

## On the Governance of Ecological environment in Chinese Sea Area

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**Keywords:** Chinese sea area, ecological environment, governance

**Abstract:** Since the reform and opening up, with the rapid development of China's economy, the problem of ecological environment pollution in sea areas has become increasingly serious. In the process of building a beautiful China, the terrestrial ecological environment has been greatly improved, and the next step is to improve the ecological environment in sea areas. First, improve the top-level design of ecological system, strengthen policy support and legal guarantee; second, strengthen Marine ecological technology innovation and build a green Marine industrial system; third, promote the scientific development of Marine resources and optimize the rational distribution of Marine ecology.

### 1. Basic Information on the Ecological and Environmental Problems in Chinese Sea Areas

#### 1.1. Rapid Economic Development Brings Water Pollution

Over the past 40 years since reform and opening up, China's Marine economy has gradually achieved leap-forward development. Relying on the unique Marine resources, China vigorously develops the Marine economy, injecting energy and impetus into the rapid development of human society. According to the Chinese Marine Economic Development Index report in 2019 released by the National Marine Information Center, the average annual growth rate of the Marine development level index was 3.7% from 2011 to 2018, and reached 134.0 in 2018, an increase of 4.7% over the previous year, and the development level continued to improve. From 2011 to 2018, the average annual growth rate of Marine GDP was 7.6%. New drivers of the Marine economy continued to grow. In 2018, the added value of emerging Marine industries increased by 10.4% over the previous year. From 2011 to 2018, the average annual growth rate was 3.1%, making steady progress. From 2011 to 2018, the Marine economy became more stable, and the growth rate showed a slow and steady trend. According to the Department of Marine Strategic Planning and Economy in Ministry of Natural Resources, in the Chinese Marine Economy Statistical report in 2019, China's Marine GDP in 2019 reached 8941.5 billion yuan, an increase of 6.2% over the previous year. The Marine GDP accounted for 9% of the GDP and 17.1 % of the GDP in coastal areas. With the rapid development of China's Marine economy, a large number of pollutants or wastes are directly or indirectly discharged into the ocean, and a series of ecological and environmental problems have become more and more prominent.

According to the Chinese Marine Ecological Environment report in 2019, the water quality in China's sea area is still below the standard, with the four types of inferior water quality reaching 28,340 square kilometers (see Table 1). The polluted sea areas are mainly distributed in Liaodong Bay, Bohai Bay and other coastal waters. There are a variety of toxic chemicals in the water, and the main indexes exceeding the standard are inorganic nitrogen and active phosphate.

Table 1 Chinese sea areas which failed to meet the first category seawater quality standards in 2019.

(Unit: square kilometers)

Sea area	2 <sup>nd</sup> category water quality	3 <sup>rd</sup> category water quality	4 <sup>th</sup> category water quality	4 <sup>+</sup> Category water quality	Total
Bohai sea	8770	2210	750	1010	12740
Huanghai sea	4890	5410	490	760	11550
Donghai sea	15820	8270	6280	22240	52610
Nanhai sea	4850	2550	1040	4330	12770
Total Sea area	34330	18440	8560	28340	89670

### 1.2. Destruction of the Environment has Led to a Sharp Decline in Biodiversity

Industrial wastewater discharged by human economic production activities enters the ocean through coastal waters and rivers, which aggravates the eutrophication of water and brings about a sharp decrease in biodiversity. As the demand of human Marine economic activities increases, the living space of Marine life is constantly compressed. Economic development caused unreasonable utilization of resources, destroyed the biological habitat environment, water eutrophication, red tide disasters and a series of Marine ecological environment problems, made Marine oxygen consumed by toxic chemicals, affected the normal habitat, reproduction of marine life, resulting in a sharp decline in Marine biodiversity. When algae and other plankton begin to reproduce in the Marine water rapidly, the amount of dissolved oxygen in the water drops rapidly, and the water quality of the ocean gradually deteriorates, and a variety of fish and other organisms will die greatly. Industrial sewage can accelerate the time of eutrophication of Marine water, produce red tide phenomenon and harm biodiversity. According to Chinese Marine Ecological Environment report in 2019, there were 38 red tides in China in 2019, among which most occurred in the East Sea and had the largest cumulative area, with 31 red tides and 1,974 square kilometers respectively (see Table 2).

Table 2 Red Tide in China's waters in 2019.

Sea area	Number of times	Cumulative area of red tide(km <sup>2</sup> )
Bohai sea	2	0.28
Huanghai sea	2	5
Donghai sea	31	1974
Nanhai sea	3	12
Total	38	1991

### 1.3. The Problem of Microplastic Pollution in Sea Areas is Severely Challenging

At present, with the rise of plastic utilization rate, the resulting Marine microplastic pollution has become a worldwide problem, but also has been concerned about as a hot issue in China. As a major producer and consumer of plastics, China officially launched Marine waste monitoring in 2007 and included Marine microplastics in 2016. The source and harm of Marine waste and Marine microplastics are very complex. According to the monitoring data in 2019, the average number of floating waste in the Marine surface water in China is 4,027 / km<sup>2</sup>, and plastic waste has become the most important type of Marine waste.

In 2004, the concept of "microplastic" was first proposed in journal Science, referring to plastic fragments and particles less than 5 mm in diameter. In fact, microplastics are difficult to distinguish with the naked eye, and are vividly called "PM2.5 in the sea." Compared with "white pollution", microplastics cause more serious harm to the Marine ecological environment. The ocean is a hot

spot of microplastic pollution. After entering the ocean, the microplastic waste will enter the deepest trench and the farthest coastline from human survival, covering all levels of the Marine life chain, seriously threatening the stability of the Marine ecological environment and the balance of the system. Microplastics themselves are difficult to degrade and harmful, once ingested by Marine organisms will lead to the death of organisms and even affect ecological populations. Non-standard Marine economic production, use and disposal of plastics will not only cause a waste of resources and energy, but also bring serious pollution of Marine ecology. Microplastics are finally imported into the ocean through rivers and lakes, constantly challenging the ecological environment of China's sea areas. In order to fundamentally control the Marine environmental pollution problem, the reduction, recycling and harmlessness of microplastics are imperative.

## **2. The Great Significance of Ecological Environment Governance in Chinese Sea Areas**

### **2.1. Strengthening Marine Ecological Environment Governance is an Inevitable Requirement for Building a "Beautiful China"**

The ocean is an important part of the ecosystem. The stable development of China's Marine ecological environment affects the political stability, economic prosperity and human security. The "Beautiful China" is the combined beauty of ecology, beauty of human, and beauty of society. The core of building a beautiful China is to achieve sound ecological environment development, prosperous and stable development of economy, and the people live a stable and happy life in accordance with the requirements of ecological civilization. Only by protecting the Marine ecological environment can we build a beautiful China in a steady and distant way. In recent years, China has adhered to improving the quality of Marine ecological environment as the core, made solid progress in Marine ecological environment governance, and made positive progress and good results. According to the data of Chinese Marine Ecological Environment report in 2019, the state has conducted real-time monitoring of Marine pollution problems such as pollution sources and water quality, and improved the quality of Marine water, among them, 97% of the waters meet the standard of type I seawater quality; the proportion of excellent (type I and II) is 76.6%, 5.3% higher year on year. The discharge of Marine pollution basically meets the prescribed standards. In 2019, water quality monitoring was conducted on 1,434 national Marine environmental quality monitoring sites, 190 state-controlled sections of rivers entering the sea, 448 direct discharge pollution sources with daily sewage discharge of more than 100 cubic meters, and 32 bathing beaches; and ecological status monitoring in 18 typical Marine ecosystems. It can be seen from the monitoring results that the overall situation of Chinese Marine ecological environment in 2019 is stable and good. Ecological civilization is a new stage in the development of human history and an important part of building a beautiful China. Only by strengthening Marine ecological environment governance and establishing a sound ecological system can we build a beautiful China with "good ecology, beautiful environment and strong life".

### **2.2. Strengthening Marine Ecological and Environmental Governance is an Effective Guarantee for Promoting "Sustainable Development"**

Strengthening the ecological environment management in Chinese sea areas is the natural basis for promoting the development of Chinese Marine economy. The ocean is very rich in biological resources, including more than 500,000 animals and more than 130,000 plants, accounting for about 80% of the total species on the earth. The rich natural resources of the ocean have become the reserve of economic development. Relying on the supply of Marine resources, China has gained huge economic benefits in coastal tourism, Marine oil and gas industry, Marine fishery, Marine biomedicine industry and many other fields.

According to data statistics, in 2019, the Marine GDP of northern Marine economic circle was 2,636 billion yuan, 8.1% higher than the previous year, accounting for 29.5% of the national marine GDP. The Marine GDP of east Marine economic circle was 2657 billion yuan, 8.6% higher than the previous year, accounting for 29.7% of the national marine GDP. The marine GDP of south marine

economic circle was 3648.6 billion yuan, 10.4% higher than the previous year, accounting for 40.8% of the national marine GDP.

Among them, the Marine fishery has realized the recovery growth, the Marine fishing structure has been optimized, and the full use of the superior Marine fishery resources has created favorable conditions for the industrial development. Only by strengthening the Marine ecological and environmental governance can we better ensure the stability of the Marine ecosystem structure and lay a solid foundation for achieving sustainable development.

### **3. Path Choice of Ecological Environment Management in Chinese Sea Area**

#### **3.1. Improve the Top-level Design of the Ecological Environment Governance System**

First, we need to firmly establish the concept of green development, improve the top-level design of the system, constantly deepen the institutional system of Marine ecological environment governance, strengthen the supervision of Marine pollution industries, and improve the scientific and effective resource use system, so that Marine resources can be guaranteed by institutions and maintained by laws. The industrial responsibility system for the Marine economy shall be clarified, and also the responsibility shall be clarified. A system of open and transparent information, the compulsory disclosure of resource use, and the punishment for serious pollution shall be adopted. We should always adhere to the protection of Marine ecological environment quality as the core, clear core intelligence of the government departments, strictly implement ecological environment management political responsibility of the relevant government departments, supervise the main responsibility of Marine economy industry, keep good governance of the marine ecological red line, in order to solve the serious marine ecological problems in the process of economic development, such as sea pollution, sharp decline of the biodiversity and microplastic.

Second, we must continue to use legal weapons to control Marine pollution and protect the Marine environment. China should constantly improve the laws, regulations and governance system of Marine environmental protection, strengthen the real-time monitoring of Marine water quality, Marine life and other factors in Chinese waters, improve the legal system for pollutant control standards, and build an integrated, systematic and refined legal guarantee system. We will revise and correct imperfect and unreasonable legal systems in a timely manner, and formulate personalized regulations in combination with the characteristics of different waters, and establish and improve a long-term legal mechanism for Marine governance. Marine economic enterprises should actively cooperate with the law enforcement departments in the inspection work, and report the Marine ecological environment governance situation to the government and legal departments in real time. In the process of developing the Marine economy, we should adhere to the legal principle that laws must be observed, strictly enforced, and lawbreakers must be prosecuted. The enterprises that violate the rules should be punished accordingly and ordered to make rectification. In the new era, the development of Marine economy has reached a critical period of turning point. In ecological and environmental governance, we must improve the responsibility position of the government and legal departments, resolutely performing their respective functions and powers, deeply understand the close relationship between economic development and ecological and environmental governance, and promote the sustainable development of Marine ecological environment.

#### **3.2. Strengthen Innovation in Marine Ecological Technology and Build a Green Marine Industrial System**

China is rich in Marine resources. Marine biological resources, Marine chemical resources, and Marine mineral resources all provide the guarantee of economic development and human production and life. China is also gradually realizing the transformation from "maritime power" to "great power", which also puts forward higher requirements for China's Marine development. In the new era, we should further solve the problem of insufficient development of Marine green innovation technology in China. At present, many traditional Marine industries are still mainly

resource-dependent, and the Marine products lack the core competitiveness. China should adhere to the concept of innovative development, promote the transformation and upgrading of the Marine industry, vigorously develop Marine drugs and biological products, Marine new energy and other industries, increase the investment in green technology innovation, and realize the effective transformation and utilization of scientific and technological achievements. Science and technology help Marine sustainable development, and we should grasp the frontier of science and technology well, promote the integration of Marine industry into the global innovation technology, gradually break through the technology barriers of innovation technology and eliminate backward industries with high consumption and low capacity. We should Establish a reasonable training system for scientific research talents, focus on advanced innovation science and technology park, Marine high-tech industry base, establish a training base for high-tech talents and provide favorable policies, facilities and resource conditions for talent development. Chinese Marine industry development trend steady and good, but the lack of green innovation technology ability is still one of the current difficulties, so we should strengthen the transformation ability of Marine green innovation of science and technology achievements and innovation level, within the limit of reasonable development, fully explore and excavate the rich Marine resources in our country, realize the new breakthrough in Marine green innovation.

### **3.3. Promote the Scientific Development of Marine Resources and Optimize the Rational Ecological Distribution of Sea Areas**

In the process of Marine economic development, in order to promote the scientific development of Marine resources, take sustainable development as the goal and seize the marine strategic opportunity period, it is necessary to reasonably plan the modern Marine industrial system and optimize the reasonable layout of ecological space in Chinese sea areas. The scientific development of Marine resources provides a favorable guarantee for the steady development of Marine economy. China should continuously expand the Marine economic space, increase the prevention and management of Marine pollution industry, support the renewal and iteration of related industries, rationally develop near coastal resources and island resources; cultivate Marine emerging industries, support the establishment of Marine economic development demonstration zone, and clarify the overall objectives and main tasks of Marine industry development, and adhere to the development principles: “Green development and protecting the sea at the source”, “adapting to the development and ecological management of the sea”, develop in protection, and protect in development. In the development of Marine economy, we should clarify the principle of "overall consideration, scientific development, reasonable layout and diversified investment", strengthen the development and restoration projects of coastal zone, offshore sea and deep sea area; form a modern and integrated development pattern of land-sea linkage, improve the radiation ability of economic circle to Marine development, change the traditional Marine development mode, and improve the comprehensive strength of Marine economy and industry.

### **Acknowledgement**

This article is in the Teaching research project "General Project of International Social Science Fund" No.20BKS053.

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