

Article

Key Sustainable Factors for Recreational Fishery Development Under Rural Revitalization Policy

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Abstract: With the promotion of rural revitalization policies, coastal cities have begun to actively develop recreational fisheries for local social and economic benefits. The recreational fishery is the future development trend of the fishery and leisure industry. Thus, this study aims to construct a set of indicators to objectively evaluate the key success factors of recreational fisheries development under rural revitalization policies. For the evaluation, relevant supporting measures are analyzed, and industry strategies are formulated. This study is conducted through a literature review and by applying the Delphi method. Through two rounds of measurement by experts and scholars, the key success factors and a set of indicators of recreational fishery development under rural revitalization policy are found. Six important dimensions are proposed, including fishery resources, environment, accommodation, services, activities, and recreational fisheries policy. After the analysis of the central tendency, 52 factors for the development of recreational fisheries are defined. The most important dimensions for recreational fishery are found to be resources and environmental conditions, followed by service conditions, activities and policy conditions, and accommodation conditions. Among them, experts and scholars are concerned about the four indicators: "Tasting delicious aquatic products", "Government support: whether the government has included the project into development and support", "Recreational fishing activities pricing" and "Talent revitalization: cultivating talents for the development of secondary and tertiary industries in fishing villages". The following suggestions are put forward with the result: (1) making recreational fishery an important object of my country's rural revitalization policy, (2) using each indicator as the basis for policy implementation, and (3) establishing a recreational fishery promotion group. At six levels, key implementation strategies are proposed.

Keywords: Rural revitalization policy, Recreational fishery, Key Sustainable Factors, Delphi method

1. Introduction

The recreational fishery enriches the content and development of the fishery. It organically combines leisure activities such as tourism, leisure, and the ornamental aquarium with modern fishing methods and realizes the combination of primary and tertiary industries. Since the 1960s, with the development and improvement of the social economy, residents' demand for consumption has increased, and recreational fisheries have emerged in economically developed countries and regions. Through planning and design, recreational fishery integrates leisure, entertainment, tourism, catering, and cultural resources in fishing villages, giving full play to the leisure and tourism functions. It promotes the experience of tourists, improves the quality of tourism, increases the income of fishermen, and promotes the development of fishing villages. In recent years, the country has proposed a rural revitalization policy. Therefore, a way of sustainable rural development needs to be explored. The rural revitalization strategy has a catalytic effect on increasing fishermen's income for improving the living environment and quality of life. The development of recreational fishery is an important part and driving force of national rejuvenation. Integrating recreational fisheries promotes the effective implementation and healthy development of rural revitalization strategies. Overall, the development of recreational fishery has advantages such as improving the quality of the tourism experience, helping to shape brand image, promoting the comprehensive development of coastal tourism, developing the entire fishery industry chain, creating a fishery ecological livable space, and realizing the construction of fishing villages.

Since the policy of rural revitalization has been put forward, various coastal cities began to actively develop recreational fisheries to achieve social and economic benefits. The recreational fishery utilizes fishing equipment, fishing village space, fisheries production sites, the art of fishing gear, fishery products, fishery activities, the natural environment, and village cultural resources

to play the leisure tourism function of fishery and fishing villages. At the same time, it enhances people's experience of fishing villages and fishery development, improves tourism quality, increases fishermen's income, and promotes the development of fishing villages. The common problem in the development of traditional fishery in China is that the development concept is lagging and long-term planning is lacking. Recreational fishery mainly focuses on recreational fishing and fishing activities, and its functions are relatively simple. The products for tourism are mainly seafood and simple marine crafts. It lacks high-quality rural revitalization practitioners. At present, their cultural and educational quality is generally low, and they lack certain professional knowledge and skills. There is also a lack of technology and capital investment in this industry. To realize the development of recreational fishery, the recreational fishery must be combined with the rural revitalization policy to increase the investment in science and technology.

2. Literature Review

In view of the key success factors of recreational fishery development under the rural revitalization policy, we discuss definitions, theories, activities, and other related issues. The related factors of the recreational fishery are numerous and complex. Therefore, to construct the exclusive success factors of the recreational fishery, the needs of tourists, the connotation of fisheries, and the development status of countries must be comprehensively considered.

2.1. Definition of Rural Revitalization Policy

The rural revitalization strategy is proposed in the report of the 19th National Congress of the Communist Party of China on October 18, 2017. The report pointed out that farmers in agriculture and rural areas had a fundamental problem related to the national economy and people's livelihood. The implementation of the rural revitalization strategy is to solve the "three rural" issues and is the top priority of the whole party's work. The CPC Central Committee proposed a "Rural Revitalization Strategy" to build a modern village with prosperous industries, livable ecology, civilized rural customs, effective governance, and affluent lives [1]. The strategy is to promote the construction of new socialist countryside and ensure the realization of the century-old dream. In accordance with the goal of the strategy, it is necessary to protect and inherit traditional rural culture, improve the high-quality development of the rural economy, build green villages, promote the modernization of rural governance, and transform rural areas into modern villages with Chinese socialist characteristics [1]. Feng and Jiang (2020) [2] proposed that rural revitalization is the basic goal of building a modern socialist country, involving industry, culture, governance, ecology, life, and other aspects. It aims to promote the all-round development of rural areas and complement the development of shortcomings and eliminate the main social contradictions [2]. He (2017) [3] pointed out that the current prosperous secondary and tertiary industries in China's coastal urban economic belt and rural areas showed a sharp contrast with the relatively limited income agriculture in general agricultural areas in the central and western regions. It is difficult to form a thriving industry only by relying on small-scale agriculture, or even agriculture for the elderly [3]. Yu (2021) [4] mentioned that based on the strategic layout of the country's rural revitalization, there are many complex factors and problems involved in the development of rural tourism in various regions. It needs to proceed from the local reality, take leisure as the core, and be supplemented by themes that conform to the local cultural heritage to form the characteristics of different cultural and regional backgrounds [4]. Lei and Yu (2021) [5] believed that the rural revitalization policy system must not be regarded as a policy cluster with a single goal and a single dimension. Its essence is composed of different policy systems, showing a complex policy system with diverse goals and dimensions, that is, a system with strong integrity and internal penetration. At present, the rural revitalization strategic policy system has been initially established at the central and local levels, which is divided into five dimensions: the industrial policy system, the ecological policy system, the cultural policy system, the rural governance policy system, and the people's livelihood security policy system. Only by cooperating and forming a complementary role, can the cross-service services be coordinated to achieve the overall requirements. Then, the implementation of the overall strategy of rural revitalization is promoted [5].

2.2. Relevant Theories of Recreational Fisheries

Lin and Hong (2005) [6] pointed out "Leisure Fishery" is a new type of tertiary industry that integrates leisure and entertainment, tourism, culture, catering, and other industries with the fishery. It expands the space for fishery development, opens up new fields of the fishery, and improves the social, ecological, and economic benefits of the fishery [6]. Ying (2005) [7] mentioned that since the 1960s, recreational fisheries have risen rapidly in economically developed coastal countries and regions, organically combining leisure, entertainment, tourism, catering, and other industries with the fishery, which improved the social development of fisheries, ecological and economic benefits and formed a new type of industry. The recreational fishery has become an important part of modern fishery and plays an important role in the protection of fishery resources, the promotion of fishermen's income, and the adjustment of fishery industry structure. However, as a new industry develops, there must be supporting planning and

management [7]. Cai (2005) pointed out that "leisure fishery" is a new field in fishery development, which integrates fishery, science popularization, tourism, fitness, entertainment, and leisure. Organically combining modern fishery with the teaching of leisure, tourism, sightseeing, and marine and fishery knowledge and culture, the mutual integration and transfer of primary, secondary, and tertiary industries are realized, thereby creating greater economic and social benefits [8]. Min (2005) pointed out that there are four existing types of "leisure fishery", such as production and operation type, recreational fishing type, sightseeing and recuperation type, and display and education type [9]. Gou (2005) [10] stated that recreational fishery, which intersects with conventional fisheries and modern tourism, has risen rapidly after the development of the fishery and has become a strategic adjustment of the national fishery structure. The recreational fishery is the essence of the experience economy and a new type of aquatic industry that investors actively enter [10]. Fang et al. (2008) [11] expressed that recreational fisheries refer to a variety of fishery resources, including fishery equipment, fishery production sites, fishery products, fishery natural environment, and human environment. It is a new type of industry that combines modern fishery activities in the form of leisure activities to meet people's leisure needs [11]. Three viewpoints have been put forward, including firstly, recreational fishery meets the strong recreational needs of the public. Secondly, it promotes economic development and adjustment of the fishery industry's structure, and finally, recreational fishery protection, reproduction, and resource recovery [12].

2.3. Industry Status and Prospects of Recreational Fisheries

There are various forms of fishery resources including fishing villages, fishery production resources, fishing gear, fishing methods, fishery products, natural organisms, natural environment, and human resources. It provides society with products and services that meet people's leisure needs by combining culture, popular science, and catering, and realizes a new fishery business that combines primary, secondary and tertiary industries. Chai (2007) [13] mentioned that the development of recreational fishery is of great significance to the adjustment and sustainable development of the fishery industry structure. The United States and Japan developed recreational fishery earlier and have many successful experiences in management systems, management methods, legal systems, organizational construction, scientific research support, and resource protection. In China, there are prominent problems such as lack of planning, disorderly competition, resource degradation, lack of funds, chaotic management, and lagging legal system construction. Drawing on the experience of the United States and Japan, the top priority is to plan well, establish a scientific management system, improve the legal system, expand financing channels, strengthen scientific research, and strengthen information system management [13].

Liu (2006) [14] pointed out that with the development of the social economy and the improvement of people's living standards, people pay more attention to the improvement of life quality. Therefore, the recreational fishery has become for people's leisure and entertainment activities and industry in countries. The practice of various countries has proved that recreational fishery has become an important part of the modern fishery and plays an important role in the protection of fishery resources, the promotion of fisher (farmer) people's income increase, and the adjustment of the fishery industry structure. However, the planning, development, and management of recreational fisheries are all deep-seated problems faced by this new type of fishery [14]. Lou (2006) [15] stated that there are essential differences between recreational fishing and traditional fishing. From the point of view of the purpose of engagement, traditional fishery production is the fishing behavior of fishermen. The purpose of its production is to obtain the amount of fishing and then economic income from the fishing industry after sales to maintain a livelihood. Obtaining economic income from the fishery is the sole purpose of traditional fishery production. Differently, the purpose of recreational fishery is to activate fishery resources and attract people other than those engaged in fishery, that is, tourists. The purpose is to create and provide opportunities for tourists who come for sightseeing and leisure. Through the personal experience of fishermen's production and lifestyle, tourists obtain physical and mental leisure and relaxation and experience another lifetime interest. Thereby, it enriches and increases life experience. That is to say, the fishermen obtain the corresponding economic income through the leisure of tourists. The purpose of recreational fishing is dual, that is, to create fishing income and recreational experiences for tourists. In addition, the main activities, the time of activities, the spatial scope of activities, and the form of activities are different from traditional fisheries. The recreational fishery pays more attention to participation, which reflects the shortness of the activity time and the diversification of the activity form [15].

According to the statistics of the leisure fishery industry, the national leisure fishery output value is RMB 70.842 billion, accounting for 2.86% of the total fishery output and 10.45% of the output of the tertiary fishery industry. There are 12,317 recreational fishing vessels in China, with a total power of 274,300 kW. There are 110,200 recreational fishery business entities nationwide, including 13,700 business entities above the designated size. Among them, the turnover of tourism-oriented leisure fishery is RMB 28.594 billion, accounting for 40.36% of the total fishery economic value, leisure fishing and collection industry RMB 23.507 billion, accounting for 40.36% of the total fishery economic value, leisure fishing tackle, bait and aquarium equipment RMB 9.591 billion, 13.54% of total fishery economic output value, and RMB 6.46 billion, accounting for 9.12% of total fishery

economic value. In addition, among the tourism-oriented recreational fisheries, the turnover of the freshwater part is RMB 17.424 billion, accounting for 60.93% of this economic output value, and the turnover of the marine part is 11.171 billion yuan, accounting for 39.07% of this economic output value. The turnover of the freshwater part of the recreational fishing and collection industry is RMB 20.434 billion, accounting for 86.93% of this economic output value, and the turnover of the marine part is RMB 3.072 billion, accounting for 13.07% of this economic output value.

2.4. Advantages of Recreational Fishery Development in China

- **Leisure fishery enriches the tourism resources of the tourist destination and builds the tourism brand**

As the development of the recreational fishery has enriched tourism products in tourist destinations, especially for destinations with relatively poor resources, it can be mined and planned to become the main local tourism brand.

- **Recreational fishery is conducive to solving the problem of fishermen's conversion and promoting the adjustment of the industry structure**

With the reduction of marine fishery resources, limited fishing areas, and difficulties for fishermen, the development of the recreational fishery has provided new opportunities for homeless fishermen and broadened the employment space. At the same time, the destinations of the recreational fishery are generally located in fishing villages with relatively remote geographical locations, weak geographical advantages, and less developed transportation. The development of the recreational fishery drives the development of other industries such as transportation, catering, accommodation, and other industries.

- **Increasing the economic income in fishing areas**

Since recreational fishery projects do not require large up-front capital investment, existing idle fishery equipment and human resources can be utilized. It has the characteristics of less investment and quick effect. The development of recreational fishery can increase the channels for fishermen to earn foreign exchange. It is conducive to improving the income of the fishery economy and tourism economy, and better driving economic, social, and ecological benefits.

- **It has a positive role in improving the quality of life of fishermen and building a harmonious society**

The combination of recreational fishery and tourism has fundamentally changed the nature of the fishery industry. It has developed from the original primary fishery industry to the tertiary tourism industry. The identity and role of fishermen have also changed accordingly, from former fishermen to professional service personnel. In this way, the fishermen are bound to change their way of life and change bad habits.

2.5. Theories related to key success factors

The key factor is to evaluate the degree of completion of specific goals, so there must be indicators of measurement. Therefore, we propose the connotation of key factor indicators for discussion.

- **Connotation of key success factors**

According to Zhang (1991) [16], the key factor is the process of evaluating the value of an event. The key factor is the process of value judgment and decision-making on the factor object [17]. The step is to gather all the relevant facts according to the key factors to understand the strengths and weaknesses and why. Its purpose is to assist factors to improve their service quality or to serve as a basis for administrative management. Jian (1997) proposed that the key factor is to collect data for value judgment and decision-making [18]. Worthern and Sander (1987) mentioned that the key factor is selected from important and representative factors. In the process, the relevant information on the factors is collected, and the value of the key factors is determined according to the factor standard [19]. The OECD (Organization for Economic Cooperation and Development, 1994) pointed out that an indicator is a parameter or a value derived from a parameter to provide information to describe the phenomenon, the environment, and the state of the region [20]. Hong (1995) believed that an indicator is a data judgment for a certain situation, and it is a measure to show the level of the situation [21]. To sum up, the key factor indicators must be based on relevant standards or parameters to evaluate and judge the value of the object or subject of the key factor.

- **Function of key factor indicators**

The developed indicators describe the status quo and reflect the gap between the status quo and the ideal standard, as well as the reference for improvement strategies. Therefore, the function of the key factor indicator is to understand the status quo and niche through the content of the indicator and provide information basis to evaluate the overall development potential.

• **Selection principles of factor indicators**

Dunn (1981) [22] pointed out that the selection principle of seven indicators is relevance, importance, validity, reliability, objectivity, timeliness, and usefulness. Chen (2002) mentioned that the selection of indicators must have representativeness and theoretical basis in addition to stability, reliability, and credibility. The indicators must be concise and easy to understand, and the data must be available in a real environment [23]. Lin (2004) believes that the key factor indicators need to reflect the core and concept of the problem, and the following seven principles are adopted such as effectiveness, availability, stability, understandability, relevance, importance, and practicality [24]. The above principles imply that key factor indicators are parameters that reflect reality and include quantitative data and qualitative meaning. The construction or use of indicators must comply with the above principles and exclude all possible interference factors. In the selection of personnel, experts in professional fields need to be invited to participate, and experts' opinions should be summarized to ensure the accuracy and rationality of the indicators.

3. Materials and Methods

3.1. Research Design and Process

This study is mainly conducted through the Delphi method, which is divided into three stages. The first is to discuss the connotation and essence of the recreational fishery. Through the collection and analysis of data, the key success factors of the recreational fisheries development are defined for research. In the second stage, a formal investigation is carried out through the Delphi method. Then, according to the results, the connotation of each index is analyzed, and a set of evaluation index systems are formulated. Finally, according to the indicators constructed in this study, the differences in views of different objects are compared, and the development focus of each indicator is analyzed to find out the implementation strategy of recreational fishery development under the rural revitalization policy.

The construction and research flow chart of the six main dimension indicators is shown in Fig. 1.

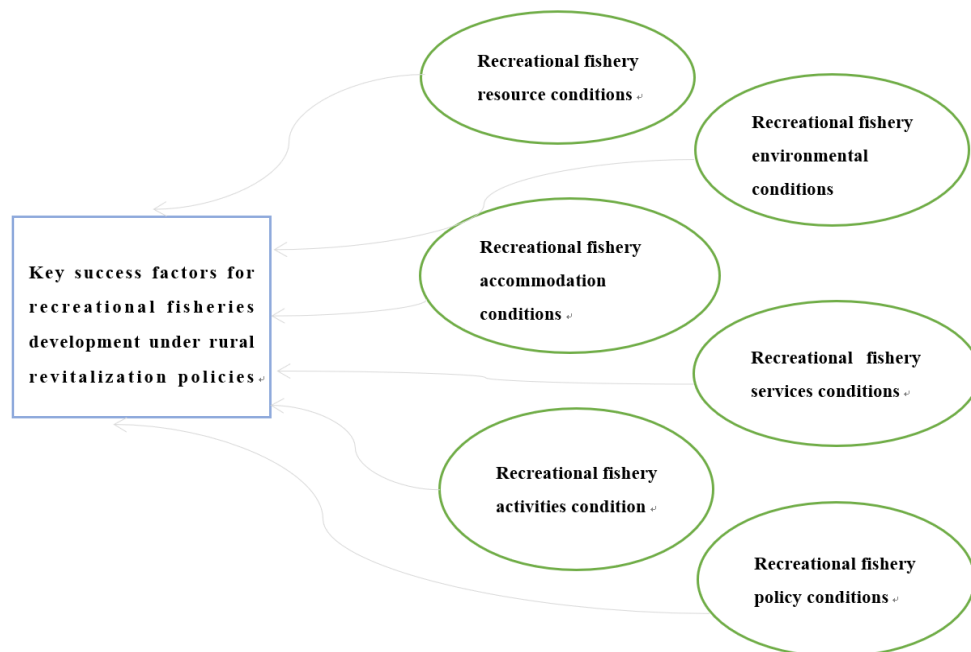


Fig. 1. Six main dimension indicators of the research.

3.2. Delphi Method

The Delphi method was proposed in 1948 by the RAND Corporation, a national defense research program for the United States. The objective was to develop a technique for the most reliable consensus of a group of experts [25]. After the 1960s, it was

gradually applied by government agencies and academic groups and expanded to include government policy, social environment, education system, technology strategy, business management, transportation strategy, research and development, and quality of life [26]. The Delphi method is an expert prediction method and a group decision-making method [27]. This method not only collects the effect of thinking but also takes into account the quality of independent judgment of experts [28]. The Delphi method is a consulting and decision-making technology based on the expertise, experience, and subjective judgment of experts and is applied to many fields based on the characteristics of anonymity, feedback, and statistics [29].

The Delphi method involves the participation of groups such as relevant government departments, scholars, and experts. Through questionnaire survey and statistics, the research topic gradually converges to the result of group decision-making. The main principles are as follows [26,30].

- **Anonymous responses**

During the process, the names and backgrounds of the interviewees are kept strictly confidential to reduce unnecessary interventions and concerns. Experts are selected to form a group, generally with 10–12 or 15–20 people.

- **Principle of repetition and control feedback (Iteration and control feedback)**

After several rounds of operation, the summary of the results of the previous round is communicated to the survey participants between each round, which can reduce unnecessary noise.

- **Statistical group response**

The opinions of the participants are comprehensively judged and counted, and a consensus is finally formed to obtain the results. Using this approach reduces the pressure of conformity in the team and allows individual opinions to be realistically presented operationally. More importantly, counting team responses is a means of ensuring that the opinions of every member of the team can be expressed in the final response.

The Delphi method uses expert guidance and experience to make intuitive predictions [25]. It maximizes expert consensus through a series of centralized expert questionnaires, supplemented by controlled opinion feedback. The Delphi method applies to inaccurate research data, and researchers need to make intuitive judgments based on the expertise and experience of the expert group [26]. Fang et al. (2022) [31] stated that the Delphi method, as a multi-stage iterative expert evaluation method, is often used for expert consensus research on specified topics. Experts in the field of target research exchange their views through many consensus and reliable conclusions. In the framework of today's evidence-based practice, expert opinion is considered if research is lacking or experimental design is not available at the ethical level. The Delphi method combines the experience and knowledge of multiple experts in the research field, guarantees information feedback and communication, and avoids possible disadvantages such as blind obedience in group decision-making [31].

The Delphi method is based on an anonymous panel of experts as the core of the investigation through a series of questionnaires, feedback, result sorting, questionnaire interviews, and feedback and conducts multiple rounds (at least two rounds) of operations to reach a consensus on a certain issue of concern. In short, the Delphi method is a series of questionnaires or rounds of discussions to encourage experts to systematically speculate on the likelihood and outcome of future events and thereby enable each expert to understand the rest of the team. The advantage is that in the absence of references, a consensus view of the matter under investigation can be obtained from the stakeholders. Through the characteristics of anonymity, repeated feedback, and group response statistics, it has the effect of precise convergence on the survey. This reduces the subjective judgment of individuals and gives each respondent a fair chance to influence the decision [32].

3.4. Appropriateness of the Delphi Method

In the past, many studies on indicators mostly used in-depth interviews with experts, the Delphi method, and the AHP analysis method to construct indicator systems. In the Delphi method, the expertise of individual respondents is used in conjunction with the research topic, the sponsor of the research, and the objectives [33]. Since we focus on the identification and consensus of experts on this indicator, the simplest form has traditionally been held for a round table meeting. A compromised virtual consensus emerges from group pressure and psychological factors.

3.5. Research Objects and Research Limitations

The Delphi method takes experts and scholars as the object of investigation, so the selection of appropriate participants is one of the important factors affecting the accuracy of the survey results. Three criteria for selecting experts and scholars, such as knowledge level, reliability, and accuracy are important. However, it is not readily available, and suitable measurement tools are lacking [23]. Therefore, the process is not a simple task and can only be measured by other alternative methods such as self-evaluation of experts and scholars, expert experience, evaluation of colleagues, sources of intelligence information, sense of responsibility, authority, and professional knowledge ability [33]. Therefore, when selecting visiting experts and scholars, the main basis is their professional knowledge ability, experience, and sense of responsibility (willingness to cooperate and support this research). In order to meet the above criteria, the research objectives include (1) contacting recreational fishery experts, (2) having taught relevant courses for more than ten years, (3) having current contact with domestic recreational fishery-related researchers, and (4) engaging in related enterprise management with decision-making positions as consulting objects. In order to avoid face-to-face contact, repeated questionnaires are used to conduct private consultations.

3.6. Questionnaire Design and Investigation Process

3.6.1. Contents of Evaluation Indicators

Regarding the content of the key success factor for the development of recreational fisheries under the rural revitalization policy, an initial questionnaire was developed. The metrics are listed in Table 1. There are three levels of the indicator structure. There are six categories including Resources, Environment, Accommodation, Services, Activities¹, and Policies. In the indicator architecture, the second level is the subcategory, and the third level is the indicator. A total of 51 indicators are included in this study.

Table 1. Overview of the categories.

Main category	Subcategory	Indicators	Indicators description
1. Resources conditions	Natural resources	1-1 Natural scenery	The related to nature in the scenery
		1-2 Climatic scenery	Weather characteristics of the region
	People's cultural resources	1-3 Humanistic scenery	Fishing village settlement style, architectural and other characteristics
		1-4 Fishery scenery	Aquaculture farms, sea fishing farms, Marine pastures, etc
2-1 Community \ urban environment		The environment of the main body of the community	
2-2 Richness of the cultural assets		The richness of a strategic asset	
2. Environment conditions	Recreational fishery people's cultural environment	2-3 Red revolution campaign site	Provide memorial sites for the Red Revolution activities
		2-4 Modern economy, technology, culture, art, scientific activities places	Provide a new era sightseeing place
		2-5 Special cultural activities	Provide regional special custom activities
		2-6 Recreational fishery industry resources	Generate recreational fishery class economic benefits
		2-7 Language	It is easy to communicate with the local people verbally
	Recreational fishery tourism environment conditions	2-8 Recreational fishery culture site	Historical sites exist for viewing and experience
		2-9 Investment value of sightseeing	Conditions for the development of tourism
		2-10 International airport location	Distance from the airport to the attractions
		2-11 Highway and bus station	The main transportation for tourism
3. Accommodation conditions		3-1 Medical service	Hospitals or clinics that provide medical services
		3-2 Recreational facility	Provide perfect leisure facilities

4. Services conditions	Recreational fishery accommodation	3-3 Environmental quality	Local air and street sanitation are suitable for tourists to enjoy the tour
		3-4 Life\Accommodation	Provide perfect living / accommodation function facilities
		3-5 Homestay	Small residential facilities built by using local dwellings and other related idle resources.
	Residence form	3-6 Hotel	Commercial agency offering visitors space for short rest or sleep.
		3-7 Boat house	Also known as the most typical local, with national characteristics of the residential sample type
		3-8 Accommodation facilities	Living room, kitchen, basic furniture
		3-9 Comfort degree	The objective environment feels from the physical and psychological aspects
	Reception organization	3-10 Privacy	Selective control of your residential environment from intrusion
		4-1 Emergency incident handling unit	Emergency comprehensive headquarters
		4-2 Tourism service unit	Engaged in the tourism service industry for international tourists and domestic tourists service working organs or work units
Introduction and consulting Services	4-3 Environmental introduction	Describes description of the attractions	
	4-4 Consultants	Professionals who provide attractions consulting services	
Service personnel quality	4-5 Service personnel attitude	Service staff in words and deeds show an manner	
	4-6 Service personnel ability	The comprehensive quality of the service personnel reflected in their work	
5. Activities conditions	Recreational fishery activity environment	5-1 Artificial water area environment	The sites with recreational fishing activities and fishery production are such as sweet and sour heap, Shihu and fish farm
		5-2 Fishing methods	With recreational fishing activities can be operated fishing gear such as pull, fixed net, pole net
		5-3 Fishing activities mode	Variety of operational activities, such as pulling, fish farm catching fish, farming, laver picking, clam picking, and oyster picking
		5-4 Food service	Delicious aquatic products delicacies
		5-5 Science education	The knowledge of aquatic products and popular science for the purpose of the display form
		5-6 Leisure sports	Provide fishing, golf, fitness and other leisure facilities
		5-7 Infrastructure	The construction of various material facilities in the scenic spots
		5-8 Original landscape	Landscape foundation for developing tourism
6. Policies conditions	Tourism policy	6-1 Government support	Government project support and funding
		6-2 Relevant national tourism departments	Relevant national tourism departments
		6-3 Tourism legal system	Solve the conflicts and disputes
		6-4 Financing system	Provide financing and reduce investment risks
		6-5 Prices	Pricing for recreational fishery activities
		6-6 Unified management of scenic spots	Reasonable recreational fishery management
	Policy conditions	6-7 Sustainable development	Coordinated development of economic, social, resource, and environmental protection
		6-8 Economic policy	Industry support and injection
	Rural revitalization	6-9 Ecological protection and supervision	Preserve the ecological environment
		6-10 Talent revitalization	Cultivate talents for rural secondary and tertiary industry development
		6-11 Cultural revitalization	Intensify the publicity of rural culture

3.6.2. Investigation Process

The questionnaires for this study were sent by mail or fax. Two rounds of expert and scholar consultations and tests were conducted. For qualified experts and scholars, 12 solicitation letters were sent out in the first round, and all questionnaires were returned. Among them, there were 2 experts from Taiwan and 10 experts from mainland China, including 5 government officials and 7 scholars. In the second round of the questionnaire survey, 13 solicitation letters were issued in this round, and all the questionnaires were returned. There were 5 experts from Taiwan and 8 experts from mainland China, including 5 government officials and 8 scholars. The operation process is as follows (Table 2). (1) Determining the research purpose: the purpose of this research is to construct an objective and fair evaluation index system that can be applied to the review of future development sites. (2) Determining consultation objects: experts and scholars in fields are selected in the recreational fishery management and decision-making positions of government departments as consultation objects, and questionnaire consultation is conducted. (3) Questionnaire design. (4) Statistics on the sending and recycling of the first round and the second round of questionnaires. (5) Compilation and analysis of the results.

Table 2. Implementation Process of Delphi Questionnaire.

Order and Time	Work Content
Pre-work June 12–20, 2022	1. Experts are invited to evaluate the first draft of the questionnaire design. 2. Revise and complete the first round of Delphi questionnaire.
Delphi questionnaire Round 1 June 23–27, 2022	1. Delphi experts receive a research explanatory letter and the first round of questionnaires 2. Delphi experts fill in each item and send it back
Delphi questionnaire Round 2 July 17–21, 2022	1. Delphi experts received the second round of questionnaires, together with the records and analysis results of the first questionnaire. 2. Delphi experts fill in each item and send it back.
Data processing	Results Pooling and Reliability Test of Questionnaire Results

3.6.3. Questionnaire Design

In Delphi's second questionnaire development and revision, for the validity test of the questionnaire, expert validity (also called content validity) is mainly used as the judgment. That is, the first draft of the second Delphi questionnaire is formulated according to the evaluation index content of the Delphi questionnaire. During the process, Taiwanese experts (scholars) conducted interviews and evaluations on the correctness and necessity of the questionnaire contents and revised and completed the second round of questionnaires (Table 3).

Table 3. Correction item and result.

Facet	Correction Item	Correction Result
The first level		It is recommended to increase the number of facilities and conditions (including recreational fishing boats, special docks and other infrastructure construction), if the previous resource conditions and environmental conditions are not included.
Resources conditions	1. Ingredients related to nature in the scenery 3. Fishing village settlement style, architectural aspects and other characteristics	1. Natural resource-related components of recreational fisheries. 3. Leisure fishery components related to cultural resources, such as fishing village settlement style, architecture and other characteristics.
	4. Aquaculture farms, sea fishing farms, marine pastures, etc	4. The richness of the resources related to the first level of production in recreational fisheries, such as aquaculture farms, sea fishing farms, and Marine pastures. It is suggested to increase the number of resources converted by fishery production into leisure, entertainment and viewing. It is suggested to increase the area of using tidal flats for aquaculture. It is suggested to increase the number of recreational fishery formats.

Environmental conditions	1. Environmental analysis: residential environment of the main community	1. Environmental analysis: the environment where community residents are the main body.
Accommodation conditions		It is suggested to increase accommodation experience: a new accommodation environment that integrates leisure fishery with folk experience, cultural experience and creativity.
Service conditions		It is recommended that warning signs be set near the service area. It is recommended to increase the provision of the internet of things. It is recommended to increase the experience service of the primary production process of recreational fishery.
Activities conditions	6. Provide fishing, golf, fitness and other leisure facilities	6. Provide fishing, recreation, sports, fitness and other leisure facilities. It is suggested to add the festival daily necessities and characteristic cultural products with the traditional culture of leisure fishery characteristics.
Policy conditions	4. Financing system: provide financing and reduce investment risks	4. Financing system: provide enterprise financing and reduce investment risks.

The first round of questionnaires used a semi-open design. The "resource conditions", "environmental conditions", "accommodation conditions", "service conditions", "activity conditions" and "Policy Conditions" were sorted out from literature. There are a total of 51 indicators in six dimensions. In the two rounds, experts and scholars were invited to pay attention to each indicator (measured by a Likert 5-point scale, very important 5, important 4, general 3, unimportant 2, and very unimportant 1) and additional clarifications to other comments. After the questionnaire was collected, statistical analysis and opinion summary were carried out.

The second round is a closed questionnaire. The content of the questionnaire is to list the survey results of the first round and the opinions supplemented by scholars and experts in detail, and repeat the questionnaires and converge their opinions. Therefore, in this round, the researchers asked the respondents to refer to the first round. After the results of the questionnaire, comments and opinions were given in the questionnaire. It mainly included three parts: the first part was the supplementary explanation for the compilation of expert opinions after the previous round of questionnaires were collected, the second part was to check the indicators again, and the third part was open-ended comments. The column provides experts and scholars to express other opinions.

Table 4. Two Delphi questionnaire recovery deadlines.

	The first round	The second round
Send a questionnaire	On June 23rd, 2022	On July 17th, 2022
Questionnaire recovery cutoff time	On June 27th, 2022	On July 21st, 2022

• **Analysis of the recovery rate and reliability of the questionnaire**

In the first round of the survey, 15 questionnaires were issued, and 12 were recovered, with a recovery rate of 80%. All the recovered questionnaires were valid. In the second round, 13 questionnaires were issued, and 13 were recovered, with a recovery rate of 100%. In the economic reliability analysis, the overall reliability of the first round was confirmed. While the overall reliability of the second round, all of these have high reliability, which shows that the data obtained from the recovered questionnaire obtained in this study are high.

4. Results

A total of 16 reviews were identified during the testing period. Fourteen reviews satisfied the inclusion criteria. The number of indicators reviewed was initially 51. 11 indicators were added based on expert opinion after the first round. The analysis was included after two rounds of the Delphi technique. The second round was a closed questionnaire. The content of the questionnaire was to list the survey results of the first round and the opinions supplemented by scholars and experts in detail and converge their opinions. Therefore, in this round, the researchers asked the respondents to refer to the first round. Based on the results of the

questionnaire, comments and opinions were given on the questionnaire. It mainly includes three parts: the first part was the supplementary explanation for the compilation of expert opinions after the previous round of questionnaires were collected, the second part was to check the indicators again, and the third part is open-ended comments. The column to express other opinions was provided for the experts and scholars. The results of the two rounds of surveys and feedback are shown in Table 5.

The main purpose of the Delphi method is to converge the opinions of experts and scholars and reach a consensus. At present, there is no conclusion on what the best convergence condition of the Delphi method is. If the opinion convergence situation is to be evaluated in an objective statistical analysis way, the most commonly used statistical methods are the median, mean and standard deviation. Since the standard deviation (SD) of most of the indicators of the first and second rounds of questionnaires is small and that of the second round was smaller than that of the first round, the result showed a convergence effect. Thus, the next round of questionnaire survey was not conducted. The standard deviation and consistency test results from the second-round questionnaire are detailed in Table 5. According to previous research results on evaluation indicators of the "concentrated potential analysis", if the option was agreed upon by more than two-thirds (about 67%) of the experts, indicators were accepted. In other words, if any round of opinion does not reach the standard, the evaluation index was deleted. The result is displayed in the column "Remarks", and 10 items were deleted.

Table 5. The standard deviation and consistency test in the two rounds of questionnaires.

Question	The First Round			The Second Round			Remarks
	Average	Mode	Standard Deviation	Average	Mode	Standard Deviation	
1. Resources conditions	4.83	5	0.38	4.54	5	0.52	
2. Environmental conditions	4.75	5	0.45	4.38	5	1.12	
3. Accommodation conditions	3.83	4	0.57	3.61	4	1.04	
4. Service conditions	4.25	4	0.75	4.23	4	0.83	
5. Activities conditions	4.33	4	0.65	4.31	4	0.85	
6. Policy conditions	4.33	5	0.88	4.31	5	0.85	
1-1.Natural resource-related components of recreational fisheries	4.42	5	0.66	4.64	5	0.51	
1-2. Overall weather characteristics of the region over the years	4	4	0.60	4.07	5	0.86	
1-3. Leisure fishery components related to cultural resources, such as fishing village settlement style, architecture and other characteristics	4.75	5	0.45	4.29	4	0.60	
1-4. The richness of the resources related to the first level of production in recreational fisheries, such as aquaculture farms, sea fishing farms, and Marine pastures	4.25	5	0.75	4.29	4	0.60	
1-5. Quantity of resources converted into leisure and entertainment (new)	--	--	--	4.36	4	0.51	
1-6. Area of using tidal flats for breeding (new)	--	--	--	3.43	3	0.87	Delete
1-7. Quantity of recreational fishery forms (new)	--	--	--	3.64	4	0.51	Delete
2-1. The environment of the main body of the community	4.25	5	0.86	4.46	4	0.52	
2-2. The richness of a strategic asset	4.25	4	0.62	4.31	4	0.48	
2-3. Provide memorial sites for the Red Revolution	3.5	4	0.90	3.54	3	1.05	Delete
2-4. Places for modern economy, technology, culture, art and science activities	3.75	4	0.86	3.69	3	0.75	Delete

2-5. Provide special regional custom activities	4.16	4	0.71	4.15	5	0.90	
2-6. Resources of recreational fishery industry	4.58	5	0.51	4.15	5	0.90	
2-7. Easy to communicate with local people	3.75	4	0.86	3.77	3	0.83	Delete
2-8. There are historical sites available for viewing and experience	4.08	4	0.79	3.84	3	0.99	Delete
2-9. Conditions for tourism development	4.41	5	0.79	4.38	5	0.65	
2-10. Important transportation points, such as the distance from airports to scenic spots	4.16	4	0.71	4	4	0.82	
2-11. Main transportation for tourism	4.33	4	0.65	4.23	4	0.73	
2-12. Hospitals or clinics providing medical services	3.75	4	0.86	3.77	3	0.83	Delete
2-13. Provide perfect leisure facilities	4.58	5	0.67	4.31	4	0.63	
2-14. Local air and street hygiene are suitable for tourists	4.25	4	0.45	4.31	4	0.63	
2-15. Provide perfect living / accommodation function facilities	4.33	4	0.65	4.15	4	0.80	
3-1. Small accommodation built by using local dwellings and other related idle resources	4.41	4	0.51	4.30	4	0.63	
3-2. Commercial organizations that provide short rest or sleep space for tourists	3.83	4	0.83	3.84	4	0.80	Delete
3-3. The most typical local living style with ethnic characteristics	4.33	4	0.65	4.38	4	0.65	
3-4. Accommodation facilities: living room, kitchen, basic furniture	3.83	4	0.57	3.92	3	0.86	Delete
3-5. Accommodation environment: comfort level	4.41	5	0.66	4.23	4	0.60	
3-6. Accommodation environment: Privacy	4	5	1.12	4.30	4	0.63	
3-7. Accommodation experience: a new accommodation environment integrating leisure fishery, folk custom experience, cultural creativity and other business forms (newly added)	--	--	--	4.38	5	0.65	
4-1. Reception and organization: Emergency comprehensive headquarters	4.16	5	0.83	4.23	4	0.72	
4-2. Reception organization: working organs or units engaged in tourism service industry	4.25	4	0.75	4.15	4	0.55	

4-3. Explanation and consulting services	4.16	4	0.57	4.30	4	0.48	
4-4. Quality of service personnel	4.66	5	0.49	4.38	5	0.65	
4-5. Warning signs should be provided near the service area (new)	--	--	--	4.23	5	0.83	
4-6. Supply of the Internet of Things (new)	--	--	--	4.07	5	0.86	
4-7. Experience service of level I production process of recreational fishery (newly added)	--	--	--	4.38	5	0.76	
5-1. Places with recreational fishery activities and fishery production are sweet and sour heap, Shihu and fish farm	4.5	5	0.52	4.46	5	0.66	
5-2. With recreational fishing activities and operable fishing gear such as pull, fixed net, pole net	4.33	4	0.65	4.31	5	0.75	
5-3. There are various kinds of operational activities such as pulling wu, catching fish farm, farming fish, picking laver, touching clams and oyster picking	4.41	4	0.51	4.31	5	0.75	
5-4. Taste delicious aquatic products	4.58	5	0.51	4.38	4	0.51	
5-5. Knowledge of aquatic products for the purpose of science	4.25	4	0.62	4.08	4	0.64	
5-6. Provide fishing, recreation, sports, fitness and other leisure facilities	3.66	4	0.77	3.77	3	1.01	Delete
5-7. Various material facilities built in the scenic spots	4.08	4	0.66	3.92	4	0.76	
5-8. The foundation for tourism development	4.33	4	1.30	4	4	0.71	
5-9. Festival daily necessities and characteristic cultural products with the traditional culture of recreational fishery characteristics (newly added)	--	--	--	4.38	5	0.77	
5-10. Specification for recreational fishery activities and safety production responsibilities (newly added)	--	--	--	4.38	5	0.65	
5-11. Having assumed the risk of recreation and accident Capability (newly added)	--	--	--	4.38	4	0.65	
5-12. Create an influential event and festival activity (new added)	--	--	--	4.15	5	0.80	

6-1. Government support: Does the Government include the project as a development and support	4.75	5	0.45	4.53	5	0.52
6-2. The government has a relevant recreational fishery department	4.41	5	0.79	4.23	4	0.60
6-3. Legal system of recreational fishery: to solve conflicts and disputes among tourists	4.5	5	0.67	4.38	5	0.65
6-4. Financing system: to provide enterprise financing and reduce investment risks	4.08	4	0.90	4.08	4	0.64
6-5. Pricing for recreational fishery activities	4.41	4	0.51	4.46	4	0.52
6-6. Reasonable recreational fishery management	4.25	4	0.75	4.31	5	0.75
6-7. Policy conditions: Sustainable development	4.41	5	0.66	4.54	5	0.78
6-8. Rural revitalization: an economic policy for recreational fishery	4.33	4	0.65	4.31	5	0.75
6-9. Rural revitalization: policies to protect the ecological environment	4.5	5	0.52	4.38	5	0.65
6-10. Talent revitalization: Cultivate talents for the development of secondary and tertiary industries in fishing villages	4.33	4	0.49	4.54	5	0.52
6-11. Cultural revitalization: Strengthen the cultural publicity of fishing villages	4.5	5	0.67	4.46	4	0.52
6-12. Enterprises operating in recreational fishery (fishermen's cooperatives) shall be registered in the local area (newly added)	--	--	--	4.23	4	0.60
6-13. Formulate self-regulatory norms and standards for recreational fishery industry (newly added)	--	--	--	4.46	4	0.52
6-14. Encourage private capital to participate in the development and	--	--	--	4.38	4	0.51

operation of recreational fisheries in various forms (newly added)

6-15. Encourage financial institutions to appropriately relax the guaranteed mortgage conditions for recreational fishery projects with good credit status and obvious resource advantages, and give preferential loan interest rates (newly added)

-- -- -- 4.23 4 0.60

Among the six dimensions, the priority that experts and scholars paid the most attention includes "1. Resources conditions", "2. Environmental conditions" and "6. Policy conditions". Also in the indicators, "5-4. Taste delicious aquatic food", "6-1. Government support: Does the Government include the project as a development and support", "6-5. Pricing for recreational fishery activities" and "6-10. Talent revitalization: Cultivate talents for the development of secondary and tertiary industries in fishing villages" are the four indicators that experts and scholars were most concerned about.

5. Conclusions

The important dimensions for recreational fishery are resources and environmental conditions, followed by service conditions, activities and policy conditions, and accommodation conditions. Experts and scholars are most concerned about the four indicators, such as "5-4. Tasting delicious aquatic products", "6-1. Government support: whether the government has included the project into development and support", "6-5. Recreational fishing activities pricing" and "6-10. Talent revitalization: cultivating talents for the development of secondary and tertiary industries in fishing villages". At six dimensions and 52 indicators, key sustainable implementation strategies have been formulated, and the following suggestions are put forward: (1) making recreational fishery an important object of my country's rural revitalization policy, (2) using each indicator as the basis for policy implementation, and (3) establishing a recreational fishery promotion group.

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