Development of a rational environmental management system and increasing environmental safety

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Abstract. The analyzed indicators indicate that the industrial complex consumes the largest volume of water resources, while not all water resources that are discharged into water bodies are subject to treatment, which, of course, affects the state of water basins. It was substantiated in the work that in order to achieve and increase the effective use of water resources, it is advisable to develop a coordinated policy to reduce water consumption and preserve the environment for future generations. At the end of the study, the necessary conclusions were drawn on the results of the work done.

1. Introduction

In recent decades, issues related to the need for rational nature management, reducing the environmental burden on the environment, improving environmental safety, and ensuring environmental conservation for future generations have become more acute in society [1-3]. Such directions became relevant in the last century, when the problems of rational use of natural resources, the maximum satisfaction of the needs of society and the minimum impact on the natural environment were voiced [4]. All these requirements were recorded in the UN Concept on Sustainable Development and the countries began to rebuild their own economies under the new conditions of existence. Some states completely abandoned the use of fuel and energy resources, began to introduce policies on energy conservation and rational consumption of goods and services, reduce the number of industrial production and develop new activities [5-6]. However, most states were unable to adapt to the new requirements of the world community and continued to work according to established principles [7].

At the same time, in the 21st century, most states began to think about preserving the environment, adopting programs to preserve the environment, rational use of fuel and energy resources, aimed at achieving rational environmental management and ensuring environmental safety. However, more and more industrial enterprises use water resources in their activity, that is, they process water and discharge it into natural reservoirs [8-10]. Of course, the use of water in the production process adversely affects water basins, namely, the destruction of flora and fauna occurs, the volume of natural reservoirs decreases, and the volume of drinking water on the planet decreases.
Thus, the study related to the analysis of the use of fresh water in the Russian Federation and the development of a rational environmental management system seems relevant.

2. Materials and methods
The goal is to assess the volume of water resources used for the needs of various fields of activity. Based on the stated goal, the following tasks were proposed:

- Analyze indicators reflecting the volume of water use;
- Formulate recommendations for reducing the use of water resources.

The study used data from statistical services that reflect the volume of water use in various fields of activity. In the work, methods and approaches were used that allowed to reveal the goal and objectives of the study.

3. Results
In modern conditions at industrial enterprises, more and more attention is paid to the efficient use of resources, especially natural resources, and reducing the burden on the environment. However, such a trend was not always relevant, since in the period when industrial complexes were created, the goal was to reduce the use of manual labor and the transition to industrial technologies [11]. At the same time, the society of that time did not think about issues of rational nature management and the reduction of the use of nature’s resources in the production process, since it did not expect that industrial complexes would develop so quickly. In this regard, the technological chains of most enterprises involved the abstraction of water, its purification, use for the needs of the technological process, and its discharge into reservoirs or natural reservoirs [12-14]. This process did not always contain requirements for water treatment before it was discharged into a body of water, but today this situation has changed and the relevant oversight departments and public institutions are monitoring water treatment. However, due to the absence of changes in the technological chains, many enterprises continue to consume and use water in their production.

Consider the volume of fresh water use in the Russia (figure 1) [15].

![Figure 1. The use of fresh water in the Russia, billions of cubic meters.](image-url)
see that although there is a decrease in consumption, the volume of water consumption for industrial needs remains at a high level and is three times higher than the figures for household and drinking needs.

Next, we present the volumes of discharged contaminated wastewater in the Russian Federation (figure 2) [15].

![Figure 2](image-url)

**Figure 2.** The volume of discharged contaminated wastewater in the Russia, billion cubic meters.

The presented figure shows that in recent years, the volume of discharged contaminated wastewater has halved, of course, this situation has a positive effect on the state of water bodies in the Russia.

Let us consider the volumes of pollutants entering sewage into water bodies in the Russia (figure 3) [15].

![Figure 3](image-url)

**Figure 3.** The flow of pollutants with wastewater into water bodies in the Russia, billions of cubic meters.

The figure shows that the volume of pollutant inflows has been declining over the past 25 years, but at the same time, the annual volume is 40 billion cubic meters. It should be noted that industrial enterprises are mainly located in large agglomerations, where a large number of people are concentrated. A similar situation requires industrial complexes, national economies and other institutions to increase the environmental safety of industrial production and reduce the burden on natural sites [16-19].
4. Discussion
Of course, in modern conditions, when natural resources are subject to constant exhaustion and use, it is necessary to develop measures that will ensure their rational use [20-21]. Today in the Russian Federation, ministries, federal agencies and regional authorities are involved in environmental issues. In addition, in recent years, environmental protection among industrial enterprises has occupied a special place. These companies conduct annual events, among which, one can single out - wastewater treatment, the transition to the rational use and consumption of natural resources, the installation of filters to treat emissions of both wastewater and atmospheric emissions [22-25].

However, it is advisable to think over new technologies that will further reduce the use of water resources. In our opinion, such events should be carried out not only within the framework of the state policy in the field of environmental protection, but also find a certain balance and agreement between the relevant ministries and corporate structures, while the development of measures should be coordinated and complementary [26]. In this case, of course, state and regional authorities should set the corporate sector to reduce the negative impact on the environment [27-29].

5. Conclusion
The study was devoted to the efficient use of natural resources, namely water resources. The work revealed that the industrial complex consumes the largest amount of natural water; however, not all water entering natural reservoirs after use is subject to complete treatment. Of course, such a situation negatively affects not only the biological balance, but also the life of a person who uses water for domestic and drinking needs. It was proposed in the work that in order to ensure environmental protection and increase the purity of water resources discharged into natural reservoirs, the state and corporate sectors should develop a joint policy on the conservation of water basins for future generations.

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