RESEARCH ARTICLE

A preliminary study on the role of Pinglu canal in the new land-sea passage in the west

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Abstract: Pinglu Canal is a newly-opened strategic channel for river-sea combined transport, and it is an important measure to build a China-ASEAN international channel. By connecting Xijiang "Golden Waterway" with Beibu Gulf Port, the problem of insufficient capacity of Changzhou Hub can be solved to some extent. Seize the great opportunity of Pinglu Canal construction, develop new quality productivity according to local conditions, promote the development of new industries, new models and new kinetic energy, and help the local modern water network construction and high-quality development of water economy.

Keywords: Water economye, Pinglu Canal, Water network construction

Citation: Yang Guang, Liao Lili, Chang Ao, 2024. A preliminary study on the role of Pinglu canal in the new land-sea passage in the west. Journal of Sustainable Urbanization, Planning and Progress, 8(1): 28-34. http://doi.org/10.26789/JSUPP.2024.01.006

1 Academic history and research trends of related research at home and abroad

1.1 Present situation of foreign research

Since the voyage of Magellan, the western shipping industry has maintained good continuity for hundreds of years. The main western canals include Suez Canal, Panama Canal, Kiel Canal and Corinth Canal. Internationally, shipping is defined as the transportation and management activities of transporting goods to their destinations with rivers and seas as the medium and ships as the tools to provide transportation services. Fisher, Marshall L (1989) discussed the influence of the development of ship technology on the competitiveness of shipping industry. Martin Stopford(2009) counts the participation of world transportation in global economy and trade, and draws the conclusion that shipping is the core competitiveness of world trade. Jose(2015) started from a national perspective, and compared the differences in shipping capacity, the implementation of shipping policies and regulations, and the data of shipping infrastructure construction in the Association of Southeast Asian Nations, and studied the influencing factors of ASEAN shipping industry in promoting ASEAN economic integration. Kim B K(2016) studies the fundamental value and competitive extensibility of the shipping industry in trade from four aspects: rapid lead, block expansion, defense mechanism and strategic adjustment. [1] Wang(2021) pointed out that the efficiency of shipping management is one of the key indicators affecting the development of shipping enterprises. At present, the research in related fields mainly starts from the technology

itself, using theoretical research and model building analysis, and there is still room for supplementation in the empirical field.

1.2 Present situation of domestic research

Different from international shipping regulations, China defines shipping as the activity of transporting passengers and goods by floating tools such as ships by using rivers, lakes, oceans, reservoirs and channels.Ya-bo sun(2014) Through the evaluation index system of maritime power in eight aspects, such as the macro-development environment of maritime industry, the development of maritime industry and its industrial chain, ports, maritime fleet, maritime enterprises, talents and technology, laws and regulations, and safety and security, this paper provides decision-making suggestions for constructing the evaluation index system of maritime power. [2] Li Yi (2018) pointed out that under the background of economic globalization and international trade liberalization, shipping has the particularity of transporting bulk goods and strong economy of long-distance transportation, which is an important reason for the rapid development of world economy and trade. Sun Guofeng (2020) believes that under the new development pattern, ocean shipping is an important help to support and promote the international and domestic double cycle. Xia Cunxia (2017) proposed countermeasures to improve China's shipping capacity by analyzing shipping soft power indicators, such as shipping talent team and the improvement of laws and regulations related to shipping. Tan Yutian (2021), through the analysis of the navigation environment for the development of ship type in Pinglu Canal, clarified the importance of shipping channel for ship control, and improved the ideas and methods of ship type demonstration to simulate cargo transportation. Zhang Xiaoyan (2024) took the hinterland port of Pinglu Canal as a medium to quantitatively analyze and predict the throughput of the direct hinterland port of the canal channel, so as to provide a reference index for the freight demand after the completion of the Pinglu Canal. [3] Based on this, this topic combined with the characteristics of the construction of a maritime power, through the sorting of domestic and foreign research literature, combined with the construction and operation management practice of Xijiang Golden waterway, analyzes the core issues and key technical issues that need attention in the construction of Pinglu Canal, studies the role of Pinglu Canal in the new land-sea channel in the west, and can also provide reference for the future planning and construction of similar canal projects in China.[4]

2 Conditions and current situation of Pinglu Canal construction

2.1 The Pinglu Canal plays an important role in the new land-sea passage in the west

1. The flat-land canal effectively improves the overall transportation capacity of the channel. As the backbone project of the new land-sea passage in western China, through the flat-land canal, goods can be more convenient to realize river-sea combined transportation, reducing transit links, reducing logistics costs, and improving transportation efficiency. At the same time, the opening of the canal also alleviates the traffic pressure in the surrounding areas and promotes the optimization and improvement of the regional transportation network.

2. The Pinglu Canal further strengthened the strategic position of the new land-sea passage in the west. As an important land-sea linkage channel and an open and explosive-oriented economic development axis in western China, the new land-sea corridor in western China plays a key role in supporting the construction of a new development pattern with the major domestic cycle as the main body and the double domestic and international cycles promoting each other. The addition of the flat-land Canal makes the passage more unimpeded and provides a more convenient channel for the western region to participate in international economic cooperation.

3. The flat-land Canal has better driven the economic development of the areas along the route. The opening of the canal has improved the transportation conditions in the areas along the route, promoted the development and

utilization of local resources, and promoted the optimization and upgrading of industrial structure. At the same time, the construction of the canal has also created a large number of local employment opportunities, raised the income level of residents, and improved people's well-being. Thirdly, the flat-land canal is conducive to boosting the coordinated development of regions.

2.2 The main advantage of Guangxi to promote the construction of Pinglu Canal

1. Unique location advantages. Along the river and the border, Guangxi is backed by the southwest, adjacent to the Greater Bay Area and facing Southeast Asia, with outstanding geographical advantages.

2. Outstanding natural endowments. Guangxi is a mountainous and hilly basin landform, with 3.4% of the water surface. The rivers in Guangxi belong to four basins, among which the Xijiang River, the main stream of the Pearl River, runs through the whole region and is the "golden waterway" connecting Yunnan, Guangxi and Guizhou to Guangdong, Hong Kong and Macao. The average rainfall is 1,546 mm, 2.4 times the national average.

3. Excellent ecological environment. The ecological quality index ranks second in the country, and the biodiversity richness ranks third in the country, with extremely rich biodiversity. There are several Chinese biodiversity conservation priority areas and national key ecological functional areas, which have important ecological functions.

2.3 Basic conditions for promoting the construction of Pinglu Canal in Guangxi

1. Water conservancy infrastructure was accelerated. The implementation of a large number of major water network projects, such as the Pinglu Canal and the Guangxi Water Resources Allocation Project around the Beibu Gulf, has been accelerated, and the scale and growth rate of investment in water transport infrastructure have both ranked among the top in China.

2. The flood control and disaster reduction system has been improved. A system of flood control, moisture prevention, drainage and disaster reduction has been initially put in place, and 11 flood control and control hub projects and 5,495 kilometers of dikes have been built.

3. Water security has been improved. The water resources allocation system has been improved, and the level of rural drinking water safety has been significantly improved, providing strong support for ensuring food security and promoting economic and social development.

4. The quality of water ecological environment continued to improve. In 2022, the area and intensity of soil and water loss in Guangxi will continue to decline, and the soil and water conservation rate will reach 84.01%, an increase of 5.3 percentage points compared with 2013. Compared with 2016, the area of rocky desertification decreased by 480,000 hectares, a net decrease of 31.5 percent, ranking first in China in the reduction of severe and extremely severe rocky desertification. The quality and improvement of vegetation ecology ranked first in China.

5. The level of water conservancy information has been effectively improved. A monitoring and perception system covering major rivers and key water conservancy facilities in the region has been basically established, and the automation of monitoring and collection of water-related elements has been greatly improved. The construction of water conservancy network security protection system has been preliminarily completed.

6. The scale of water-related industries continues to grow. The water-related industries in Guangxi Province show a good trend of all-round development, and have made remarkable achievements in shipping, smart water conservancy and water conservancy tourism.

2.4 There is a problem

Although the development of water conservancy in Guangxi has made remarkable achievements, there are still some problems, such as the overall development level of

the core area of Pinglu Canal Economic Belt needs to be improved, the cooperation and supporting facilities are not strong enough, and the operation of Pinglu Canal may face insufficient channel depth and low transportation efficiency.

3 The general idea of giving full play to the role of Pinglu Canal as a new land-sea channel in western China

3.1 Adhering to the "four adhere"

Guided by the national strategy of fully integrating into the new land-sea corridor in western China, we should learn from the useful experiences at home and abroad to promote the construction of modern water network and the development of water economy in Guangxi. First, adhere to the overall situation, overall planning, around the overall idea of "a game of chess" in the region, overall planning to promote water resources, water ecology, water environment, water disaster management. Second, we will give priority to water conservation and balance the space. We will make decisions based on water, take measures based on water, and take measures based on water conditions to strengthen rigid constraints on water resources. Third, we will adhere to green ecology and harmony between people and water, firmly establish the concept of ecological civilization, and systematically manage mountains, rivers, forests, fields, lakes, grass, seas and wetlands. Fourth, adhere to the system concept, risk prevention and control, strengthen forward-looking thinking, overall planning, strategic layout, overall promotion, based on the river basin as a whole, systematically solve the problems of water resources, water ecology, water environment, water disasters.

3.2 Implement the "four major projects"

First, the implementation of the aquatic industry system expansion project. Seize the major strategic opportunity of Pinglu Canal Economic belt construction, accelerate the development of shipping oriented port industrial zone, and build a cross-regional industrial system with green chemical industry, new energy materials, equipment manufacturing as the core. The modern fishery system with Guangxi characteristics is constructed by the construction, extension and supplement of industrial chain. Second, we will implement projects to improve flood control capacity. We will coordinate the implementation of flood control projects, build a flood control safety network of higher standards, focus on improving the flood control system of major rivers, improve our ability to cope with the risk of water disasters caused by extreme weather, strengthen weak links in flood control, and eliminate hidden dangers in flood control. Third, we will implement projects to optimize the allocation of water resources. We will take into account factors such as population distribution, industrial distribution and climate change to promote sustainable use of water resources. We will strengthen water conservation and efficiency in key areas, enhance water resources regulation and storage capacity, optimize the spatial distribution of reservoirs, optimize the allocation of regional water resources, speed up the construction of emergency backup water sources, and build an efficient water supply guarantee network that is mutually beneficial and coordinated. Fourth, we will implement projects to ensure the health of rivers and lakes. We will step up efforts to protect drinking water sources, promote ecological protection and restoration of important rivers and lakes, expand the supply of high-quality water ecological products, strengthen treatment of heavily polluted river basins, promote comprehensive prevention and control of soil erosion, and build happy rivers and lakes that benefit the people.

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4 Countermeasures and suggestions to play the role of Pinglu Canal as a new land-sea channel in western China

1. We will jointly build a new land-sea corridor in the western region at a high level. Relying on the new land-sea corridor in the western region, we will focus on the integrated development of transportation, logistics and economy, build a flat-land canal economic belt at a high level, and use river-sea combined transport to enable industrial advantages and promote industrial upgrading. With a view to creating a convenient place for the operation of domestic and international double-circulation markets, we will build flat-land canals with high standards, plan to build a number of railways and highways directly to ports and logistics parks, and build a backbone project for new land-sea passages in western China. We will coordinate the construction of multiple channels for major rivers with water transport functions.

2. We will promote the integrated development of water networks and water transport networks. The Pinglu Canal will connect the main stream of the Xijiang River with the Beibu Gulf. Upon completion, it will open up a second passage to the sea through the Xijiang River in Guangxi and southwest China, and directly connect the waterway network of inland rivers in Guangxi and some parts of Yunnan and Guizhou with ocean transportation. With the combination of road, railway, water and other modes of transportation, goods from Guizhou, Yunnan and other places will be shipped to the Beibu Gulf port in a faster way and exported to ASEAN countries. At the same time, the products of ASEAN countries can also go deep into the western hinterland through the Beibu Gulf port by means of sea-rail combined transport and rail-rail combined transport. With the coordinated construction of Pinglu Canal and Guangxi water resource allocation project around the Beibu Gulf as the focus, the cross-industry integrated development of water network and water transportation network will be promoted.

3. We will vigorously develop water-related industries with Guangxi characteristics. We will develop the ship maintenance and Marine equipment manufacturing industry, build Xijiang Ship Maintenance Industrial Park, develop green and new energy ships in inland rivers, and encourage the construction and operation of river-sea ships. Develop shipping service industry, and promote Guangxi to become a regional shipping factor allocation center and trading center. Strengthen the modern logistics industry, extend the development of water transport services connecting multiple water systems, strengthen the function of iron and water combined transport, and build a comprehensive radiation inland iron and water combined transport network. We will vigorously develop the cultural and tourism industry with river and sea characteristics, upgrade the Xijiang tourism

belt, and develop coastal tourism, cruise tourism, and water sports.

4. The overall layout of Guangxi water network was constructed systematically. Based on the natural water system structure of rivers and lakes, with water diversion and diversion projects as channels, regional river and lake connectivity and water supply pipes and canals as conduits, and controlled regulation and storage projects as nodes, the intelligent construction of water network is strengthened, and the main skeleton of Guangxi water network of "two horizontal and eight vertical, six river connectivity, diversion and supplement, and combination of regulation and storage" is built, integrating flood control and disaster reduction, water resource allocation, water ecological protection and restoration. And with the national backbone network, city and county network interconnection, gradually formed Guangxi water network "a network". We will improve the layout of the flood control and drainage system in the river basin, and build a flood control and drainage pattern of "moire-proof seawall in one area, storage and drainage security in ten rivers, standard improvement in 100 cities, and flood control in thousands of rivers".

5. We will improve water supply security and water allocation capacity. Relying on the layout of Guangxi's water network with "two horizontal, eight vertical and six rivers connected", it is planned to form a systematic, safe and efficient water supply safety guarantee system of "south diversion, central (east) optimization, west connection and north supplement". We will build a high-guarantee urban water supply system, and basically form a pattern of high-guarantee and safe water supply in one city and one large reservoir. We will promote the construction of a number of dual or multiple water sources in counties where conditions permit, and basically form a stable and reliable water supply pattern of "one county, one reservoir". Ensuring water supply to key industrial parks.

6. We will improve the pattern of water ecological protection and management. Focusing on improving the quality and stability of the ecosystem, we will coordinate the management of the wetland system of mountains, rivers, forests, fields, lakes, grass and sea, and promote the coordinated management of ecotourism and landscape maintenance in northeast Guangxi and the water environment of the Beibu Gulf. For centralized drinking water sources in urban areas, the implementation of "one source, one policy" water sources to ensure safety standards. Focusing on major rivers and rivers and lakes in cities and towns whose water quality is not up to standard, we will comprehensively improve the ecological environment of rivers and lakes in a coordinated manner. We will continue to build sheltering forests along the Pearl River and strengthen the prevention and protection of soil erosion. We will implement dual control of groundwater consumption and water level, and promote comprehensive treatment of groundwater over-exploitation areas such as Litang Town, Binyang County, Nanning City, Beihai City and Hepu County.

7. We will improve the digital and intelligent level of water networks. We will accelerate the formation of an overall architecture of Guangxi smart water network based on physical water network, supported by information infrastructure, driven by digital twin platform, targeted by "four pre-operations" business applications, and guaranteed by information security system and standard and specification system. We will focus on building a three-dimensional perception network of sky and ground with comprehensive coverage and accurate monitoring, and build a multi-level interconnection and high-speed flow water conservancy information network. Build a stable, safe and efficient water network dispatch and command platform.

8. We will introduce policies to support the development of water-related industries. We will accelerate the improvement of policies and measures to support water-related industries with land, capital and other factors to ensure that all policies can be implemented, operational and effective. We will improve fiscal support policies, and support the development of innovation platforms for key industries with distinctive features by replacing subsidies

with awards and building them first before subsidies are made. We will strengthen financial support policies and guide financial institutions to strengthen financial support for key enterprises involved in water.

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