

# Construction and Collaborative Analysis of Marine Ecological Civilization in Jiaodong Economic Circle

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**Abstract:** The ocean has become an important field of global cooperation and development. As the vanguard of China's Marine economic development, Jiaodong has achieved remarkable results in its regional collaborative development, but there are few researches in the field of Marine ecological civilization. Based on the analysis of Marine ecological civilization construction in Qingdao, Yantai, Weifang, Weihai and Rizhao of Jiaodong economic Circle, this paper identifies the shortcomings and deficiencies of each city in the process of Marine ecological civilization construction.

**Keywords:** marine ecological civilization, coordinated development, jiaodong Economic circle

## 1. Introduction

The strategic position of the ocean in safeguarding the overall national security and promoting economic and social development is more prominent;It plays an increasingly important role in the market economy and cultural exchanges. The world's Maritime powers and neighboring countries have formulated marine strategies and plans under the new situation, and accelerated their marine layout. The concept of "Maritime Community with a Shared Future" was first put forward in 2019, and its core content is to achieve "harmonious coexistence of people and sea" [1]. Shandong is a traditional strong marine province in China, and its marine economy accounts for about 20% of the total marine outputvalue of the whole country. As an important force for Shandong to develop its blue marine economy, the five cities of Jiaodong (Qingdao, Yantai, Weifang, Weihai and Rizhao) have broad space and foundation for cooperation and development in the marine field. The transformation of the concept of "Ocean Destiny Community" in Shandong focuses on the practical results in Jiaodong.

## 2. Connotation of Marine ecological civilization

Marine ecological civilization is the concentrated embodiment of the thought of ecological civilization in the Marine field, it is the concept of the initiative in the process of Marine governance. There are many foreign studies on sustainable development, Marine ecological environmental protection, Marine ecological governance and other close to ecological civilization, but there is no relevant explanation of Marine ecological civilization. At the 18th CPC National Congress, ecological civilization was included in the overall plan of the "five-sphere integrated" socialist cause with Chinese characteristics, and the construction of ecological civilization was elevated to an unprecedented height, setting forth the goal of building a beautiful China and ushering in a new era of socialist ecological civilization. The ocean is an important area in the overall construction of national ecological civilization. The core proposition of Marine ecological civilization is to form and maintain the harmonious relationship between man and the ocean. With the continuous progress of Marine ecological civilization construction, the definition of its connotation has been the focus of scholars' research. Chen Jianhua put forward that the construction of Marine ecological civilization is the inevitable requirement of realizing the sustainable development of economy and society, and analyzed its connotation from five aspects: consciousness, behavior, morality, system and industry<sup>[2]</sup>; Shen Manhong pointed out that the construction of Marine ecological civilization mainly includes the theory of Marine ecological system, the theory of overall management of land and sea, the theory of Marine ecological red line and the theory of Marine ecological system<sup>[3]</sup>; According to Sun Jianfeng, the basic

goals of Marine ecological civilization construction are to realize rational and economical utilization of Marine resources, healthy Marine ecological environment, scientific and orderly development of Marine economy, effective construction of Marine culture, sound and efficient management of Marine institutions. Its connotation includes five aspects: Marine resources, Marine ecological environment, Marine economic development, Marine culture construction and Marine system management<sup>[4]</sup>; Fang Shinan believes that the core of Marine ecological civilization is to put people at the center, effectively safeguard the interests of the people, realize overall planning of land and sea, harmony of the sea, and promote the construction of a maritime power<sup>[5]</sup>.

### 3. Evaluation of Marine ecological civilization construction in Jiaodong Economic Circle

#### 3.1 Construction of ecological civilization in the East Ocean

A strong Marine province is a long-term development strategy followed by Shandong. In 2020, Shandong's Marine economy will account for about 20% of the regional GDP and 16.48% of the national GDP. However, the development of Marine economy is faced with serious terrigenous pollution, depletion of offshore fishery resources and irrational utilization of Marine resources for a long time. In order to promote the sustainable development of Marine economy in Shandong, the National Development and Reform Commission issued the Development Plan of Shandong Peninsula Blue Economic Zone in 2011, pointing out that the timing sequence, focus and mode of development should be reasonably arranged according to the ecological environment carrying capacity of different sea areas, and the construction of Marine ecological civilization should be strengthened. During the 12th Five-Year Plan Period (2011-2015), Shandong took the lead in establishing provincial-level Marine ecological civilization demonstration zones, establishing 5 national-level Marine ecological civilization demonstration zones and 10 provincial-level Marine ecological civilization demonstration zones, forming the agglomeration effect of Marine ecological civilization construction on the Shandong Peninsula in the country. In 2016, the seven departments of Shandong Province jointly issued Opinions on Accelerating the Construction of Marine Ecological Civilization in Shandong Province<sup>[6]</sup>, formulated and implemented the Plan of Marine Ecological Civilization Construction in Shandong Province<sup>[7]</sup>, and incorporated the core content of Marine ecological civilization construction into the national economic and social development plan of Shandong Province during the 13th Five-Year Plan. Marine ecological civilization construction has become a strategic requirement at the provincial level. In the period of the 14th Five-Year Plan, facing the complex changes in the domestic and international environment, Shandong Province has given priority to ecology and promoted the high-quality development of Marine economy through the construction of Marine ecological civilization, in order to give full play to the prominent role of Marine economy in building a global Marine community with a shared future. Qingdao, Yantai, Weifang, Weihai and Rizhao also regard Marine ecological civilization construction as an important content in the "14th Five-Year Plan" of Marine economic development.

#### 3.2 Effect evaluation of Marine ecological civilization construction in Jiaodong Five cities

Based on "Marine Ecological Civilization Demonstration Zone Construction Index System" and referring to "Marine Ecological Civilization Demonstration Zone Construction Index Interpretation, calculation and scoring Method", this paper carries out quantitative score evaluation on Marine ecological civilization construction in Qingdao, Yantai, Weifang, Weihai and Rizhao. The evaluation results showed that the scores of Marine ecological civilization construction effect from high to low were Yantai city, Qingdao City, Weihai City, Weifang City, Rizhao City.

Table 1: Score of Marine ecological civilization construction in five cities of Jiaodong

Evaluation index system for Marine ecological civilization construction			Score of Marine ecological civilization construction in five cities of Jiaodong				
Target layer	Index layer	Evaluation criterion	Qingdao	Yantai	Weifang	Weihai	Rizhao
Regional economic development	The added value of the Marine industry accounted for the regional GDP	≥10%	4	4	4	4	4
	Per capita disposable income of urban residents	≥2.70 Ten thousand yuan / person	4	4	4	4	4
	Development of strategic emerging Marine industries	The proportion of the Marine industry ≥15%	3	3	2	2	2
	The added value of the Marine tertiary industry accounts for the added value of the Marine industry	≥48%	4	2.17	3.5	3.58	4
Utilization of Marine resources	Value value of Marine industry per unit coastline	≥1.78 100 million /km	5	5	5	2.95	5
	Energy consumption per unit of GDP	≤0.87 t Standard coal / ten thousand yuan	4	4	2.9	4	0
	Offshore fishery fishing intensity	The number of horsepower and the number of coastal fishing vessels increased by zero	3	3	3	3	3
	The area of open aquaculture accounts for the sea area of aquaculture	≥80%	1.43	2.18	1.19	2.86	3
Ecological protection	Ratio of Marine protected areas to the sea area under management	≥11%	2.4	4	2.6	1.11	0.91
	Natural shoreline retention rate	≥36%	5	5	3.47	5	5
	Investment intensity of regional shoreline or coastal waters restoration in the past three years	≥1000 ten thousand	4	4	4	4	4
	The proportion of the first and second class water quality of the coastal waters in the sea area under its jurisdiction	≥70%	5	5	4.61	5	5
	Urban sewage treatment rate	≥90%	4	4	4	4	4
	Direct discharge outlet of industrial sewage reaches the standard discharge rate	≥90%	4	4	4	4	4
Cultivation of Marine culture	The GDP COD emission reduction range of ten thousand yuan in the past three years	≥8%	0	0	0	0	0
	Development of Marine culture publicity	Regularly carry out Marine environmental protection, disaster prevention and mitigation, Marine knowledge popularization and publicity activities	4	4	4	4	4
	The proportion of cultural undertakings expenses in the total government expenditure	≥Provincial mean	3	2.32	3	3	2.86
	Marine Scientific Research and Education institutions	Number of higher education institution	3	3	3	2.17	1.58
Security system construction	The proportion of the investment in Marine science and technology in the added value of the regional Marine industry	≥2.08%	4	3.54	4	4	4
	Building key systems for promoting Marine ecological progress	Implementation of the rules and regulations on Marine administration by the Marine administrative departments	4	4	4	4	4
	Building a comprehensive Marine management system	The establishment of the Marine management agency	4	4	4	4	4
	Construction of a Marine public service system	Construction of a public or public service guarantee mechanism in the Marine sector	2.5	3.5	2.5	4	2.5
	Organize, lead and promote the implementation of the construction of Marine ecological civilization demonstration zone	Organization, leadership and progress of Marine ecological progress	2	3	2	1	1
The public pays close attention to the construction of Marine ecological civilization in this city			10	10	10	10	10
The final score			89.33	90.71	84.77	85.67	81.85

Note: The data are from the 2020 Shandong Provincial Statistical Yearbook and the statistical Yearbook of each city, as well as the annual bulletin of the relevant departments. Some missing data are supplemented by the data of similar years.

In the field of regional development, Qingdao, Rizhao, Weihai, Weifang and Yantai scored from

high to low. Qingdao has great advantages in the development of Marine industry and the proportion of Marine strategic emerging industries, while Rizhao is slightly insufficient in the aspect of Marine strategic emerging industries, but the Marine tertiary industry accounts for a relatively high proportion. In the field of resource utilization, the scores from high to low are Yantai City, Qingdao City, Weihai City, Weifang City and Rizhao City. Yantai City has higher scores of Marine industry added value per unit of coastline and energy consumption per unit of GDP, while Rizhao City and Weifang city have higher GDP energy consumption, losing more points in this index. In the field of ecological protection, Yantai, Qingdao, Weihai, Rizhao and Weifang got the highest score from high to low. Yantai got the highest score in the area of Marine protected areas, while other cities had shortcomings. In addition, Yantai got full marks for its natural shoreline preservation rate, the investment intensity of regional shoreline or offshore area restoration in the past three years, the proportion of Class I and II water quality in offshore area, the urban sewage treatment rate, and the standard discharge rate of industrial sewage direct outlet. In the field of Marine culture, Qingdao and Weifang tied for the first place with full marks for all items, while Rizhao got the lowest score. The main difference was in the proportion of cultural institution expenses in the total financial expenditure and the two indicators of Marine scientific research and education institutions. In the field of security system, each city has its own characteristics. The main differences are in the construction of Marine public service system and the construction of Marine ecological civilization demonstration zone, organization, leadership and promotion of the implementation of two indicators. The highest score is Yantai City, and the lowest is Rizhao City. See Table 1.

#### 4. Analysis and Discussion

According to the evaluation results of Marine ecological civilization construction in Jiaodong five cities, the author calculated the proportion of lost points in five levels of regional economic development, intensive utilization of resources, ecological protection, Marine culture cultivation and security system construction, that is, the weak link corresponding to Marine ecological civilization construction in each city. See Table 2.

*Table 2: Analysis of weak points in Marine ecological civilization construction of each city*

Target layer City	Qingdao	Yantai	Weifang	Weihai	Rizhao
Regional economic development	-	20%	10%	9%	5%
Intensive utilization of resources	15%	9%	19%	14%	22%
Ecological protection and construction	52%	43%	48%	45%	39%
Marine culture cultivation	-	12%	-	6%	9%
Security system construction	33%	16%	23%	26%	25%

Note: "-" indicates that the city has not deducted points in this category

As can be seen from the table, there are some deficiencies in three aspects in the construction of Marine ecological civilization in Qingdao, among which ecological protection construction is the weak link, losing 5.6 points, accounting for more than half of the total points lost, followed by security system construction and intensive utilization of resources, accounting for 33% and 15% respectively, which are mainly reflected in the low proportion of open aquaculture area in the sea area for aquaculture. The mechanism for ensuring public services in the Marine field and the organization and leadership for building a Marine ecological civilization need to be strengthened. Yantai has lost points in five levels, among which ecological protection construction is the aspect that should be paid the most attention, losing 43% of the points. The main problem is that the COD emission reduction range is not up to the standard, which is also where Yantai needs to make efforts in the future Marine ecological civilization construction process. There are four problems in Marine ecological civilization construction in Weifang. The main problem lies in ecological protection construction. The ratio of Marine reserve area to managed sea area, natural shoreline preservation rate, coastal water quality ratio and COD emission reduction range all fail to meet the construction requirements, accounting for 48% of the loss. In addition, there are inadequacies in regional economic development, intensive use of resources and security systems. The main problems of Marine ecological civilization construction in Weihai are ecological protection construction, and the loss accounts for 45%. The main reasons are that the area of Marine protected areas is relatively low, and the COD emission reduction range is not up to the standard. Secondly, 26% of the points were lost in the guarantee system, which was reflected in the lack of organizational leadership in Marine ecological civilization construction. The problems in Rizhao are mainly related to ecological protection construction, security system construction and

intensive resource utilization. For example, the area of Marine protected areas is relatively low, the COD emission reduction range is not up to the standard, the energy consumption per unit GDP is relatively high, and the organization and leadership of Marine public service guarantee and Marine ecological civilization construction are insufficient.

To sum up, it can be found that there are both individual weaknesses and common problems in the construction of Marine ecological civilization in the five cities, which are reflected in the ecological protection construction, especially the COD emission reduction range and the area of Marine protected areas. Secondly, the guarantee system for Marine ecological civilization construction is not yet perfect. These problems are also key links to be overcome in Jiaodong Marine ecological civilization integration construction.

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