The Utilization and Protection Research of the Island Resources in China: A Case Study of Zhejiang Province

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Abstract. China has a mass of island resources. For the exploitation, utilization and protection of the island resources, it has a very important position and value in Chinese marine economic development strategy. Through the research and investigation, based on the existing problems in the island resources exploitation and protection, this paper analyzed the development and utilization principles, and development purposes of island resources in China, and put forward the use patterns and the development countermeasures on the basis of the classification type.

Introduction

Currently, the economic development of human society is faced with the historical transition, that the transition from land to the ocean economy. CPC Central Committee on the Twelfth Five-Year Plan proposed for the first time that "the development of ocean economy" [1]. The eighteenth National Congress of the Communist Party of China clearly put forward to improve ocean resources development, and develop the marine economy, protect the marine environment, and resolutely safeguard national maritime rights and interests, and construct the marine power [2]. The plans also stated that China must establish and improve ocean resource assessment and inspection system, strengthen the protection of uninhabited islands, rationally develop the shoreline resources and island resources, improve the island infrastructure, and construct some big or medium sized islands with better conditions into the port logistics island, clean energy island or international tourist island [3].

Development Situation of Island Resources in Zhejiang Province

Zhejiang Province is located in Chinese eastern coastal, located in the south wing of the Yangtze River Delta, the largest number of islands and the most abundant island resource in China. Through the investigation informed that currently the coastal waters of Zhejiang Province, the number of island land area larger than 500m\textsuperscript{2} is 3,061 (including 2,875 uninhabited islands), accounting for 39.4 percent of the total in China, and accounting for 68.5 percent of the island number in East China Sea [4]. Zhejiang offshore fishing grounds have 222,700 km\textsuperscript{2}, and the estimated potential fishery resource to be about 2,050,000 T, ranking first in China; Zhejiang beach resources area is nearly 266,700 ha; Zhejiang island tourist resources is nearly accounting for 13.7 percent of those in China; Zhejiang marine energy to be developed into tidal energy capacity is nearly accounting for about 40.8 percent of those in China. The rich island resources in Zhejiang province, has a good geographical advantages, a good industrial base, which makes the island resources in Zhejiang Province have a big role in Chinese coastal development strategy.

2011, Zhejiang has made the 100 important islands (92 inhabited islands, and 8 uninhabited islands) into the "Zhejiang Important Island Exploitation and Protection Plan" [5]. Although the figure isn’t big, they accounts for a larger proportion of the total of Zhejiang island resources. These
100 islands with a total area of 1,819km², accounting for 96 percent of Zhejiang's total area of the island; The island beach area is 313km², accounting for 78 percent of Zhejiang's total area beaches; The islands coastlines is total length of 2,470km, accounting for 53% of Zhejiang’s island coastline . In addition, these important islands have the rich ports, fisheries, tourism and other marine mineral resources, especially the port resources. They are the ideal location area for the construction of large deep-water port group. These important islands is nearby the Zhoushan fishing ground distribution, so that they are Chinese important ocean fishing production base and are the excellent, exploitation prospects with a national or provincial-level scenic spots, marine tourism resources, such as Putuo Mountain, Shengsi Islands, Peach Blossom Island.

**Exploitation and Protection Problems in Zhejiang Islands**

For the exploitation and protection field in Zhejiang province, there are some problems are found as Fig.1.

![Exploitation and protection problems in Zhejiang islands](image)

**Figure 1. The exploitation and protection problems in Zhejiang islands.**

**Lack of Planning and Random Exploitation Activities**

Until 2011, Zhejiang province issued "Zhejiang important island exploitation and protection plan". Prior to this, the plan related to the utilization and protection of the island didn’t exist, especially for the uninhabited islands. But there is still a lack of support for policies and rules, and the management of the implementation is still not satisfactory. Moreover, there is the island vague question of the ownership and management for the island resources.

**Serious Ecological Damage Islands**

By the survey, the varying degrees of blasted islands, blasted reefs, reclaiming land from sea, linking islands, enclosing the sea and embanking, quarrying and digging sand and other changes activities in the island topography are found in Zhejiang coasts, serious and even causing the disappearance of some islands and reefs. In addition, other destructive behavior of rare events are found, such as the dumping of garbage and hazardous waste on the island, cutting mangroves, dredging coral reefs, overfishing, indiscriminately gathering the island biological resources, etc. [6]

**Inadequate Efforts to Protect The Island**

Zhejiang is facing the East China Sea, so that the islands have a high number of important rights, national defense, resource and ecological value. These special-purpose islands need the strict protection. Because of the lack of effective planning and strong protection, some islands have already suffered damage, and some islands are deserted or even long-termed carelessly or indiscriminately used, and even the worse individual islands and reefs are gradually collapsed and disappeared.
Lack of Provincial and Local Laws and Regulations

"Island Protection Law of People's Republic of China" has been implemented since 2010, but its content is to protect the island and its surrounding ocean ecological systems. Many of the clauses are in favor of principle requirements and operability is not strong, which result in the difficulty to be applied at the local governments. The only one local legislation relating to the island in Zhejiang province is the implementation of the "Ningbo City uninhabited islands protection regulations" that was approved in 2004, but the ordinance is limited to the use scope of Ningbo City, and the rank of local legislation is very lower.

Lack of an Effective Evaluation System and Management Mechanisms

Due to the lack of an effective evaluation system and the approval, supervision and enforcement mechanisms, and the majority of the utilization managers are short of the ecological function and the national defense capabilities and enough protection awareness, results in the serious disorder, excessive, gratuitous situation of island exploitation and utilization, and leads to the lower development level, low economic efficiency.

The Extensive Island Development and Utilization Methods

Currently, the majority of the island's development and utilization of Zhejiang is limited to tourism development, but the island tourism positioning is very single and identical, most still in level of the seaside tour or fishing tour. The characteristic of the island's tourism potential wasn’t fully tapped. In addition, it was more serious for the repeated construction phenomenon of close range scenic regions, so as to form a number of unnecessary competitions. Most of the island's tourism projects are also lack of specialty packaging and brand planning.

Development Principles and Purposes for Zhejiang Islands

Exploration and Utilization of the Islands

According to the characteristics of Zhejiang island resources, the comprehensive survey, utilization, protection and other specific details and development planning of the island resource should be introduced as soon as possible. Implement the investigation and the assessment of the island resources and ecological condition. Provide the various kinds of safeguards measures, such as the organization and leadership, the rule of law, capacity building, public participation, proposed project management and financial security, etc. Implement the resource exploitation and ecological island protection according to the principles of scientific planning, conservation priority, balanced, category management, rational development and sustainable use. There are three main types of island resources as Fig. 2.

![Figure 2. Three main types and the development purposes of island resources.](image)
Development Purposes of the Islands

Define and strictly protect the special-purpose islands

Special-Purpose Island refers to the island with a special purpose or important conservation values, including baseline point where the island, national defense purposes island, marine nature reserve island, special purpose area residents of the island, and so on. Any organization or individual shall not exploit such islands, and must strictly protect and closely monitor those. At the same time, the relevant government organizations have to prevent spontaneous destruction of such islands, and strengthen routine investigation and monitoring.

Scientific, reasonable and appropriate utilization of the inhabited islands, and strengthen ecological protection

The inhabited islands should optimize the development and utilization method. Such islands can be planned the development as the professional islands with public service function, or with island tourism and entertainment function, or with the agriculture, forestry, animal husbandry and fishery function, or with the industry function, or with the warehousing function, or with the transportation function, or with the renewable energy use function, or with the urban and rural construction function, and so on.

Moderate use of uninhabited islands

Uninhabited islands should be given the priority to the protection and appropriate use. Governments should follow the dominant use of uninhabited islands, and propose the general requirements of the development, utilization and protection for each island. Part of the islands be adapted to the development and utilization planning should be developed as the tourist recreational island, the transportation island, the industrial island, the warehousing island, the agriculture, forestry, animal husbandry and fishery island, the renewable energy use island, the retention category island, etc.

Island Resources Development and Utilization Patterns in Zhejiang

Based on the conditions of Zhejiang island resources, according to the above principles of exploitation and development purposes, Island resources development and utilization patterns in Zhejiang province may include the following:

Island Development and Utilization Pattern with the Value of National Defense and Sovereignty

Exploitation pattern of such islands should continue to strengthen resource conservation and sustainable use. The abundant marine living resources and the rich oil and gas resources have provided a broad space for the development and utilization of ocean economic development. For the islands suitable for military use, due to their larger areas and superior natural conditions, they can be positively developed as the special tourism islands with the far shore. The tourism infrastructure can also be conducive to the military use in the wartime.

Island Development and Utilization Pattern with The Value of Economic Profits

For the exploitation and utilization of these islands, part can be selected to develop the fisheries, mining or ecological economy and fully to be tapped the potential of the island specialties, and the other part can be selected to develop the island-land integrated economic model, such as the ports, logistics, etc to achieve joint development profits. At the same time, needs to pay attention to protection. Adhering to the sustainable development model, not only safeguards the rational development and utilization of economic resources of the island, but also be conducive to long-term protection of these island resources.

Island Development and Utilization Pattern with the Value of Ecological Environment

The exploitation and utilization of these islands should adopt ecological economy and tourism economy pattern. For the ecological resources with possible exploitation value, they should be
developed in the ecological and tourist way. For the island resource with the restrictions use, the islands can be established as the ecological protection zone to achieve effective protection. In addition, the island with extensive mangrove forests, coral reefs and other resources, as well as the island with special conservation value of endemic local species, they can be developed into the teaching, research and science base.

**Island Development and Utilization Pattern with the Value of Social Cultures**

Island has a social and cultural values, means the islands with the archaeological and scientific value, or with cultural historical value, or with geological heritage value, and the islands with typical island landscape value for people to travel and tourism. The development of such island, should encourage the development and use of social and cultural resources in these islands, and accelerate the development of social and cultural resources of the islands, classify and protect the island areas at all levels, and adopt a sustainable island tourism-oriented development pattern.

**Countermeasures and Suggestions**

Based on the above Zhejiang island resources characteristics, exploitation principles, purposes and patterns, the premise of development and protection, surrounding the construction target of "island province", gradually promote the sustainable exploitation of island resources and utilization. To achieve the goal, especially propose the following suggestions.

Firstly, study and formulate the Zhejiang laws and regulations on island protection and utilization, verify the regulatory bodies for the island resources, strengthen the island resources and environmental investigations, improve government supervision, and prevent and reduce the island destructive development mode.

Secondly, comparative analyze the development modes in other regional or local island resources, use for reference from their successful experience, sum up from the failure experiences, scientifically research, formulate and publish the short, medium and long term planning on the distinctive island resources development and conservation for Zhejiang province.

Thirdly, step up the publicity efforts, strengthen government guidance, hold on island development bidding under the open and fair method, conduct the island protection technology researches, standardize the island development and utilization behaviors, promote the green, environmental protection, low-carbon, energy-saving ideas, strengthen the protection consciousness of island residents and developers, explore the island sustainable development pattern, and accelerate promote the island to protect the healthy development based on the technological innovation.

Fourthly, roundly promote the island resources investigation and protection, and highlight the development and protection of the key islands. For some inhabited islands and the special islands with the important economic development value, formulate the protective measures according to local conditions, scientifically select development mode, and implement an effective monitoring mechanism to accelerate the island's economic and social sustainable development in Zhejiang Province.

Fifthly, for the islands with the value of national defense or territorial waters basis points, strengthen the infrastructure construction, formulate the scientific and standardized inspections, monitoring and protection measures, and ensure national sovereignty and territorial integrity. At the same time, continue to strengthen ecology and resource conservation in the core area of nature protection zone.

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