

Research on Public Participation in the Governance of Marine Plastic Waste in Qingdao

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Abstract: With the strengthening of marine ecological protection in China, the public has paid more attention to the governance of marine plastic waste. This paper studies the problem of public participation in the governance of marine plastic waste in Qingdao. The public's understanding of marine plastic waste and the attitude towards the marine plastic waste are presented. According to the existing problems, this paper proposes countermeasures to promote public participation in the governance of marine plastic waste in Qingdao.

Keywords: Marine Plastics; Garbage Management; Public Participation

1. Introduction

Qingdao is located the southeast of the Shandong Peninsula, facing the South China Sea. It has a vast ocean area and abundant coastal resources. The marine industries are developing rapidly, such as marine tourism and marine transportation. According to data released by the Qingdao Bureau of Statistics, in 2021, Qingdao's gross ocean product was 468.484 billion yuan and nearly 90 million tourists visited Qingdao. With the rapid development of marine economy, the problem of marine waste management has achieved the focus of public attention. Hence, with the acceleration of Qingdao's urbanization process and the rapid development of the marine economy, unreasonable development and utilization of the coast have occurred, and the pressure on the coast is increasing.

Marine waste refers to any persistent man-made or processed solid waste in the marine and coastal areas. According to the "2021 Bulletin on the State of China's Marine Ecological Environment", plastics are the main component of marine waste. The average number of floating garbage on the sea surface is 24 per square kilometer, and the proportion of plastics reaches 92.9%. The average number of beach garbage is 154,816 per square kilometer, and plastics also account for the largest proportion, reaching 75.9%. The average number of seabed garbage is 4770 pieces per square kilometer, and the proportion of plastics is still the most, reaching 83.3%. From the above data, it means that plastics account for the majority of marine waste.

The proliferation of marine plastic waste will not only pollute the marine environment, but also threaten the survival and reproduction of marine organisms, damage the health of the public in coastal areas, and hinder the stable development of the economy and society^[1]. Therefore, China has promulgated the "Opinions^[1] on Further Strengthening the Control of Plastic Pollution" and the "14th Five-Year Plan" Action Plan for Plastic Pollution Control to strengthen the governance of marine plastic waste. Many scholars believe that in addition to strengthening the government's supervision of marine plastic waste and improving the corresponding laws and regulations, public participation should also be emphasized^[2]. Hence, it is significance to study the problem of marine plastic waste governance from the perspective of public participation.

2. Survey on the present situation of public participation

2.1 The design of the questionnaire

To understand the level of awareness of Qingdao citizens and coastal residents on marine plastic waste pollution and governance methods, this paper designed a questionnaire on Qingdao marine waste governance to investigate and analyze Qingdao and surrounding areas citizens' understanding of marine plastic waste, governance opinions and awareness of participation.

Based on the current literatures, this paper designs the questionnaire with two parts. The first part is the basic information of the respondents, and the second part is the basic present situation of the Qingdao's public participation in marine plastic waste governance. The basic present situation includes the three dimensions, i.e., public's awareness of participation, degree of participation and channels of participation in the governance of marine plastic waste.

2.2 Issuance of the questionnaire

The concept of "public" discussed in this paper refers to the participation of individual citizens and the participation of groups. In order to achieve more public to attend this research, the questionnaire is conducted by both online and offline forms and uses a combination of online distribution and on-site distribution. During the on-site investigation, the May 4th Square, the Olympic Center, the Zhanqiao Pier, the Badaguan Scenic Area, the beach and other crowded places are chosen.

This survey has the characteristics of wide scope, multi-branch and comprehensive questions, covering a wide range of ages and occupations. Therefore, it is widely representative. 300 questionnaires were distributed and 276 were recovered, with a recovery rate of 92%. After the questionnaires were recovered, the questionnaires were sorted out and the unqualified ones were eliminated. It is mainly based on two principles. One is that the answers to the questions in the questionnaire are incomplete; the other is that the logic has obvious errors. 261 valid questionnaires were obtained, and the effective rate of questionnaire recovery was 94.6%.

2.3 Statistical analysis of the questionnaire

2.3.1 Basic information of respondents

Based on 261 valid questionnaires, the descriptive statistical analysis is presented as follows. The coverage of education level, age composition, male and female ratio, and occupational composition are described. It is hope to discover the depth and breadth of data sources. The specific data are shown in Table 1 below.

Table 1 Basic information of respondents

Statistical indicators	Classification indicators	Number of people	Percentage
Age	25 years old and below	126	48.3%
	31 to 45 years old	78	29.9%
	46 years old and above	57	23.2%
Sex	male	141	54.0%
	female	120	46.0%
Education level	Junior high school and below	18	6.9%
	high school (technical secondary school)	101	38.7%
	university graduate (junior)	142	54.4%

	college) and above		
Profession	student	102	39.1%
	corporate staff	79	30.3%
	individual business owners	54	20.7%
	retired	26	9.9%

2.3.2 Public awareness of participation

A survey is conducted on the public's attention to the governance of marine plastic waste in Qingdao. The results are shown in Fig. 1. There are 105 Qingdao residents who expressed "very concern", accounting for 40.2% of the total number. There are 80 residents who are "more concerned", accounting for 30.7%. The first two proportions reached 70.9% in total, indicating that the surveyed public pays relatively high attention to the governance of marine plastic waste in Qingdao.

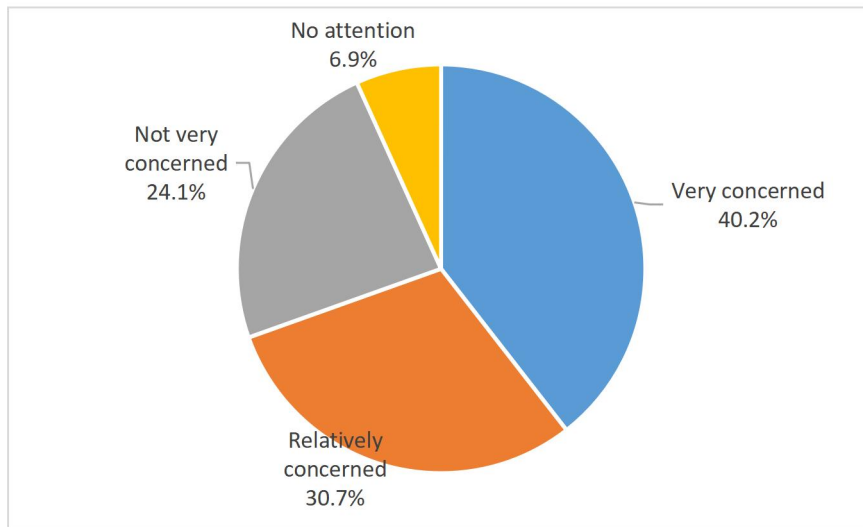


Figure 1 Qingdao's public attention to the governance of marine plastic waste

In order to discover the willing of Qingdao citizens to participate in the governance of marine plastic waste, the results are shown in Fig.2. Only 53 people, accounting for 20.3% of Qingdao citizens, are very willing to participate in the governance of marine plastic waste. However, 102 people, accounting for 50.5%, are very unwilling to participate in the governance of marine plastic waste. It indicates that the surveyed Qingdao citizens are not active in the governance of marine plastic waste.

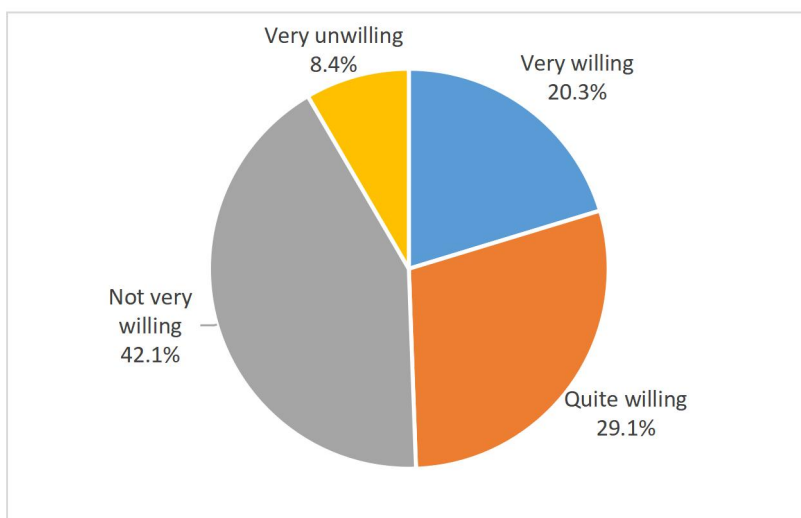


Figure 2 Public willingness to participate in the governance of marine plastic waste in Qingdao

In Fig.3, Qingdao's public opinion on the main responsible person for marine plastic waste governance are given. More than 150 people, accounting for 58.2% of the public, believe that the government is primarily responsible for marine waste governance, and 22.2% of the respondents believe that the whole society should participate in marine plastic waste governance. Only 33 people, accounting for 12.6%, believe that individuals are responsible.

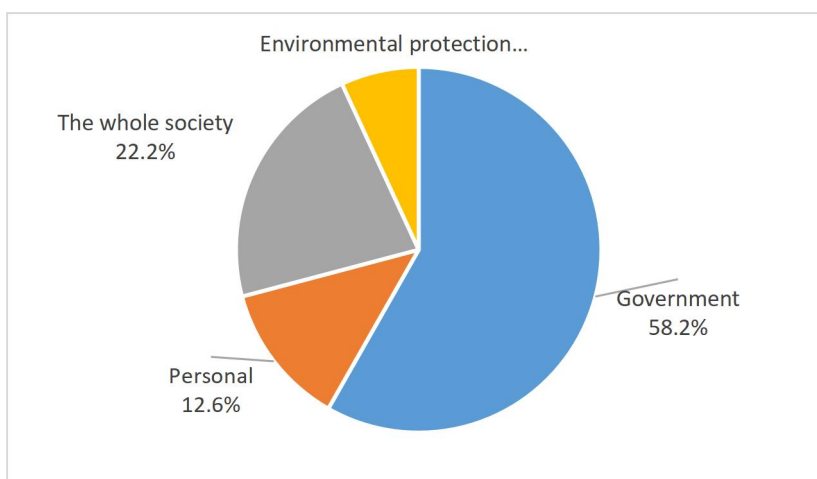


Figure 3 Qingdao's public awareness of the responsibility of marine plastic waste governance

According to the survey on the frequency of Qingdao's public participation in marine plastic waste governance activities, the results are shown in Fig. 4. Only 30.3% of Qingdao's public always participate and frequent participate, indicating that the frequency of Qingdao's public participation in marine plastic waste governance is low.

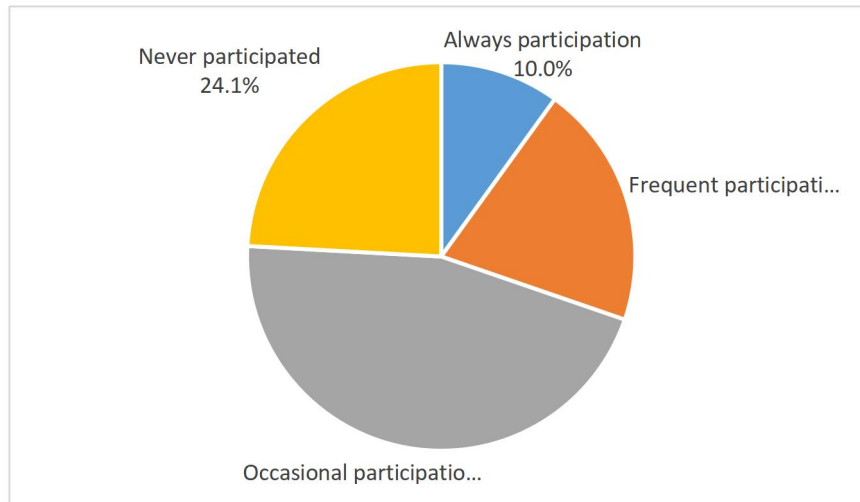


Figure 4 Frequency of Qingdao's public participation in marine plastic waste governance

3. Problems of public participation in Qingdao marine plastic waste governance

3.1 Inconsistency of public concern and action

According to the above survey results, Qingdao's public generally pays high attention to marine plastic waste governance. However, the survey on the frequency and willingness to participate in marine plastic waste governance shows that most of the public are unwilling or do not participate in marine plastic waste governance. It indicates that most of Qingdao's public are not active in marine plastic waste governance. Even though some Qingdao citizens have paid attention to the marine plastic waste treatment, they also feel that the whole society and individuals should participate in the marine plastic waste treatment activities. But they have not put them into action, their concerns and actions are inconsistent, and they lack the practical action to participate in the marine plastic waste governance in Qingdao.

3.2 Unreasonable public participation structure

In general, young people have stronger cognitive and practical abilities in marine plastic waste governance than middle-aged and elderly people. However, with the rapid development of society, the accelerated pace of life, and the working pressure of young people, young people do not have too much energy and time to participate in the marine plastic waste treatment. Through the specific analysis of the survey data, it is found that the public who are willing to and have participated in the marine plastic waste governance are often middle-aged and elderly people. These people have basically stable life and work, and even some people have retired. They can give a lot of time to participate in the marine plastic waste governance in Qingdao. It can be seen that the middle-aged and elderly people are the main participants in the marine plastic waste governance in Qingdao.

3.3 Low degree of participation in public organization

From the above frequency of public participation in marine plastic waste governance, it can be seen that most investigators have not participated in or occasionally participated in marine plastic waste governance activities. According to the survey on relevant marine plastic waste governance activities in Qingdao, Qingdao environmental protection

organizations have not widely broadcast to guide public' participation. Hence, the degree of public participation is generally low.

4. Countermeasures to enhance public participation in Qingdao's marine plastic waste governance

4.1 Strengthen the scientific publicity of marine plastic waste governance

In needs to improve Qingdao's public's awareness and enthusiasm of participating in marine plastic waste governance. The government should increase the science popularization of relevant marine plastic waste to promote public participation in marine plastic waste governance [3]. First, we should publicize the hazards of marine plastic waste and arouse the public's awareness of the importance and prevention of marine plastic waste in combination with the current marine environmental problems. Second, we will actively carry out marine plastic waste governance activities to improve the public's attention and participation in Qingdao. Through the publicity of relevant knowledge of marine plastic waste governance, the public's awareness of relevant knowledge will be improved, and the public's awareness of participation in marine plastic waste governance will be enhanced.

4.2 Establish a multi-level practical education system

For different levels of Qingdao's public, a multi-level education system on marine plastic waste governance can be established to improve public awareness of marine plastic waste issues and related knowledge [4]. First, for students in school, in their daily education, we will popularize some common sense and relevant knowledge about marine plastic waste governance. Then, t students can learn about relevant information in time and actively participate in marine plastic waste governance activities. Second, for young employees, different measures should be taken according to the nature of their enterprises. For example, Qingdao university or research institute personnel can strengthen the research on the understanding of marine plastic waste and the treatment methods of in-service personnel by way of project-based research. For enterprises that produce plastic packaging, they can participate in marine plastic governance in the way of plastic reduction by training employees how to recycle and recycle waste plastic products. For fishermen and crew working at sea, they should be strengthened their awareness of daily marine protection. Finally, for retirees and self-employed households, the Qingdao public can be included in the marine plastic waste governance system through the universal education of community organizations and non-governmental environmental protection organizations.

4.3 Improve the incentive mode of public participation

It is a feasible method to take favorable incentive measures to encourage the public to actively participate in marine plastic waste governance under the social situation. The incentive measures may stimulate to form a rational and mature civic awareness. For example, we will reward the public with prizes or gifts for their constructive suggestions on marine waste governance. Give material or spiritual rewards to individuals who voluntarily participate in marine garbage governance activities. The public can also be encouraged to participate in the marine plastic waste governance activities by selecting, publicizing, and rewarding "small talents".

5. Conclusions

With the strengthening of national marine ecological protection and the continuous promotion of ecological civilization construction, the public's attention to marine plastic waste governance is increasing. The Qingdao government has begun to

seek new governance methods in the new governance ecology to improve the governance level of marine plastic waste. However, the previous research on the governance of marine plastic waste has not been deeply discussed at the level of public participation. Therefore, this paper takes the issue of public participation in Qingdao's marine plastic waste governance as the research object, conducts in-depth research on the current situation and problems of Qingdao's public participation in marine plastic waste governance, and puts forward countermeasures and suggestions contrapuntally.

References

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