

A study of public perceptions of ecological protection and urban development in Dongting Lake

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Abstract. As a key river-connected lake and ecological barrier in the middle reaches of the Yangtze River, Dongting Lake plays a critical role in coordinating ecological protection and socioeconomic development, which directly affects the well-being of nearly 22 million residents living around the lake. Based on questionnaire data collected from 30 respondents living in areas surrounding Dongting Lake, this study examines public perceptions and preferences regarding the lake's ecological environment, health impacts, economic value, and future development pathways from the perspective of subjective public perception. The findings show that respondents generally hold a highly positive view of Dongting Lake, with 83.3% believing that it has a significant positive impact on their quality of life. At the same time, water quality, livelihood-related water and environmental issues, and flood control and safety in response to climate change have emerged as the core concerns most strongly perceived by the public. The survey results indicate that the public does not regard ecological protection and economic development as mutually exclusive options. Instead, respondents generally expect ecological advantages to be steadily translated into improvements in people's well-being through the improvement of safety and security systems, the transition toward green industries, and fair mechanisms for coordinating interests. The findings may provide a reference for advancing the governance of the Dongting Lake basin from macro-level monitoring indicators toward tangible improvements in residents' everyday lives, thereby contributing to the establishment of a long-term collaborative mechanism characterized by "government governance, corporate responsibility, social participation, and benefits for residents."

Keywords: Dongting Lake, ecological protection, public perception, public well-being, green development

1. Introduction

Located in the middle reaches of the Yangtze River, Dongting Lake is the second-largest freshwater lake in China and a typical river-connected lake. Known as the "kidney of the Yangtze River," it receives the waters of the Xiang, Zi, Yuan, and Li Rivers and is connected to the Yangtze River, forming a distinctive river-lake interaction system. The lake basin covers an area of approximately 2,628 square kilometers, with an average annual inflow of 30.18 billion cubic meters. As a core ecological barrier in the middle reaches of the Yangtze River, Dongting Lake performs critical ecological functions, including flood regulation and storage, the

maintenance of species habitats, and climate regulation. At the same time, its abundant water and land resources support agriculture, fisheries, and related industries in the lake region, laying the industrial foundation for the region's reputation as a "land of fish and rice." The area has also developed a profound regional culture centered on Huxiang culture, embodying a strong sense of national responsibility characterized by the spirit of "seeking persistently from above and below" and "putting the worries of the world before one's own and enjoying the world's happiness only after others."

In September 2020, during his inspection tour of Hunan Province, General Secretary Xi Jinping explicitly put forward the principle of "jointly pursuing greater protection rather than large-scale exploitation," providing a clear direction for the ecological protection of Dongting Lake. In recent years, a range of measures, including ecological restoration, science- and technology-based water management, and the integrated development of culture and tourism, have gradually contributed to continued improvements in the ecological environment of the lake region. However, with the acceleration of urbanization around the lake and increasing industrial agglomeration, constraints on land resources, water resources, and environmental carrying capacity have become increasingly pronounced. Balancing the demands of ecological protection and development therefore continues to face numerous practical challenges.

Existing evaluation systems for ecological and environmental governance tend to focus on macro-level statistical indicators, such as water quality compliance rates, the area of wetland restoration, and industrial value added, while paying relatively little attention to the dimensions of everyday perception among ordinary residents. Residents often assess the actual effectiveness of environmental governance and coordinated economic development around Dongting Lake through concrete experiences, including their sense of livability and well-being, the safety and taste of drinking water, thermal comfort in summer, mosquito density, convenience of transportation, disaster risks, and changes in employment and income. This study collects subjective evaluation data from people with different backgrounds through a questionnaire survey, supplementing the public perception perspective that is difficult to capture through macro-level monitoring and providing empirical evidence for understanding the actual livelihood needs associated with the governance of Dongting Lake. This study therefore treats subjective public perceptions as complementary evidence for environmental governance and for the social value of ecosystem services [1-3].

2. Research methods

2.1. Survey participants and sample

The study employed convenience sampling and distributed paper and electronic questionnaires in areas along the shores of Dongting Lake, including Yueyang, Changde, and Yiyang, from July to August 2026. The survey targeted permanent residents who had lived in the area for at least one year. A total of 30 valid questionnaires were collected, yielding a valid response rate of 100%. Among the respondents, 46.7% were male and 53.3% were female. The age distribution was concentrated primarily in the 26–55 age group, which accounted for 70.0% of the sample. The respondents represented a range of occupations, including farmers, fishermen, self-employed individuals, corporate employees, civil servants, and employees of public institutions. In terms of educational attainment, most respondents had completed senior high school/secondary vocational education or junior college/undergraduate education.

2.2. Questionnaire design

The questionnaire consisted of four sections: (1) basic demographic information; (2) perceptions of the ecological environment, health impacts, economic value, and current challenges associated with Dongting

Lake, assessed through multiple-choice questions and a five-point Likert scale; (3) preferences and priority judgments regarding future development directions, assessed through ranking questions and rating scales; and (4) respondents' demands regarding governance measures, assessed through multiple-choice questions. The questionnaire was revised following a pilot test, and its internal consistency reliability, as measured by Cronbach's α , was 0.82.

2.3. Data analysis

SPSS 26.0 was used for descriptive statistical analysis, including the calculation of percentages, means, and standard deviations. For open-ended questions, content analysis was employed to identify and summarize major themes.

3. Results

3.1. Everyday concerns regarding environmental health

In the survey on factors that may affect residents' health, 76.7% of respondents identified drinking water safety, water pollution, and unpleasant odors from household waste as the primary health risks. A further 56.7% were concerned about high temperatures, humidity, and mosquito breeding, while 50.0% believed that flooding, urban waterlogging, and seasonal drought could directly affect residential health. These findings indicate that the public's understanding of health is not limited to the traditional medical perspective but is closely intertwined with their everyday experience of the residential environment. Water environmental quality and the comfort of the local living environment have therefore become core dimensions through which residents perceive and evaluate health impacts. These patterns are summarized in Figure 1.

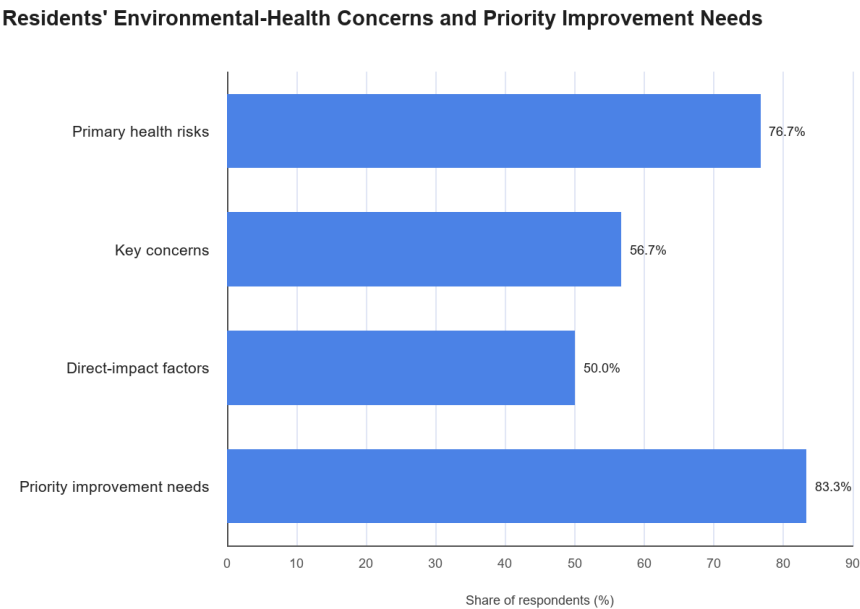


Figure 1. Residents' environmental-health concerns and priority improvement needs

3.2. Perceptions of economic value

Respondents generally recognized the multiple values of Dongting Lake as a foundational resource for the local economy. Specifically, 76.7% of respondents believed that the region's unique natural conditions support the development of aquaculture, while 73.3% noted that the lake generates employment opportunities in tourism and catering. Another 66.7% recognized its fundamental role in providing a stable water supply for industrial and agricultural production. Meanwhile, 60.0% acknowledged the value of its natural landscapes and recreational environment in enhancing livability and creating related investment opportunities, and 50.0% highlighted its advantages in supplying green agricultural and ecological products. By comparison, only 26.7% of respondents selected the promotion of transportation, logistics, and commodity trade, suggesting that the indirect value generated by industrial chains associated with water transport, ports, and shipping is relatively difficult for ordinary residents to perceive directly. All respondents selected at least one positive impact brought by Dongting Lake, and none believed that the lake had no significant positive effects. These perceived economic values are shown in Figure 2.

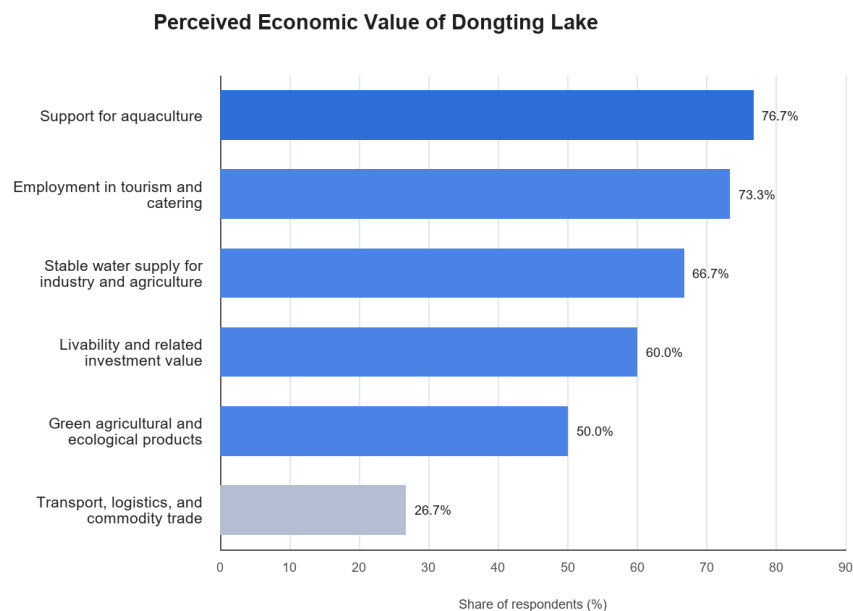


Figure 2. Perceived economic value of Dongting Lake

3.3. Perceptions of current challenges

The survey shows that 83.3% of respondents believed that changes in water quality would directly affect their sense of environmental safety and quality of life. A further 76.7% reported strong concerns about humidity, mosquito breeding, and localized unpleasant odors in the lake region. Meanwhile, 50.0% of respondents were concerned about the negative effects of drought during low-water periods on water availability for production, while 33.3% believed that flooding and urban waterlogging would disrupt daily travel and residential safety. Notably, when asked about the adverse impacts they had already experienced in reality, none of the respondents mentioned a direct conflict between ecological protection and residents' production activities. However, when asked about future governance priorities, 33.3% identified this potential conflict as one of the issues requiring the most urgent attention. This discrepancy in perceptions suggests that the public has not yet generally experienced direct conflicts of interest arising from relevant policies, but has already anticipated that

conservation measures such as fishing bans and the relocation of fishing activities, wetland management and control, and restrictions on industry access may affect the livelihoods of certain vulnerable groups. The distribution of perceived challenges is shown in Figure 3.

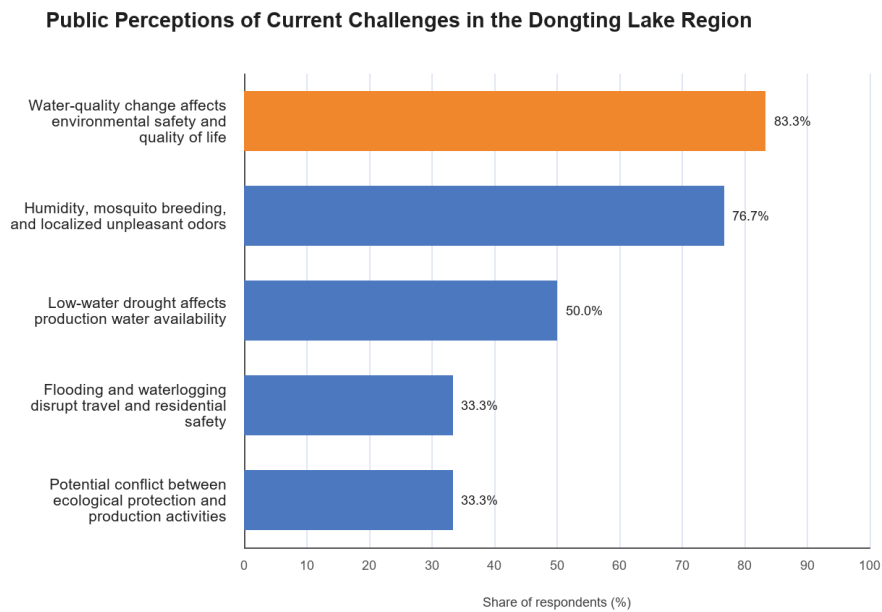


Figure 3. Public perceptions of current challenges in the Dongting Lake region

3.4. Overall assessment of quality of life

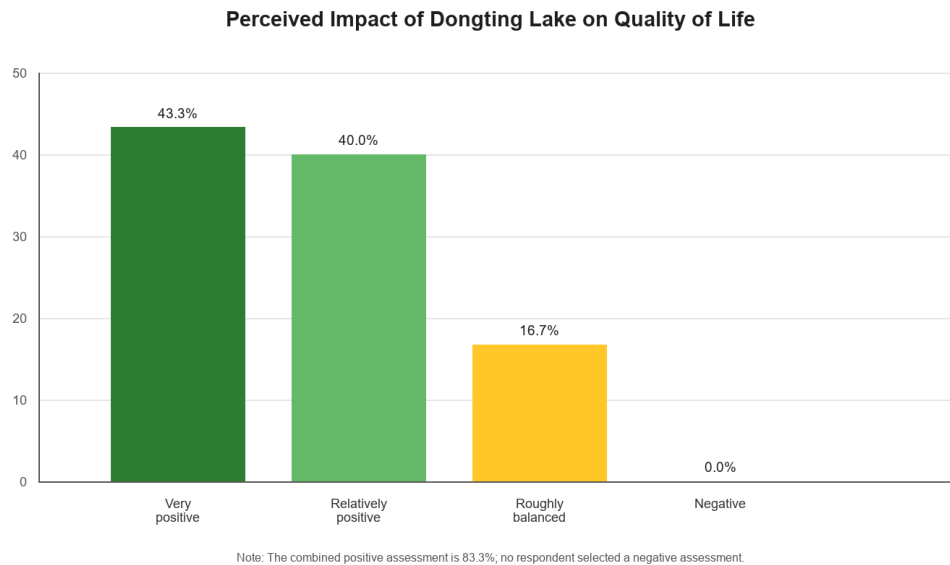


Figure 4. Perceived impact of Dongting Lake on quality of life

The survey results demonstrate a markedly positive overall orientation. Among the respondents, 43.3% believed that Dongting Lake has a very strong positive impact on residents' quality of life, while 40.0% considered its positive impacts to be relatively substantial. Only 16.7% believed that its positive and negative impacts were roughly balanced, and none of the respondents gave an entirely negative assessment. Overall, 83.3% of respondents gave a clearly positive evaluation of the lake's impact on quality of life, indicating that, within the sample covered by this survey, the ecological, productive, and cultural value of Dongting Lake generally outweighs the negative experiences associated with environmental risks. The distribution of assessments is shown in Figure 4.

3.5. Attitudes toward future development and priority setting

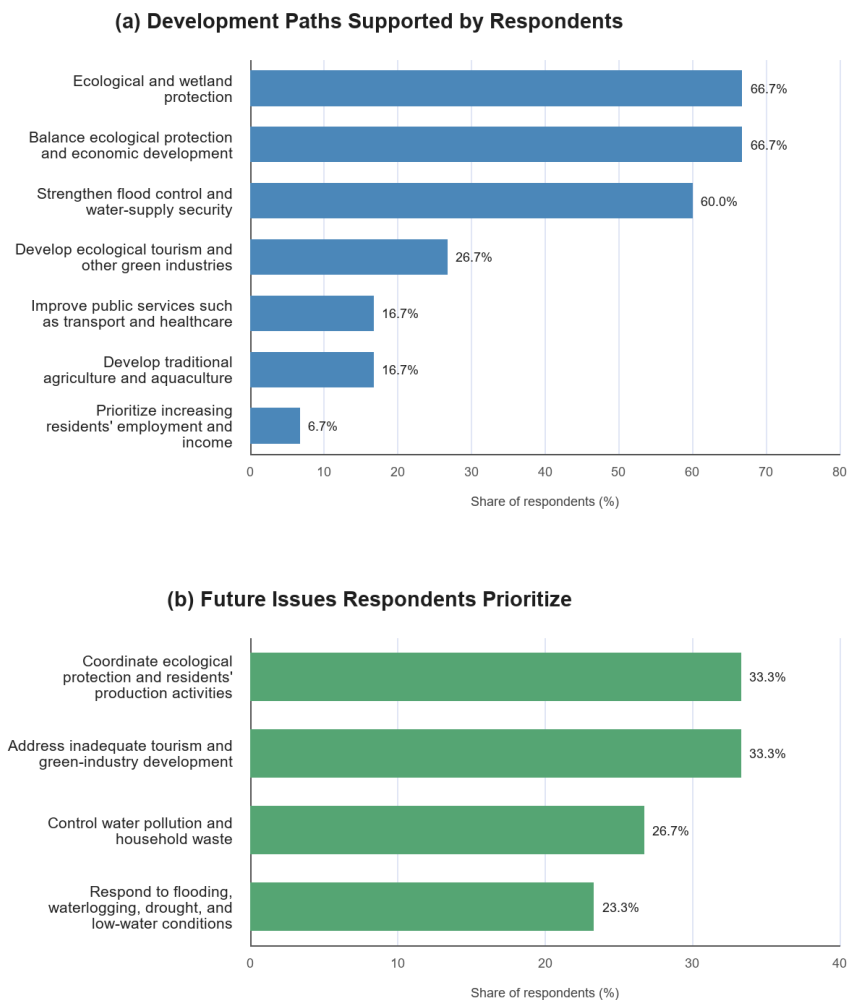


Figure 5. Support for future development paths and priority issues among respondents

Regarding the development pathways that should receive greater emphasis in the future, "ecological and wetland protection" and "balancing ecological protection and economic development" each received support from 66.7% of respondents. Meanwhile, 60.0% believed that priority should be given to strengthening safety and security capacities, including flood control and water supply. In the ranking of future issues requiring the highest priority, coordinating conflicts between ecological protection and residents' production activities and

addressing the inadequate development of tourism and green industries ranked jointly first, with each selected by 33.3% of respondents. Water pollution and household waste management accounted for 26.7%, while flooding and urban waterlogging and drought and low-water conditions each accounted for 23.3%. Support for development pathways and priority issues is shown in Figure 5.

The results of the five-point Likert scale showed that the overall mean score across the seven core statements was 4.53. "Improving capacity for flood control, drainage, and drought resistance" and "promoting mutual reinforcement between ecological protection and income growth" received the highest and equal mean scores (4.83), with a support rate of 100%. These were followed by "providing more employment opportunities" (4.70), "improving public services such as drinking water, healthcare, and transportation" (4.63), "having confidence in future development" (4.63), and "providing reasonable ecological compensation to affected residents" (4.33). "Increasing income stability" received the lowest score (3.77). However, 43.3% of respondents selected a neutral response, reflecting uncertainty about the prospects for sustained long-term income growth rather than outright opposition. The item-level mean scores are shown in Figure 6.

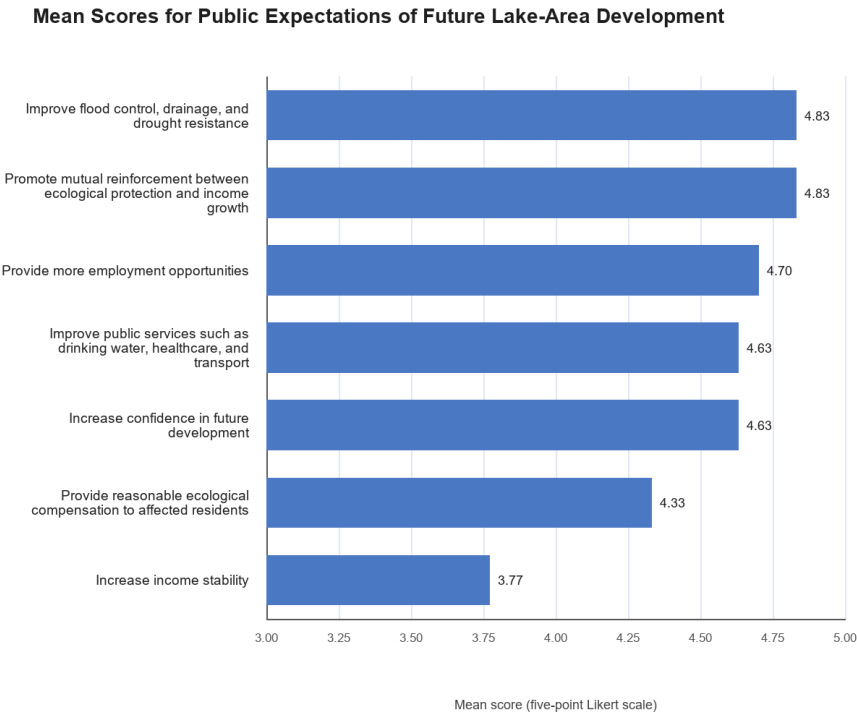


Figure 6. Mean scores for public expectations of future lake-area development

4. Discussion

4.1. Core characteristics of public perceptions

This study finds that residents living around Dongting Lake have a highly positive perception of the lake, and that this perception is grounded in a broad consensus on prioritizing ecological protection. The public generally rejects the notion that ecological protection and economic development are mutually opposed, instead expecting the two to be coordinated through systematic transformation. This perceptual foundation provides a favorable social environment for policy implementation, while also placing higher demands on the

refinement and fairness of governance strategies. Research on common-pool and social-ecological systems likewise emphasizes the importance of legitimate, participatory, and locally acceptable institutional arrangements [4, 5].

4.2. Three-dimensional expectations of security, protection, and shared benefits

The findings can be summarized into three core dimensions: security (flood and drought control and reliable water supply), protection (water environmental governance and wetland restoration), and shared benefits (ecological compensation, employment stability, and income growth). Among these, security and protection constitute the foundation, while shared benefits are the ultimate objective. The relatively low level of public confidence in "increasing income stability" indicates that existing industrial transformation and employment support policies have not yet fully alleviated residents' livelihood concerns. There is therefore a need to shift from short-term project-based employment toward long-term, sustainable public-interest employment opportunities. This emphasis on distributional fairness and benefit sharing accords with ecosystem-service research that treats social values as substantive components of environmental decision-making [3, 6].

4.3. Climate change and risk perception



Figure 7. Embankment breach at Tuantzhouyuan, Huarong County, Yueyang, in 2024

Against the backdrop of global climate change, the Dongting Lake region has experienced increasingly frequent rapid shifts between drought and flooding. The breach of the embankment at Tuantliuzui in Huarong County, Yueyang, in July 2024¹ further heightened public demand for flood-control safety. In the survey, 90.0% of respondents supported providing reasonable compensation to residents directly affected by ecological protection measures. This is consistent with the institutional arrangements established under the Regulations of Hunan Province on the Protection of Dongting Lake². Further efforts are needed to specify the eligible recipients, assessment criteria, and funding sources for such compensation. The event is shown in Figure 7.

¹ Xinhua News Agency. (2024, July 6). Xi Jinping gives important instructions following the breach of the first-line embankment at Tuantzhouyuan, Huarong County, Yueyang City, Hunan Province. The State Council of the People's Republic of China.

² Regulations of Hunan Province on the Protection of Dongting Lake.

4.4. Pathways for governance optimization

Based on the findings of the survey, governance optimization is recommended in five areas: (1) further advancing coordinated water environmental governance across the entire basin, establishing rapid-response mechanisms, and improving residents' everyday environmental experience; (2) developing an integrated safety system for flood control, drainage, drought resistance, and water supply, while strengthening early-warning mechanisms and community-based disaster preparedness education; (3) developing distinctive green industries within the constraints of ecological carrying capacity, enabling local communities to participate deeply in these industries and share their benefits; (4) enhancing the long-term stability of employment and income policies and transforming temporary employment opportunities into sustainable public-interest positions; and (5) improving ecological compensation mechanisms, incorporating residents' opinions at an early stage of major governance projects, and establishing a diversified framework for public participation. Participatory mechanisms should make residents' knowledge and preferences visible in decisions, rather than treating residents only as downstream recipients of policy [7].

5. Conclusion

This survey clearly demonstrates that, in the perception of the public living around Dongting Lake, the lake is not merely an important natural ecological space but also a fundamental resource that supports the operation of cities around the lake and residents' production and daily lives. The public's core expectations for future development can be summarized into three dimensions: security, protection, and shared benefits. The principles of balancing ecological protection with economic development and promoting mutual reinforcement between ecological benefits and pathways to increased income have received broad public support, indicating that residents do not accept a binary choice between the two. In recent years, the integrated protection and restoration of mountains, rivers, forests, farmlands, lakes, grasslands, and deserts in the Dongting Lake region have begun to yield visible results [8]. Future governance should move beyond the path dependence of simply pursuing macro-level monitoring indicators and place greater emphasis on improvements in the everyday environment that residents can directly perceive. This would enable residents living around the lake to genuinely become participants in, supervisors of, and the most direct beneficiaries of ecological protection, thereby establishing a solid foundation of social consensus for the high-quality development of the Dongting Lake Eco-economic Zone.

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