

Original Research Articles

Research on Development Strategies for Leisure Fishing in Inner Mongolia from the Perspective of Industrial Integration

Xue Li¹, Tiantian Pang², Xuebin Feng³, Jianying Zhang⁴^a, Zhuming Zhao^{5b}

¹ Inner Mongolia Business & Trade Vocational College, ² Inner Mongolia Electronic Information vocational Technology College, ³ Inner Mongolia Agricultural University, ⁴ Vocational and Technical College of Inner Mongolia Agricultural University, ⁵ Yellow Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences

Keywords: Inner Mongolia, Recreational fisheries, SWOT analysis, Sustainable development, Industrial integration

<https://doi.org/10.46989/001c.126356>

Israeli Journal of Aquaculture - Bamidgheh

Vol. 76, Issue 4, 2024

This study explores the current status of leisure fishing in Inner Mongolia and its implications for the development of leisure fishing abroad. As an important province in northern China, Inner Mongolia has rich natural resources and unique geographical conditions but still faces many challenges in infrastructure development and ecological protection. By analyzing Inner Mongolia's unique geographical and climatic conditions, water resource distribution, and industrial structure, the research finds that while the region possesses abundant water resources, inadequate infrastructure and weak awareness of ecological protection remain major constraints on its development. Using the SWOT analysis method, the study identifies the strengths, weaknesses, opportunities, and threats of leisure fishing in Inner Mongolia, highlighting the importance of government policy support and eco-friendly development models in enhancing industry competitiveness. Furthermore, the research proposes strategies to promote industrial chain integration, optimize industrial structure, strengthen infrastructure, implement sustainable development models, and enhance brand building and market promotion. Based on Inner Mongolia's experience, the study offers insights for developing leisure fishing abroad, recommending a focus on ecological protection and technological innovation, enhancing brand influence, and fostering international cooperation and resource sharing. This research provides a theoretical foundation and practical guidance for developing leisure fishing in Inner Mongolia and other regions, serving as a reference for the sustainable development of global leisure fishing. It emphasizes the necessity of integrated governance and ecological protection while projecting the future prospects for the synergistic development of leisure fishing in economic, environmental, and social dimensions.

INTRODUCTION

As an emerging economic model, leisure fishing is rapidly becoming a significant component of the global tourism industry. With improved living standards and the increasing demand for leisure activities, leisure fishing provides consumers recreational opportunities and brings new growth points to local economies.¹ In many countries, leisure fishing has diversified regional economies by promoting eco-tourism and sustainable development²; for example, South Korea has attracted many tourists by organizing sea fishing competitions and developing island tourism. North America and Europe are among the most developed regions worldwide for recreational fisheries. The total value of

recreational fisheries in the United States is about US\$40 billion, exceeding that of traditional capture fisheries. European countries have also attracted many tourists through recreational fishing, which has become an important source of the economy.³ Against the backdrop of the leisure fishery being listed as one of the five major industries of China's modern fishery industry, China's Ministry of Agriculture issued the Guiding Opinions on Promoting the Sustainable and Healthy Development of the Leisure Fishery in 2012, which emphasized the significance of the leisure fishery, and put forward the principles of strengthening policy guidance and support, adapting to local conditions, developing innovatively and highlighting characteristics. It encourages the development of culturally diverse leisure

a Corresponding author: Jianying. Zhang, e-mail: ndzjying@163.com

b Corresponding author: Zhuming Zhao, e-mail: zhaozm@ysfri.ac.cn

fisheries and enhances the level of development and sustainability of leisure fisheries. Research indicates that leisure fishing fosters economic growth and offers new perspectives on ecological protection and resource management.⁴ However, due to geographical limitations, the development of leisure fishing in Inner Mongolia has lagged, facing challenges such as inadequate infrastructure and low market awareness.⁵ The region's unique geographical and climatic conditions provide potential for the development of leisure fishing. While its abundant water resources lay a solid foundation for the sector, there are also challenges related to environmental protection and sustainable development.⁶ With policy support and growing market demand in recent years, leisure fishing in Inner Mongolia has gradually developed, attracting increasing investment and attention.⁷ As a representative development area of leisure fishery, Hangjinhou Banner is located in the western part of Bayannur City, Inner Mongolia, which is situated in the river-loop plain and has abundant water resources, including 14,666.6 hectares of water surface, of which about 10,000 hectares of water surface can be utilized for fishery. Four distinctive leisure fishery models have been formed in the region: aquaculture and angling type, leisure angling and catering collection type, ecological sightseeing and tourism type, and comprehensive leisure fishery. Currently, leisure fishery enterprises in Hangjinhou Banner have grown to 25, involving 300 hectares of water surface, receiving more than 50,000 consumer visits a year, with an annual operating income of more than 15.6 million yuan. Translated with [DeepL.com](https://www.deepl.com/) (free version). However, achieving sustainable development in leisure fishing within industrial integration remains a pressing issue. This study aims to explore the current status and strategies for developing leisure fishing in Inner Mongolia from the perspective of industrial integration. Using SWOT analysis, the study identifies the strengths, weaknesses, opportunities, and threats associated with leisure fishing in the region and proposes practical development strategies. Furthermore, the research will summarize successful experiences from Inner Mongolia to provide insights for developing leisure fishing abroad, thereby promoting the sustainable development of global leisure fishing.^{8,9} The findings will serve as a reference for policy formulation in Inner Mongolia and offer lessons for other countries in their leisure fishing development, especially in balancing economic growth with ecological protection. By learning from successful international experiences, leisure fishing in Inner Mongolia can optimize areas such as brand building, market promotion, and ecological management, facilitating high-quality development.

CURRENT DEVELOPMENT STATUS OF LEISURE FISHERIES IN INNER MONGOLIA

RESOURCE OVERVIEW

Inner Mongolia has abundant water resources, providing a solid foundation for developing leisure fisheries. According to statistics, the water area of Inner Mongolia reaches

nearly 100,000 square kilometers, including various types of water bodies such as lakes, rivers, and reservoirs. Major water resources include the Yellow River, Liao River, and numerous natural lakes, such as Hulun Lake and Hasuhai. These water bodies provide an excellent natural environment for fish growth and create conditions for leisure fishing activities. However, the water resources in Inner Mongolia face multiple challenges. On the one hand, overfishing and environmental pollution threaten the ecological system of these water bodies, making the sustainability of fish resources a pressing concern; on the other hand, water resource management and protection measures are still inadequate, affecting the sustainable development of leisure fisheries.¹⁰ Therefore, while developing leisure fisheries, Inner Mongolia must strengthen the management and protection of water resources to achieve a win-win situation for both ecology and economy.

The distribution of water resources in Inner Mongolia is relatively concentrated, primarily in the eastern and southern regions. Hulunbeier City, Bayannur City, and Wuhai City are rich in water resources and are becoming important regions for developing leisure fisheries. Hulun Lake, the largest freshwater lake in Inner Mongolia, is an ideal location for leisure fishing activities, attracting many tourists for fishing, boating, and more.¹¹ Typical fishing areas include:

Hasuhai: Known for its beautiful natural scenery and rich biodiversity, Hasuhai has become a popular destination for leisure fishing and ecological tourism.

Wuliangsu Lake: This lake is renowned for its vast water surface and diverse aquatic life, providing excellent fishing opportunities for enthusiasts.

Jiuxing Lake: Known for its tranquil environment, Jiuxing Lake attracts visitors seeking a peaceful fishing experience in nature.

Daihai: This lake, with its clear waters and beautiful surroundings, is another important site supporting leisure fishing activities.

These areas provide a variety of leisure fishing options and significantly contribute to local economic growth and ecological sustainability. Currently, the utilization of water resources in Inner Mongolia shows a positive development trend, but some issues remain. Many water bodies have not been fully developed, and leisure fishing activities are relatively simplistic, primarily focusing on basic forms such as fishing and sightseeing. Meanwhile, due to the lack of professional management and services, the visitor experience is low, affecting the further expansion of the market.¹² Therefore, improving the utilization efficiency of water resources and diversifying activity forms has become key to promoting the development of leisure fisheries in Inner Mongolia.

INDUSTRY STRUCTURE ANALYSIS

The industry structure of leisure fisheries in Inner Mongolia is still undergoing adjustment and optimization. Currently, leisure fisheries are divided into several segments: fishing, aquaculture, processing, and tourism. Fishing and aquaculture serve as the foundational segments, while process-

ing and tourism represent value-adding stages. Data shows that the output value of leisure fisheries in Inner Mongolia has been increasing yearly, especially with the integration of tourism, which has greatly boosted regional economic development.¹³ In the industry chain, fishing and aquaculture are the foundational stages of leisure fisheries; however, due to resource limitations and ecological protection needs, traditional fishing methods face challenges, leading to aquaculture gradually becoming mainstream. The aquaculture in Inner Mongolia mainly focuses on freshwater fish species such as grass carp, common carp, and yellow eel. While production capacity is continuously improving, the overall technical level remains low, and the modernization of the industry urgently needs enhancement.¹⁴

The processing stage is an important way to increase the added value of leisure fisheries. Currently, the number of processing enterprises in Inner Mongolia's leisure fisheries is limited, and most rely on traditional manual methods, lacking large-scale and branded development. By strengthening the modernization of the processing stage and brand building, the market competitiveness of leisure fisheries can be effectively improved. The industry chain of leisure fisheries in Inner Mongolia typically includes the following key segments:

Resource Acquisition: Primarily through fishing and aquaculture, ensuring the sustainable utilization of water resources.

Processing and Storage: Processing and storing the products from fishing and aquaculture to extend the market lifecycle of the products.

Market Promotion: Leisure fisheries can be marketed through various channels, including traditional media and new media platforms. Traditional media channels include TV advertisements, radio stations, newspapers, and magazines, while new media platforms include social media, short video platforms, and live broadcasting platforms. Through careful planning and execution, leisure fisheries' brand awareness and market influence can be effectively enhanced to attract more tourists and consumers.

Consumer Experience: Integrating with tourism to provide consumers with richer leisure experiences, including fishing, boating, sightseeing, and other activities.

Currently, the industry chain of leisure fisheries has not formed a complete ecological system, especially in the processing and market promotion stages, which lack professional talents and technical support, impacting overall market performance. By optimizing the industry chain, leisure fisheries in Inner Mongolia can achieve more effective resource utilization and value enhancement.

MARKET DEMAND AND CONSUMER BEHAVIOR

With improved living standards and the increasing demand for leisure activities, the market demand for leisure fisheries in Inner Mongolia has gradually grown.

MARKET DEMAND ANALYSIS

Inner Mongolia's market demand for leisure fisheries shows a year-on-year growth trend. Several factors mainly drive this growth:

1. **Improvement of Living Standards:** With economic development and increasing per capita income, consumer demand for leisure and entertainment activities continues to rise. More and more people are willing to invest time and money in leisure fishing activities.
2. **Rise of Ecological Tourism:** In recent years, ecological tourism has become increasingly popular, with consumers paying more attention to opportunities for close contact with nature. Leisure fisheries precisely meet this demand, attracting many visitors seeking relaxation and entertainment.
3. **Enhanced Health Awareness:** Modern consumers are becoming more health-conscious, viewing leisure fisheries as a healthy activity that can relax the mind and body while enjoying fresh seafood. Thus, they are becoming increasingly popular.

CONSUMER BEHAVIOR ANALYSIS

When choosing to participate in leisure fisheries activities, consumers are mainly influenced by the following factors:

1. **Activity Experience:** Most consumers prefer leisure fisheries venues that provide a good experience. Firstly, with the improvement of living standards, more and more people are willing to participate in leisure activities during their free time; secondly, modern consumers pay more and more attention to the experience of closeness to nature and the natural environment and ecological activities provided by leisure fisheries satisfy this demand; lastly, leisure fisheries not only provide recreation, but also promote physical and mental health, which is regarded by many consumers as a healthy way of relaxing through activities such as fishing mood, enjoying fresh air and outdoor sports. Thus, the fun of fishing, the natural environment of the venue, and the quality of supporting services are all key considerations for consumers.
2. **Social Factors:** Many consumers participate in leisure fisheries activities with family or friends to enhance social interaction. Research shows that leisure fisheries are often a preferred activity for family outings or gatherings among friends.
3. **Access to information:** Consumers' decisions often rely on online platforms, social media, and word-of-mouth recommendations, so the richness of the content, the authenticity and reliability of the information with the user evaluation, and experience sharing are particularly important. Consumer information acquisition cannot be separated from the marketing strategy, and an effective marketing strategy not only enhances the visibility and attractiveness of the

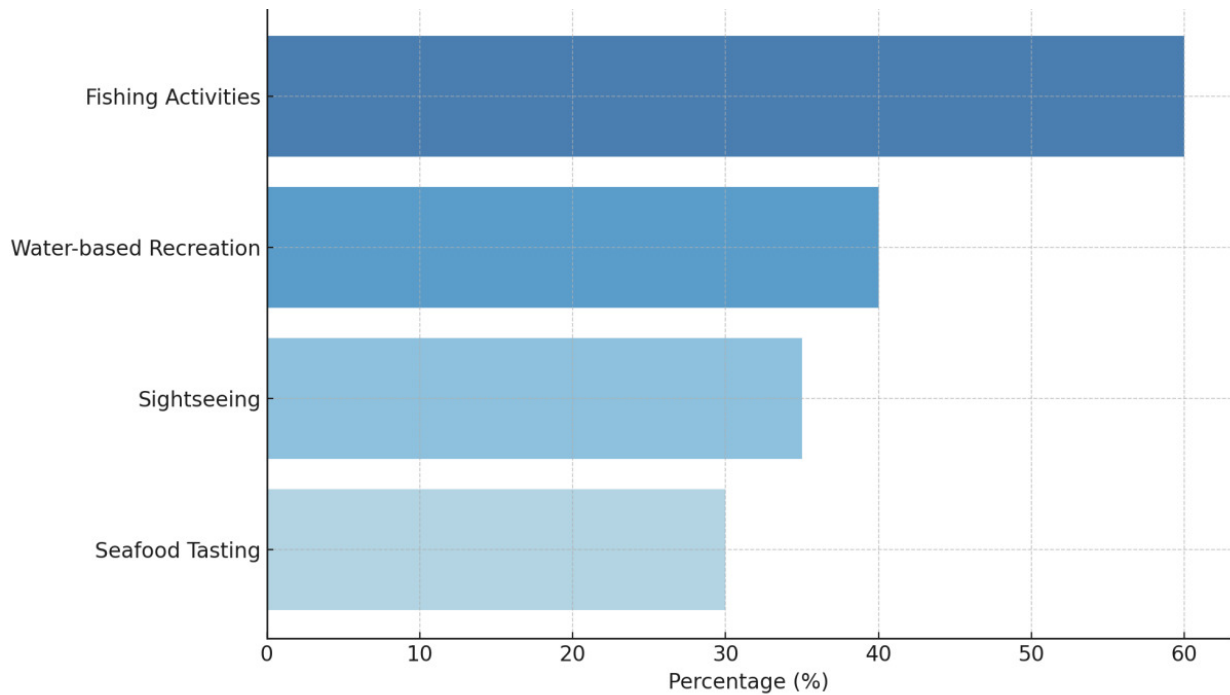


Fig. 1. Demand Preferences for Recreational Fishing Activities

leisure fishery but also increases customer traffic and revenue and promotes sustainable development.

CONSUMER AWARENESS AND DEMAND ANALYSIS OF LEISURE FISHERIES

According to market research data, there are differences in consumer awareness of leisure fisheries in Inner Mongolia. The following is an analysis of consumer awareness and demand:

1. **Awareness Level:** Surveys indicate that only 45% of respondents know leisure fisheries in Inner Mongolia, and their understanding of specific activity forms is quite limited. This indicates that there is still a need to strengthen market promotion and consumer education.
2. **Demand Preferences:** When choosing leisure fishing activities, respondents generally prefer the following types of activities ([Figure 1](#)): fishing activities (60%), water-based recreation (40%), sightseeing (35%), and seafood tasting (30%).

ANALYSIS OF INNER MONGOLIA'S RECREATIONAL FISHERY INDUSTRY BASED ON SWOT METHOD

SWOT analysis offers a comprehensive perspective when assessing the development potential of Inner Mongolia's recreational fishery. By identifying strengths, weaknesses, opportunities, and threats, strategies can be formulated to enhance the development of recreational fisheries in Inner Mongolia. The specific steps of SWOT analysis include (1) collecting relevant data and literature, (2) interviewing industry experts and practitioners, (3) questionnaire survey,

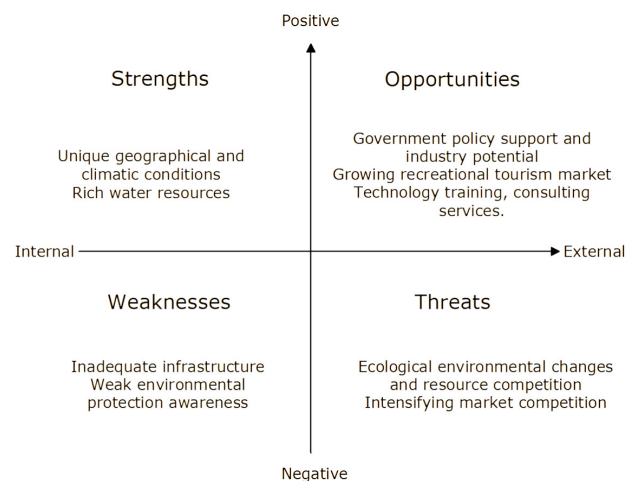


Fig. 2. SWOT Analysis

and (4) synthesizing and analyzing the data to draw research conclusions. The results are detailed in [Figure 2](#).

STRENGTHS

Unique Geographical and Climatic Conditions: Inner Mongolia boasts abundant water resources and diverse climatic conditions suitable for the growth and reproduction of various aquatic organisms, providing a solid natural foundation for the development of recreational fisheries. **Rich Water Resources:** The lakes, rivers, and reservoirs in Inner Mongolia offer a wealth of fishery resources, attracting visitors for fishing, sightseeing, and ecological tourism.

WEAKNESSES

Inadequate Infrastructure: Existing transportation, accommodation, and entertainment facilities are not well developed, impacting the visitor experience and participation.

Weak Environmental Protection Awareness: In some areas, there is insufficient emphasis on ecological protection, which could lead to environmental degradation and affect sustainable development.

OPPORTUNITIES

Government Policy Support and Industry Development Potential: The importance and support given to recreational fisheries by national and local governments create a favorable policy environment for the industry, facilitating investment and resource attraction. **Growing Recreational Tourism Market:** With rising living standards, the demand for recreational tourism is increasing, presenting new development opportunities for Inner Mongolia's recreational fisheries.

THREATS

Ecological Environmental Changes and Resource Competition: Climate change and competition for water resources may impact fishery resources, threatening sustainable development. **Intensifying Market Competition:** As recreational fisheries in other regions develop, Inner Mongolia faces increasing market competition and must enhance its appeal and competitiveness.

Through SWOT analysis, Inner Mongolia's recreational fishery demonstrates considerable development potential in terms of resources and market demand yet faces infrastructure and ecological protection challenges. Strategies can be developed to leverage strengths and opportunities while addressing weaknesses and threats, promoting the sustainable development of recreational fisheries in Inner Mongolia.

RESEARCH ON STRATEGIES FROM THE PERSPECTIVE OF INDUSTRY INTEGRATION

In the current economic environment, recreational fisheries development requires not only its own strengths but also a higher level of synergy and integration through industry integration. The following are specific strategies for developing recreational fisheries in Inner Mongolia.

PROMOTE INDUSTRY CHAIN INTEGRATION

ESTABLISH INTEGRATION MODELS WITH TOURISM AND AGRICULTURE

Inner Mongolia's recreational fisheries should actively integrate with related industries such as tourism and agriculture to form a diversified industry chain. For example, developing "fishing + tourism" projects that provide comprehensive services like fishing, sightseeing, and agricultural experiences can attract more visitors. This integration enhances the visitor experience and promotes the mutual development of various industries, creating a positive cycle.

OPTIMIZE INDUSTRY STRUCTURE AND IMPROVE RESOURCE UTILIZATION EFFICIENCY

It is necessary to rationally optimize and adjust the existing recreational fishery industry structure. By conducting an in-depth analysis of market demand, priority products and services can be identified to reduce inefficient and redundant resource investments, thereby improving overall resource utilization efficiency. Additionally, promoting the application of new technologies can enhance the automation and intelligence levels of fishery production, achieving more efficient resource management and utilization.

STRENGTHEN INFRASTRUCTURE CONSTRUCTION

JOINT INVESTMENT BY GOVERNMENT AND ENTERPRISES IN RECREATIONAL FISHERY FACILITIES

To enhance the attractiveness of Inner Mongolia's recreational fisheries, investment in infrastructure must be increased. The government should encourage enterprises to participate in the construction of recreational fishery facilities through public-private partnership (PPP) models, jointly developing and managing related facilities. These facilities, including recreational fishery centers, fishing platforms, and visitor reception centers, can provide better service experiences for visitors.

IMPROVE TRANSPORTATION AND INFORMATION INFRASTRUCTURE

Convenient transportation and advanced information infrastructure are key to attracting visitors. Efforts should be made to accelerate the construction of roads and transportation facilities to improve visitor travel conditions. At the same time, promoting information technology development by creating apps and websites related to recreational fisheries can facilitate information access and service reservations for visitors, enhancing overall operational efficiency.

ECOLOGICAL PROTECTION AND SUSTAINABLE DEVELOPMENT

PROMOTE ECO-FRIENDLY AQUACULTURE AND MANAGEMENT MODELS

Emphasizing ecological protection and sustainable development is crucial in developing recreational fisheries. Eco-friendly aquaculture and management practices should be promoted, such as using renewable resources and ecological farming techniques to minimize environmental impact and protect aquatic ecosystems. This not only helps maintain biodiversity but also enhances brand image.

STRENGTHEN WATER RESOURCE MANAGEMENT AND PROTECTION

Managing and protecting water resources is fundamental to the sustainable development of recreational fisheries. A comprehensive water resource management system should be established, with scientific water use plans and standards to ensure efficient water resource utilization. Additionally, monitoring and protecting water quality is essen-

tial to prevent pollution and overexploitation and maintain the health of aquatic ecosystems.

BRAND BUILDING AND MARKET PROMOTION

CONDUCT BRAND PROMOTION ACTIVITIES TO ENHANCE AWARENESS

Brand building is crucial to enhancing the market competitiveness of Inner Mongolia's recreational fisheries. Diverse brand promotion activities should be undertaken, such as participating in domestic and international tourism exhibitions, organizing experiential activities, and collaborating with media to increase awareness and influence of these fisheries.

DEVELOP DIVERSE RECREATIONAL FISHERY PRODUCTS AND SERVICES

A variety of recreational fishery products and services should be developed based on market demand. For example, in addition to traditional fishing activities, diverse projects such as fishing experiences, ecological education, and family activities can be launched to meet the needs of different visitors. This diversification not only attracts more tourists but also contributes to improving overall revenue levels.

By implementing the above strategies, Inner Mongolia's recreational fisheries can achieve sustainable and high-quality development within industry integration. The deep integration of fisheries with other industries can enhance resource utilization efficiency and effectively respond to market competition and ecological challenges, injecting new vitality into Inner Mongolia's economic development.

INSIGHTS AND SUGGESTIONS FOR THE DEVELOPMENT OF RECREATIONAL FISHERIES ABROAD

The development experience of recreational fisheries in Inner Mongolia provides valuable lessons for its own future growth and offers important insights and suggestions for the development of recreational fisheries abroad.

ECO-FRIENDLY DEVELOPMENT MODELS

Inner Mongolia emphasizes ecological protection and sustainable utilization in its recreational fisheries development, a successful fishery management strategy adopted by many developed countries. Implementing eco-friendly aquaculture and management practices can effectively maintain ecological balance in water bodies, ensuring the long-term sustainability of fishery resources. Foreign recreational fisheries should continue to explore and promote eco-friendly business models, such as using environmentally friendly materials and technologies in aquaculture to reduce environmental impact. Strengthening ecosystem protection through legislation and policy guidance can encourage sustainable fishing practices.

POLICY SUPPORT AND BRAND BUILDING

The experience from Inner Mongolia indicates that government policy support is crucial for developing recreational

fisheries. Financial support, tax incentives, and relevant regulations create a favorable environment for businesses and practitioners. Additionally, brand building is essential for enhancing market competitiveness. Foreign recreational fisheries should invest more in brand building to enhance brand awareness and market influence, attracting more consumers. Simultaneously, governments should strengthen policy support for recreational fisheries, encouraging local characteristic brands' development and market promotion.

TECHNOLOGICAL INNOVATION AND MARKET DIVERSIFICATION

Inner Mongolia's recreational fisheries are gradually adopting new technologies to improve production efficiency and product quality, aligning with international market demands. Technological innovation not only optimizes the industry chain but also provides consumers with a wider range of choices. Foreign recreational fisheries should continue to increase investments in technological innovation, particularly in smart management, information services, and digital marketing. Moreover, promoting market diversification by developing various forms of recreational fishery activities can meet diverse consumer needs and attract a broader market participation.

INTERNATIONAL COOPERATION AND EXPERIENCE SHARING

Inner Mongolia can gain rich experiences through international cooperation in developing recreational fisheries, especially in resource management, market development, and technological innovation. This cooperation model is widely applied abroad and helps enhance the overall industry level. Foreign recreational fisheries should strengthen international cooperation and actively participate in global fishery exchange and cooperation projects. By sharing successful experiences and technologies, resources can be shared, and mutual benefits achieved, jointly promoting the sustainable development of global recreational fisheries.

The development experience of Inner Mongolia's recreational fisheries offers crucial insights for foreign counterparts, including eco-friendly development models, policy support and brand building, technological innovation and market diversification, and international cooperation and experience sharing. By learning from these experiences, foreign recreational fisheries can achieve greater breakthroughs and progress in sustainable development, market competitiveness, and resource management.

DISCUSSION

MAIN RESEARCH CONCLUSIONS

The analysis in this study indicates that Inner Mongolia's leisure fishing industry possesses unique advantages and potential but also faces challenges such as infrastructure deficits, ecological protection, and market competition. Im-

plementing industrial integration, eco-friendly operating models, and strengthening infrastructure will lay a solid foundation for the development of leisure fishing in Inner Mongolia.

OUTLOOK FOR THE FUTURE DEVELOPMENT OF INNER MONGOLIA'S LEISURE FISHING INDUSTRY

Inner Mongolia's leisure fishing industry is poised to seize new development opportunities as policy support and market demand increase. Inner Mongolia's leisure fishing is expected to become a favored destination for domestic and international tourists by continually optimizing industrial structure, enhancing service quality, and strengthening brand development.

LIMITATIONS OF THE STUDY AND FUTURE RESEARCH DIRECTIONS

This study primarily relies on existing literature and case analysis, lacking in-depth field research, which may affect the applicability of certain conclusions. Future research could explore consumer needs and behavior characteristics through empirical studies and surveys, further providing evidence for the development of leisure fishing in Inner Mongolia. Additionally, as the global leisure fishing market evolves, dynamic monitoring and analysis of relevant policies and market trends will provide essential references for the sustainable development of Inner Mongolia's leisure fishing industry.

ACKNOWLEDGMENTS

This study was supported by Central Public-Interest Scientific Institution Basal Research Fund, Chinese Academy of Fishery Sciences(2023TD30). We also extend our gratitude to the anonymous reviewers for their valuable comments and suggestions, which have significantly improved this manuscript. We appreciate the editors for their insightful feedback and editorial handling.

AUTHORS' CONTRIBUTION

Conceptualization: Xue Li (Equal), Tiantian Pang (Equal), Zhuming Zhao (Equal). Funding acquisition: Xue Li (Equal), Zhuming Zhao (Equal). Investigation: Xue Li (Equal), Xue-

bin Feng (Equal). Methodology: Xue Li (Equal), Tiantian Pang (Equal). Resources: Xue Li (Lead). Writing – review & editing: Xue Li (Equal), Zhuming Zhao (Equal). Formal Analysis: Tiantian Pang (Equal), Jianying Zhang (Equal). Software: Tiantian Pang (Equal), Jianying Zhang (Equal). Writing – original draft: Tiantian Pang (Equal), Jianying Zhang (Equal). Data curation: Xuebin Feng (Equal), Jianying Zhang (Equal). Supervision: Xuebin Feng (Equal), Zhuming Zhao (Equal). Visualization: Xuebin Feng (Lead). Project administration: Jianying Zhang (Equal), Zhuming Zhao (Equal). Validation: Jianying Zhang (Equal), Zhuming Zhao (Equal).

COMPETING OF INTEREST – COPE

No competing interests were disclosed.

ETHICAL CONDUCT APPROVAL

IACUC

RESEARCH INVOLVING ANIMALS

We have consulted the 'Animal Research: Reporting In Vivo Experiments' (ARRIVE) guidelines, developed by the NC3Rs, to improve reporting standards and ensure that the data from animal experiments can be thoroughly scrutinized and utilized. We confirm that all efforts were made to ameliorate animals' suffering. We comply with the Convention on Biological Diversity and the Convention on the Trade in Endangered Species of Wild Fauna and Flora.

INFORMED CONSENT STATEMENT

All authors and institutions have confirmed this manuscript for publication.

DATA AVAILABILITY STATEMENT

All are available upon reasonable request.

Submitted: October 30, 2024 CST. Accepted: November 24, 2024 CST. Published: December 12, 2024 CST.



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-4.0). View this license's legal deed at <http://creativecommons.org/licenses/by/4.0> and legal code at <http://creativecommons.org/licenses/by/4.0/legalcode> for more information.

REFERENCES

1. Eagles PFJ, Windh A. The Role of Recreational Fishing in Tourism. *Fisheries Research*. 2018;209:58-64.
2. Kearney J. Sustainable Development of Recreational Fisheries: The Global Perspective. *Marine Policy*. 2020;113:103797.
3. González AF et al. Ecotourism and Recreational Fisheries: A Sustainable Future? *Fisheries Management and Ecology*. 2019;26(2):123-134.
4. Huang XT, Huang ZG. Current issues and countermeasures for the development of leisure fishing in the Beibu Gulf. *Jiangxi Aquatic Science and Technology*. 2022;1:56-57.
5. Dong XY. *Research on the Issues and Countermeasures for the Development of Leisure Fishing in Shandong Province*. Master's thesis. Dalian Ocean University; 2024. doi:[10.27821/d.cnki.gdlhy.2024.000617](https://doi.org/10.27821/d.cnki.gdlhy.2024.000617)
6. Zhang Y, Li SS, Zhang QH, et al. Investigation of the problems and countermeasures in the development of leisure fishing in Zhoushan City. *Rural Economy and Technology*. 2024;35(01):75-77.
7. Dai YJ, Luo XD, Zhou SY, et al. Research on countermeasures for the development of island leisure fishing under the background of rural revitalization: A case study of Pingtan, Fujian. *Straits Science and Technology*. 2023;36(06):93-96.
8. Xu FL. *Research on Countermeasures for the Development of Leisure Fishing in Zhejiang Province Based on Grey Relational Analysis*. Master's thesis. Zhejiang Ocean University; 2022. doi:[10.27747/d.cnki.gzjhy.2022.000061](https://doi.org/10.27747/d.cnki.gzjhy.2022.000061)
9. Lin J. Investigation of issues and countermeasures for the development of leisure fishing in China under the background of rural revitalization. *Southern Agriculture*. 2021;15(35):148-150. doi:[10.19415/j.cnki.1673-890x.2021.35.050](https://doi.org/10.19415/j.cnki.1673-890x.2021.35.050)
10. Liu CP. A brief discussion on countermeasures for the development of leisure fishing in Yongjing County. *Scientific Fish Farming*. 2021;07:77-78. doi:[10.14184/j.cnki.issn1004-843x.2021.07.045](https://doi.org/10.14184/j.cnki.issn1004-843x.2021.07.045)
11. Ma P, Wang SJ, Liu SD, et al. Research on countermeasures for the high-quality development of leisure fishing in Shandong. *China Fisheries*. 2023;9:90-92.
12. Li GF. Current status and countermeasures for the development of leisure fishing in Jinghai District. *Modern Rural Science and Technology*. 2022;8:107-108.
13. Yu SJ, Sun Y. Current status and countermeasures for the development of leisure fishing tourism in Sanya. *Business Exhibition Economy*. 2024;11:43-46. doi:[10.19995/j.cnki.CN10-1617/F7.2024.11.043](https://doi.org/10.19995/j.cnki.CN10-1617/F7.2024.11.043)
14. Shen F. *Research on Countermeasures for the Development of Leisure Fishing in Haikou under the Background of the Free Trade Port*. Master's thesis. Zhejiang Ocean University; 2023. doi:[10.27747/d.cnki.gzjhy.2023.000254](https://doi.org/10.27747/d.cnki.gzjhy.2023.000254)