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ECOLOGICAL ASPECTS OF WATER PROJECTS IN BULGARIA

Water projects usually are classified as infrastructural projects. They spend a large investment resource, have a long duration and high level of risk, but the effects of their implementation are not only economical but also social and environmental. Integration of sustainability in the water projects management ensures environmental balance.

The environmental aspects of project management include achieving better ecological status of water and enhancing its ecological value by reducing pollution and improving its quality indicators (Stoyanova et al., 2019). One of the most important aspects is the reduction of health risks for population (Georgiou et al., 1998). Some authors analyze the benefits of avoided health risk, which shows how investments in water infrastructure can lead to improved welfare (Pattanayak et al., 2005). Water projects ensure a construction of installation for treatment of waste water. This leads to a reduction in eutrophication and associated negative effects (Howarth et al., 2001), such as the development of phytoplankton, the reduction of oxygen concentrations in water bodies and the reduction of biodiversity.

Increasing investments in water sector generates environmental benefits. By investment in improving and construction of water infrastructure and implementing projects is observed a direct impact on the environmental aspects of regional sustainable development. The implementation of such projects is of significant importance for achieving a good quality of life conditions for the population, increasing the attractiveness of regions by improving access to clean drinking water and protecting the ecological potential (Stoyanova, Todorova, 2018).

Methodology

The purpose of the paper is based on the analyses of ecological aspects of implementation of water projects to assess their impact on the environment. The methodological framework of the study includes: 1) theoretical review of the ecological aspects of water projects; 2) analysis of the ecological effect of water projects in Bulgaria; 3) general conclusions. The analyzes in the paper is a part of the results of scientific project (Stoyanova et al., 2015). For the purpose of the project was conducted a survey and organized structured interviews with experts from municipalities and Basin directorates in Bulgaria.

Results and discussions

Evaluation of the territorial scope of the environmental impact of water projects, show that projects have environmental benefits "even outside the area where the project is operating" (75% of the respondents). 15% of the experts consider that the projects have an ecological effect only on the territory on which they are realized and only 10% share a view that only partial effects for the territory are observed.

The comparative assessment of the benefits of the projects carried out in the economic, ecological and social aspect shows that the environmental impact is the highest (40%), followed by the social (38%) and the economical (22%).

The environmental benefits for the economy and society of project implementation are highly evaluated and the highest level is for Improvement and development of waste water infrastructure (85%), followed by Improvement and development of drinking water infrastructure (75%) and Preservation and improvement of the ecological status of the waters in the municipality (75%). 50% of the respondents evaluate high the benefits connected with Water monitoring and protection and 35% consider that water projects reduce the cost in the water sector (Table 1). The evaluations of the benefit Increasing flood response capacity are highly differentiated. There are no ecological benefits from the water projects according to 10% of the respondents. Experts have different opinion in evaluation for Improvement of air quality. Most of them (35%) state that there are high benefits and 30% consider that benefits are very high.

Table 1. Evaluation of the ecological benefits for the economy and society of the implementation of the projects in water sector

BENEFITS	No benefits	Low benefits	Average benefits	High benefits	Very high benefits
Improvement and development of drinking water infrastructure	5	0	10	10	75
Improvement and development of wastewater infrastructure	5	0	10	0	85
Preservation and improvement of the ecological status of the waters in the municipality	5	5	5	10	75
Enhancement of flood response capacity	10	5	30	25	30
Monitoring and protection of water	5	5	25	15	50
Improving the air quality	10	15	35	10	30

Source: own survey

Conclusions and recommendations

The environmental benefits of the water projects for the economy and society related to the improvement and development of the drinking and waste water infrastructure, the

preservation and improvement of the ecological status of the water in the municipality are highly evaluated. The construction of water infrastructure as treatment plants contribute to the safe removal and treatment of waste water, which improves the quality of water resources, ensure the proper functioning of ecosystems. The exploitation of natural resources and in particular of water resources are not sustainable, therefore they need a change that is related to project management and financing. In this respect, it is necessary to move from a traditional project management approach to a more sustainable one. This can be done by including environmental criteria as environmental management practices, stakeholder involvement, energy efficiency, waste management, sustainable procurement practices at the design phase of the project.

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