

Benefit analysis and understanding of the east route of the South-to-North Water Transfer Project

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Objectives

The eastern route of the South-to-North Water Transfer Project is a major strategic infrastructure to transfer water from the lower reaches of the Changjiang River to alleviate the shortage of water resources in the eastern part of the Huanghuaihai Plain and Jiaodong region. According to the plan, the project is constructed by stages. Since the first stage of the eastern route of the South-to-North Water Transfer Project was officially put into operation in 2013, it has provided a strong water resources support to ensure the economic and social development of the water-receiving areas. Systematically analyze the benefits of the first stage of the eastern route project , so as to fully and correctly understand the benefits of the project, and timely summarize useful experience, which will be conducive to fully play the comprehensive benefits of the project in the future .At the same time, in combination with the new situation and new requirements of the country's ecological civilization construction, water network construction and the high-quality development of water resources in the new stage, put forward the new functions and new positioning of the eastern route project in the new stage, and comprehensively understand the benefits that the project can play . It is expected to provide relevant reference for the high-quality development of the follow-up project of the South-to-North Water Transfer Project.

Methods

Make a comparative analysis of The expected benefits of the eastern route of South-to-North Water Transfer Project and the actual benefits brought into play since the first phase of the project was put into operation, to evaluate the performance of the benefits. Taking into account the new situation and requirements of the construction of the national ecological civilization, the construction of the national water network and the high-quality development of the South-to-North Water Transfer Project, and focusing on the potential and strategic functions of the project, to propose the new functions and positioning of the Eastern route project in the new stage, Fully understand the benefits the project can play in the social, economic, ecological, cultural, security and other aspects .

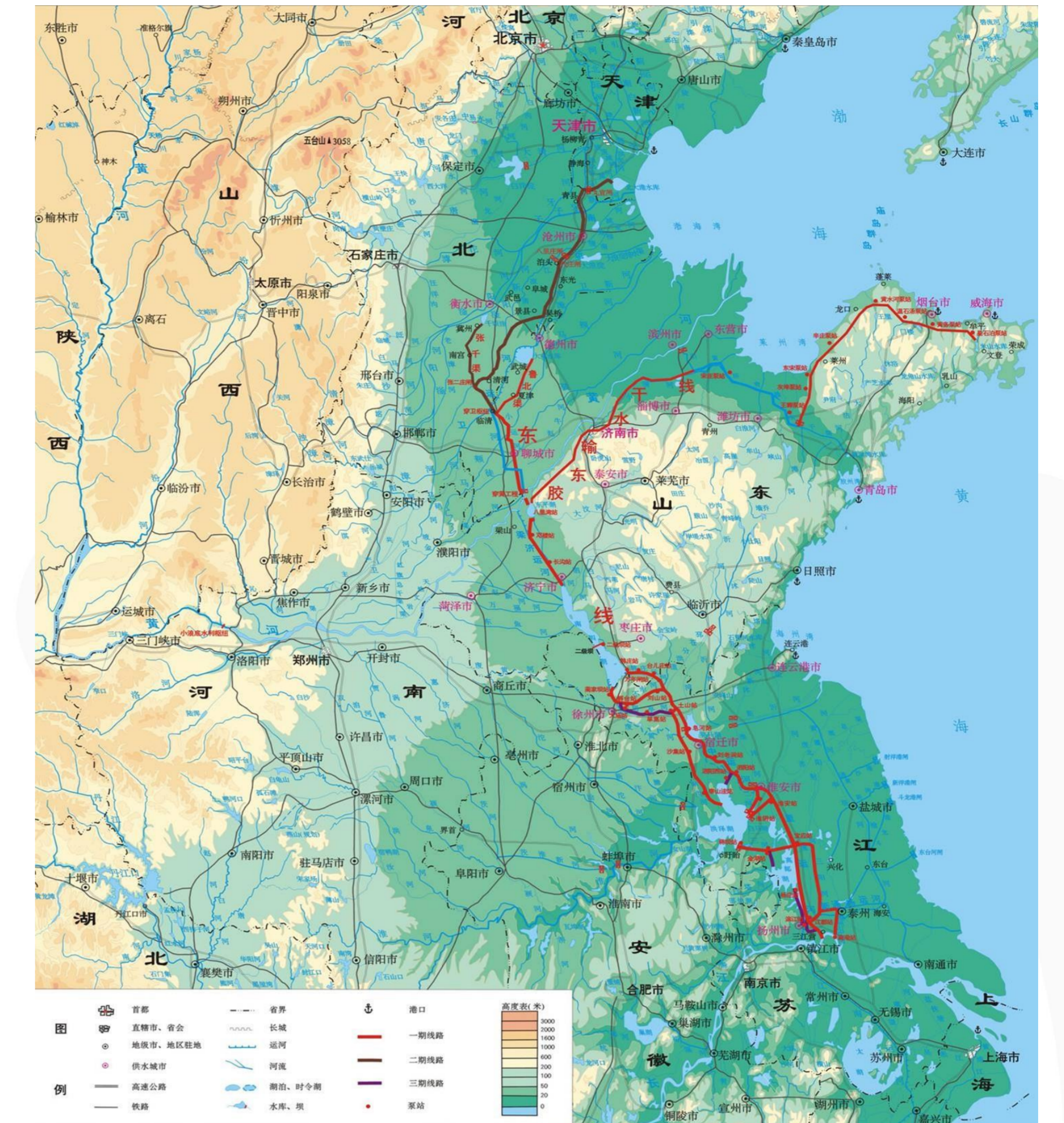
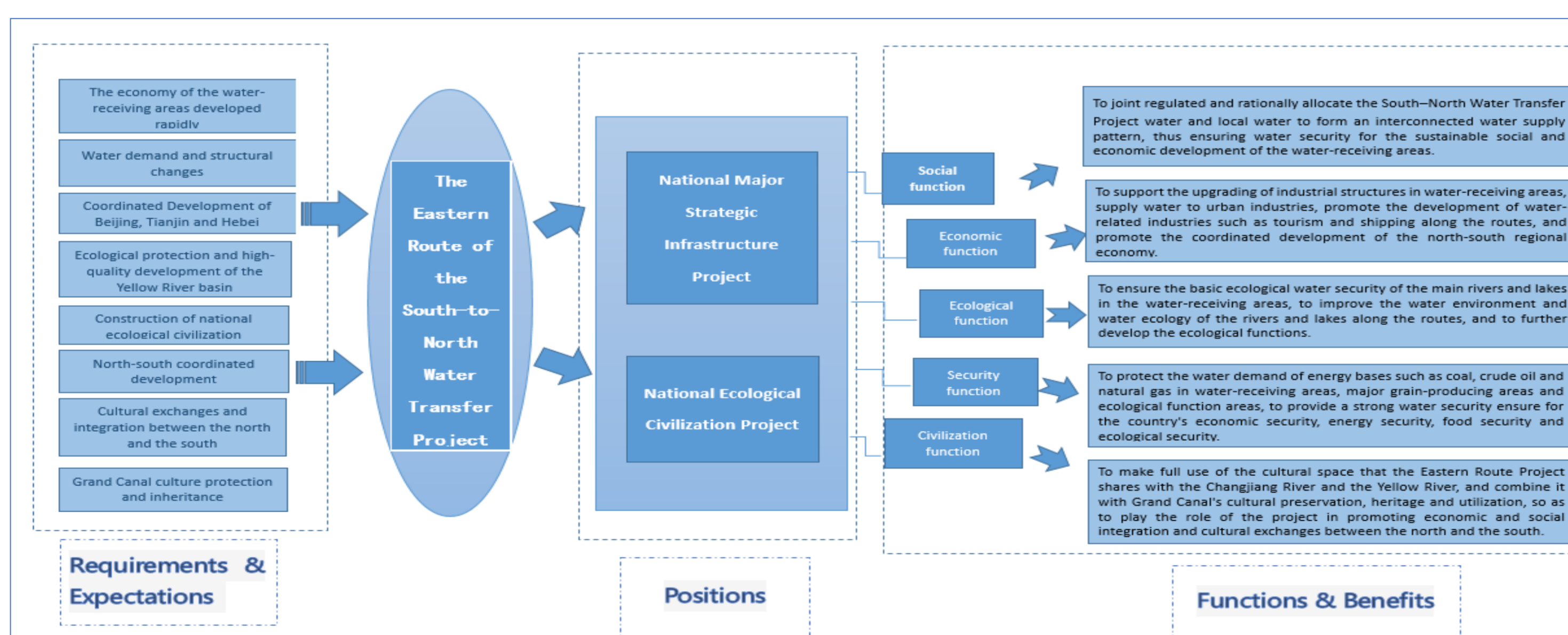


Figure 1 The eastern route map of the South-to-North Water Transfer Project

Results

According to the master plan of the South-to-North Water Transfer Project and the Feasibility Study Report of the first phase of the Eastern route project, the expected benefit objectives of the first phase of the Eastern route project mainly include social, economic, ecological and environmental aspects. The completion and operation of the first phase of the Eastern route project laid a solid foundation for the construction of the national water network pattern of " South-North distribution, mutual aid between East and West", it has brought into play comprehensive functions and benefits in the aspects of ensuring urban water supply security, drought resistance, flood and waterlogging control, improving shipping, agricultural irrigation, restoring ecological environment, etc. It effectively supports the implementation of national strategies and the sustainable development of regional economy and society, and realizes the unity of social benefit, economic benefit, ecological benefit and security benefit. The comparison of expected benefits target and actual benefits is shown in Table 1. Through comparative analysis, it can be seen that the first phase of the Eastern Route Project has brought into play significant benefits, generally reaching or even exceeding the expected benefits of the planning feasibility stage, it provides a solid support of water resources for the economic and social development and the improvement of ecological environment in the water-receiving areas.

At the same time, the rapid economic development and the changes in water demand and structure of the water-receiving areas, as well as the implementation of national strategies for coordinated development of the Beijing, Tianjin and Hebei, ecological protection and high-quality development of the Yellow River basin, have raised new demands for the project. the construction of national ecological civilization, the coordinated development of the north and the south, the integration of cultural exchanges and the protection of Grand Canal, have raised new expectations for the project . So it is needed to further deepen the understanding of the functional positioning of the eastern route project. In the long run, the project will not only solve the serious shortage of water resources in the north of China, realize the rational allocation of water resources, ensure the coordinated development of economy, population, resources and environment. In the future, it will be also a national ecological civilization project to promote the protection and restoration of the ecological environment in the north of our country and the integration of the north and south cultures. It can play social, economic, ecological, security, civilization and other functions. See Figure 2 for details.



Conclusions

1. Since the first phase of the Eastern Route Project has been in operation, it has brought into play remarkable social, economic, ecological and security benefits, and on the whole, it has achieved or even exceeded the expected benefit objectives of the planning feasibility stage, it provides a solid support of water resources for the economic and social development and the improvement of ecological environment in the water-receiving areas.
2. In the new stage, the Eastern route project should be based on giving full play to the important strategic infrastructure and strongly supporting the sustainable development of economy and society in the water-receiving areas, we should give further play to the role of promoting the construction of ecological civilization and the integration of north and south cultures, increase the positioning of the project as an ecological civilization project.

Types of benefits	The expected benefits target in the Planning feasibility stage	The actual performance of the first phase of the Eastern Route Project
Social benefits	It can supply water resources to the water-receiving areas, promote the adjustment of industrial structure, and provide water resources guarantee for the urbanization and sustainable development of the water-receiving areas and so on	The completion and operation of the first phase of the project has opened up a channel for the diversion of water from the main stream of Changjiang River to the north. As the end of June 2023, more than 5,000 million m ³ water was transferred to Shandong province by the first phase of the Eastern route project. 18 large and medium-sized cities in Jiangsu and Shandong provinces directly benefited, with 67 million people benefiting. The project has provided strong water resources support for urban development and industrial restructuring in the water-receiving areas. The project also took on the task of providing emergency water supplies, such as responding effectively to the worst drought in 60 years that hit the Huaihe River Basin in Jiangsu province, the uninterrupted water supply to the Jiaodong region for more than 800 days when Shandong suffered severe drought in 2017 and 2018.
Economic benefits	Direct economic growth, supply water to industry and residents, improve shipping conditions, and improve local standards for flood and waterlogging control, to alleviate water shortage in agriculture and so on	In addition to the direct economic growth driven by the investment in the first phase of the project, significant benefits have been achieved in supporting regional GDP, shipping, flood and waterlogging control, and increasing agricultural output. The project has brought significant economic benefits to the water-receiving areas and the surrounding areas, based on the Water consumption per 10,000 yuan of GDP in 2022 (49.6 m ³), the project has provided high-quality water resources support for the 1.2 trillion yuan of GDP of Shandong water-receiving area. Shipping has been upgraded, with 17.96 km of newly opened waterway in Jiangsu and 92.45 km of improved waterway. The Hanchuan Canal section of the Beijing-Hangzhou Canal in Shandong province has been upgraded from a third-class waterway to a second-class waterway. An additional 62km of navigable distance has been added, opening up the water channel between Nansi Lake and Dongping Lake. shipping benefits has improved significantly. The standard of flood control and drainage has been raised, and the project has cooperated with local flood control and drainage many times, and the cumulative flood discharge and flood diversion has exceeded 900 million m ³ , which has effectively reduced the flood control pressure in the cities along the project line and ensured the safety of people's lives and property. The level of agricultural irrigation has increased. 3.93 million mu dry fields are changed into paddy fields in Jiangsu province and 2 million mu of irrigation area are increased in Shandong province. The project has improved the timing and benefits of agricultural irrigation in the water-receiving areas.
Ecological benefits	Effectively curb the decline of groundwater level, ease the trend of deterioration of the ecological environment, gradually repair the natural ecological environment of the water-receiving areas and so on	The ecological and environmental benefits of the first phase project are outstanding, the amount of main pollutants entering the river is reduced, and the overall water quality of the whole line can meet the surface water class III water quality standard. The project has provided Nansi Lake, Dongping Lake and Xiaoxing River, improving the ecological environment of lakes and rivers, and transforming Nansi Lake into a lake with excellent water quality, using the Changjiang River water pumped from the first phase of the Eastern Route Project as the main alternative water source, the groundwater over-extraction treatment have been carried out for many years. The groundwater level in the water receiving area is on the rise. The completion and operation of the first phase of the project has laid a solid foundation for the construction of the national water network pattern of "South-North distribution, mutual aid between East and West", effectively alleviating the water resources shortage in the northern region and ensuring water supply security. It has supported the implementation of major national strategies; at the same time, it has ensured the use of water for agricultural irrigation and energy bases, played an emergency role in combating drought, and ensured food and energy security; in addition, the first phase of the eastern route Project has both flood control and drainage functions, reducing flood disasters and protecting the lives and property of the people.
Safety benefits	Not explicitly stated	

Figure 2 The framework for functional positioning analysis of the eastern route of the South-to-North Water Transfer Project in the new stage

Table 1 Comparison table of expected benefits target and actual benefits