical models of water supply indicators for the population and territory, water management and geochemical balances of the Tobol River basin catchment area, taking into account the peculiarities of water use in the regions;
- development of proposals and recommendations for the development strategy of administrative districts and cities of the Kostanay region for the purpose of rational use and management of water resources.

The object of research is the watershed of the Tobyl River basin

The subject of the study - is the assessment of geo-ecological conditions for the use of water resources in the catchment area of the Tobyl River basin.

Research methods. Among the approaches and methods proposed for solving the problems, the main ones used are: the landscape-basin approach, the principles of sustainable development and environmental management, methods and techniques for determining the influence of climatic and anthropogenic factors on the hydrological regime of river basins, as well as those widely used in scientific research statistical and system analysis using the Microsoft Excel software package.

As the basis for the information analysis fund, data from the republican state institution "Department of Statistics of the Kostanay Region", the reference and information portal "Weather and Climate", data from climatic and hydrological indicators of the World Meteorological Organization (WMO) and the RSE "Kazhydromet" were used. analytical data from the republican state institution “Tobol-Turgai Basin Inspectorate for regulation of the use and protection of water resources of the Committee on Water Resources of the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan” on the use of water resources in sectors of the economy.

Basic provisions (proven scientific hypotheses and other conclusions that are new information) submitted for defense:

- results established over a long-term period of spatiotemporal changes in average annual water flows in the catchment areas of the Tobol River basin in modern natural and anthropogenic conditions, taking into account climate change;

- modern water use systems in the catchment area of the Tobol River basin have a nature-based nature of formation and a feature of their functioning is the territorial discrepancy between the water resource potential and the needs of the population and the economy;

- long-term water use in the catchment area of the Tobol River basin is determined, first of all, by changes in housing and communal services, production and agricultural activities, and an important condition for the forecast is the demographic component of development and accounting for the amount of environmental flow.

Justification of the novelty and practical significance of the results obtained.

Scientific novelty. A theoretical and methodological approach and an algorithm for assessing water use in the catchment area of the Tobol River basin are proposed, depending on the existing structure of economic use of the territories, population settlement and the characteristics of the functioning of the water industry;

- the theoretical methodology for assessing the specific water supply of the territory and population of river basins and their water management and geochemical balances has been improved, based on the laws and principles of environmental management;

- an assessment of the future water supply of the Tobol River basin in the context of water management areas, administrative districts and cities is presented, using equations of linear trends obtained on the basis of indicators of modern water use on a spatiotemporal scale.

Practical significance. The theoretical and practical significance lies in the fact that the research results are focused on solving applied problems of increasing the efficiency and quality of management decisions made in the field of use and protection of water resources in the Tobyl River basin. The database obtained during the study on the structure and dynamics of water use, original water management maps and linear drainage diagrams of the Tobyl River basin can be used in organizing and ensuring environmentally acceptable water use. The developed system of measures and algorithm for studying water use in river basins, conclusions and other materials obtained in the work can become a basic component for further research in the field of increasing the efficiency and rationality of the use of water resources, ensuring the standard quality of drinking and wastewater treatment, and protecting water bodies , as well as timely management decisions in moving towards achieving and maintaining a state of sustainable and environmentally friendly water use.

Compliance with directions of scientific development or government programs. The work was carried out at the Kazakh National Agrarian Research University NJSC within the framework of the innovative project AR05131448 “Theoretical and methodological foundations for the design of agricultural

landscapes based on the environmental assessment of the natural resources of Kazakhstan."

Description of the doctoral student's contribution to the preparation of each publication. The main provisions of the dissertation were reported and discussed at the international scientific and practical conference with international participation (Shumakov Readings) "Innovative technologies for land reclamation, water and forestry in the South of Russia" (Novocherkassk, 2018), at the international scientific and practical conference "Land reclamation is an integral part of restoration and development of the agro-industrial complex of the non-chernozem zone of the Russian Federation" (Moscow, 2019), at the international scientific and practical conference "Waste, causes, their formation and prospects for use" (Krasnodar, 2019), the international scientific and practical conference "Problems of increasing the efficiency of the use of electrical energy in branches of the agro-industrial complex" (Tashkent, 2018), at the XV International Scientific and Practical Symposium and Exhibition "Clean Water of Russia" (Ekaterinburg, 2019), at the international anniversary scientific and practical conference "Problems of the development of agricultural reclamation and water management complex based on digital technologies" (Moscow, 2019), at the international scientific and practical conference dedicated to the 1000th anniversary of the city of Brest "Current problems of geosciences in the study of transboundary regions" (Brest, 2019), at the All-Russian scientific and practical conference (Shumakov Readings) with international participation, dedicated to the 130th anniversary of the birth of Academician B. A. Shumakov "Innovative technologies for land reclamation, water and forestry in the South of Russia" (Novocherkassk, 2019), at the international scientific and practical conference "Agricultural landscapes, their sustainability and development features" (Krasnodar, 2020) and at the international scientific and practical conference "Modern problems of land reclamation development and ways to solve them" (Kostyakov Readings) (Moscow, 2020).

The latest research results were published in 14 scientific papers, of which 5 articles were published in peer-reviewed journals recommended by KKSON, 1 in an international journal indexed by Scopus.

Structure and scope of the dissertation. The dissertation consists of an introduction, 4 chapters, a conclusion and a list of used sources of 106 titles, 31 appendices; contains 145 pages of computer text, illustrated with 49 figures and 21 tables.