Sustainable Management and Environmental Limitation in Recreational Raft Industry at Cigu Wetland in Taiwan

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Abstract

Cigu wetland is one of few well preserved wetlands in Taiwan. It covers 2,997 hectares including the Cigu lagoon. The Cigu lagoon is now a famous eco-tourism site and recreational raft is the key component attracting tourists to enjoy their leisure activities at Cigu wetland and its neighboring communities. The objective of this thesis was to address the broader aspects of recreational raft industry at the wetland not only fishery recreation use but in the long term to achieve sustainable management of the wetland. Qualitative analysis has been performed. Content analysis and triangulation have been implemented to achieve consistency results. A SWOT analysis and the NVivo package have been used to discuss in five aspects consisting of law, environmental constraints, recreation satisfaction, resource integration, and ecological sustainability. The obtained results indicate that the law prohibits more than 45 passengers per raft should be modified to accommodate more tourists on a single raft. The depth of raft sightseeing courses is safe only on the southern bay course. It is recommended that all raft courses should be maintained at very safe level all year round. Recreation satisfaction is the main responsibility of the 12 existing rafting companies to hire more professional workforce on ecology interpretation and conservation. All 12 rafting companies should be confined to a union that can be working efficiently. Application of limits of acceptable change should be implemented to pursue ecological sustainability at the Cigu wetland.

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Introduction

Motivation of the Research

In 1993, Cigu Lagoon and salt pans of administrative areas in Cigu District and Jiangjyun District would be developed as petroleum and steel manufacturing sites under BinNan Industrial Development Plan. In response, over 100 local NGOs and environmentalists launched a "Save Cigu Wetland and Black-faced Spoonbills" movement to protect the wetland, which had provoked heated debate and demonstration of the pros and cons between economic development and environmental conservation. Local coastal residents were influenced directly and intensively because they were living by fishing and lagoon breeding fish, shrimp and shellfish, oysters and other seafood. For the fishing rights and maintaining livelihoods, their protesting voice can be witnessed by their actions in public hearings.

To demonstrate their determination to protect coastal area , Cigu lagoon and as their rights to live and work, fishermen in Cigu district established the "Cigu Coastal Preservation Association" on November 23, 1997, calling for concerning ecosystem of Cigu lagoon and assisting oyster farmers to sell out non-contaminated oyster as initial motivations with providing ecological experience tours and recreation service of fresh fishing & tasting seafood as their selling points: by using rubber raft carrying people to introduce lagoon environment of oyster breeding, experience leisure of fishing with fishnets, study of mangroves ecology closely and enjoy all kinds of egret families hiding in the mangrove forest; by landing Wuantsuliao Shoal to enjoy the thrill of riding waves and sand stepping, taste freshly baked oysters or sweet clams soup, etc. local cuisine.

In the time of pursing life quality, outdoor activity and ecological tour, it is necessary to improve quality of public service & leisure experience and to provide a reliable and safe environment of recreation tourism for people. Therefore, the study explored that making sure and clarifying the consisting of law, passenger safety, environmental education, resource integration and ecological sustainability, etc. operation references and environment constraints for those rafting companies who run recreational fishery in Cigu Lagoon.

Purposes of the Research

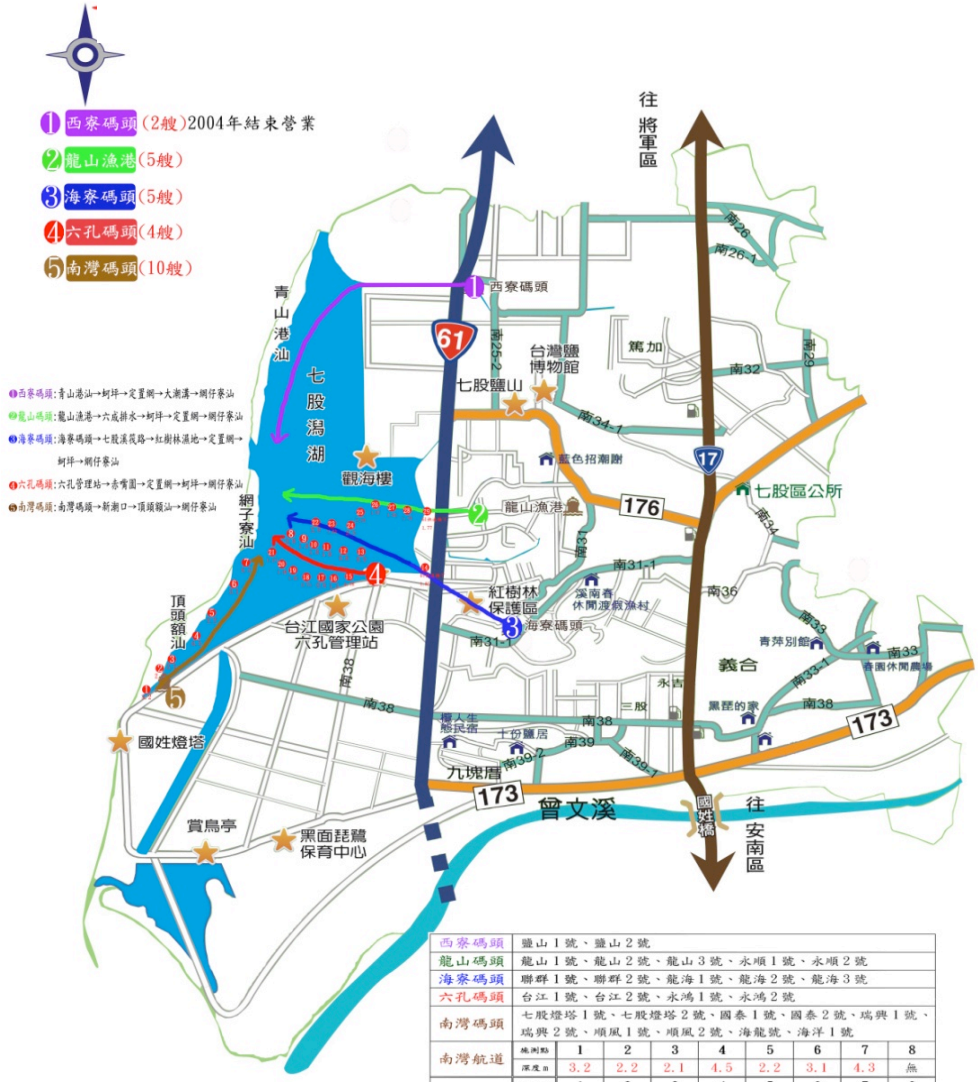
The purposes of the study are as follows:

First, to discuss Cigu wetlands' environment constrains and sustainable management to clarify the interdependence among the administrative authority, the rubber raft industry and the aquaculture and seek how to improve;

Second, to explore the current legal basis and status of recreational raft industry and have field tests to faithfully reflect survey data of channel depth to make sure courses' deposition for passengers' travel safety;

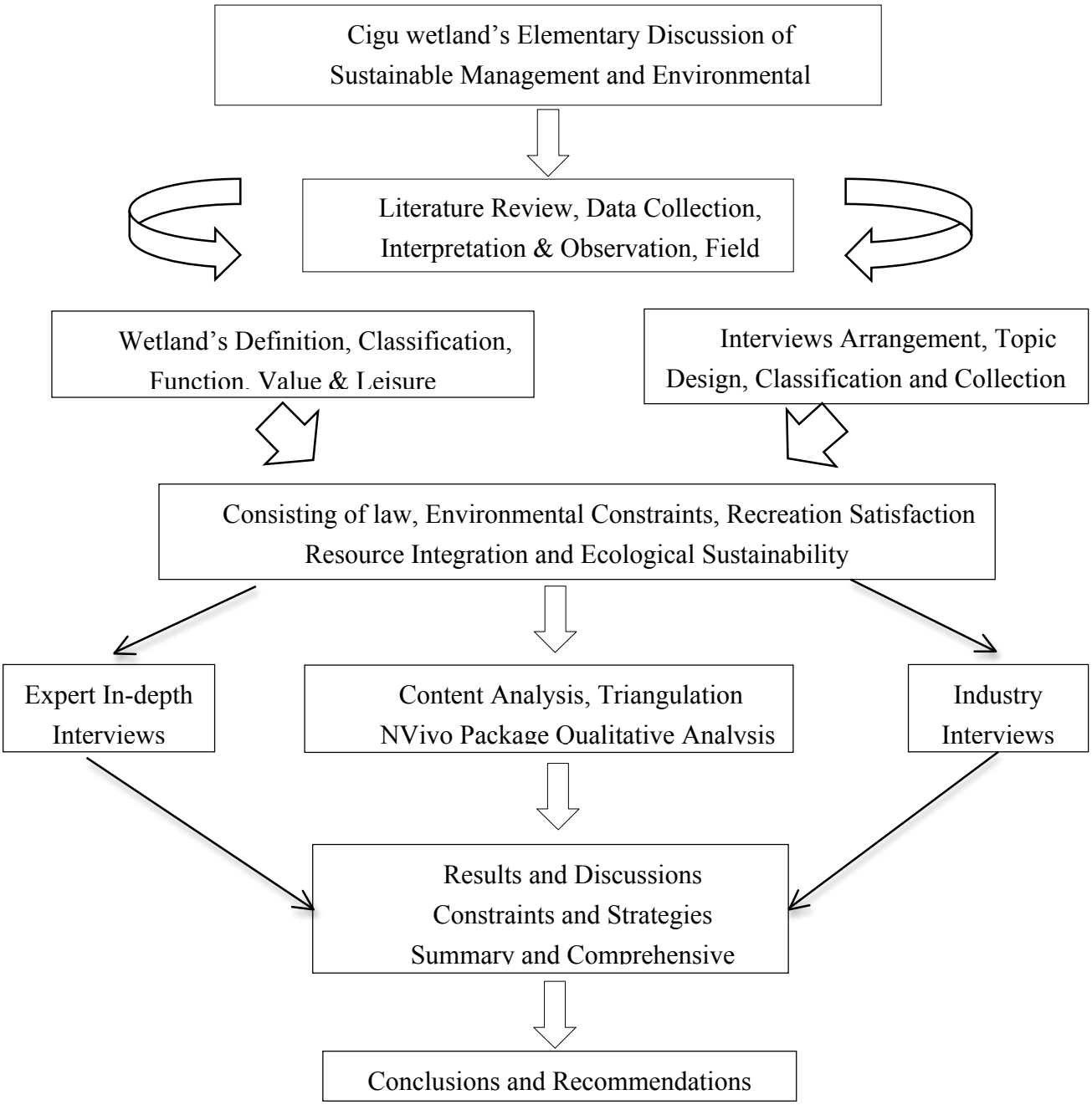
Third, to collect, analyze and summarize information of expert in-depth interviews, industry interviews, observation, field tests of courses in order to achieve sustainable development of Cigu wetland in five aspects-consisting of law, environmental constraints, recreation satisfaction, resource integration and ecological sustainability. According to conclusion of the research, we had proposed strategies to remove environment constraints and suggestions and methods for sustainable development of Cigu wetland as reference to assist government to make tourism policy, maintain tourism safety, enhance environmental education and increase innovation and quality of the industry 's service content.

Raft Distribution and Filed Tests of Course in Cigu Lagoon



西寮碼頭	鹽山1號、鹽山2號								
龍山碼頭	龍山1號、龍山2號、龍山3號、永順1號、永順2號								
海寮碼頭	聯群1號、聯群2號、龍海1號、龍海2號、龍海3號								
六孔碼頭	台江1號、台江2號、永鴻1號、永鴻2號								
南灣碼頭	七股燈塔1號、七股燈塔2號、國泰1號、國泰2號、瑞興1號、瑞興2號、順風1號、順風2號、海龍號、海洋1號								
南灣航道	施測點	1	2	3	4	5	6	7	8
	深度m	3.2	2.2	2.1	4.5	2.2	3.1	4.3	無
海寮航道	施測點	1	2	3	4	5	6	7	8
	深度m	0.8	1.8	1.8	1.8	0.8	0.9	1.85	無
六孔航道	施測點	1	2	3	4	5	6	7	8
	深度m	0.78	1.1	0.6	0.75	1.45	1.48	1.37	無
龍山航道	施測點	1	2	3	4	5	6	7	8
	深度m	2.0	1.83	2.5	2.34	1.67	1.04	1.76	1.77

Research Framework and Flow Chart



Method

The study was based on collection and observation of wetland usage as well as literature review. Also, we personally visited and recorded experts and raft industry's 'opinions about current operation status, faced problems their expectation and viewpoints of future ecological leisure tourism of recreational leisure fishery Raft Industry. The interviews framework included five aspects-consisting of law, environmental constraints, recreation satisfaction, resource integration, and ecological sustainability, which were collected, summarized and discussed in detail by

qualitative research methods in order to actually outline, integrate and cross – check on respondents' views & opinions with and discussion of the thesis for exploring the substantive issues and achieving the expected results.

Research Objectives

The interviewees were public policy formulation and implementation personnel, recreational fishery rafts industry, interpreters, fishermen's association officers, local heads of boroughs & neighborhoods, directors and fishermen, street vendors.

Range of Cigu Wetland

(A) Geographic Location:

Cigu wetland is located at Southwest coast of Taiwan, south to the Tropic of Cancer and about 25- km-long coastline.

Figure 2.1.1 Range of Cigu wetland (modified from Google Maps data)

Data Collection

The study adopted "in-depth interviews", "observation", "filed tests of channels" and so on method to collect research data from December 14, 2013 to April 13, 2014, a total of 11 respondents.

As to field tests of channel depth, first we had sampling tests of quay depth of Hailao, Mangrove Channel, Wuantsuliao Shoal, Lioukong, Longshan, and Xiliao and Xiliao Inspection Office, and then based on the tidal flow every 15 days a large high tide cycle characteristics, we tested again by afternoon up at low tide time on new moon of April 15 and the full moon of April 29, a total of eight sampling points with each field test for contrast verification of tidal stability in order to improve the reliability of the measured data.

Date Collation

At the end of the interviews, the recording content of interviews was personally written into transcripts with remarks of interviews time, location and other information.

Date Analysis

This data analysis of study is aimed to achieve the followings:

1. A comparison of the data consistency of the expert interviews, the industry's interviews, the other respondents and the observation;
2. A comparison of the data consistency in different time of the expert interviews, the industry's interviews, the other respondents and the observation;
3. A comparison of the data consistency in different expert interviews, the industry's interviews, the other respondents to increase the reliability and validity of the research data;
4. According to data of field tests, a faithful presentation is given to the status of the navigation in the course by the comparison chart.

Based on the interviews, observation, literature review and field tests' results of quay and channel depth to obtained followings:

1. Colleting domestic relevant laws and practical regulations and summarizing the present development of recreational fishery raft industry for exploring legitimacy of raft tourism;
2. Using SWOT to analyze the business operation status of the industry and proposing improvement and related recommendations;
3. Consolidating laws and regulations of Cigu lagoon district's administration responsibility, experts' in-depth interviews and industry interviews, field observation, and filed tests of channel depth and so on measurement ways to summarize environmental constraints of Cigu wetlands and propose strategies for reasonable exploitation and sustainable development of the wetland.

Results Analysis and Discussion

After nearly a year of planning, literature review and expert in-depth interviews, industry interviews, observation, participating and field tests of channel depth, data collection, summaries of various information and discussions with advisors many times, the study propose the interviews framework included five aspects-consisting of law, environmental constraints, recreation satisfaction, resource integration, and ecological sustainability for environmental constrains and sustainable management.

The thesis adopted used SWOT analysis for industry's' pros and cons and NVivo for consolidation of interviews data. Qualitative analysis had been performed to do research of diversified subjects and to inspect results of questions' depth and breadth of the issues to faithfully carry out the contents and findings of the study.

SWOT Analysis of Raft Industry

Table 3.2 SWOT Analysis of Raft Industry

Pros and Cons / Internal & External Environments'	Pros	Cons
Internal Environment	Advantage (Strength) Owners are local fishermen and familiar with the geographical environment and marine ecological introduction. Rubber rafts are reformed from fishing raft to save cost of new make. They won the oyster farming to reduce procurement costs. Most of the staffs are relatives and friends to have strong cohesiveness. Every tour has its own feature without disturbing each other. Providing local fresh cuisines to increase the customer base. Making good use of public space to eliminate the purchase cost of land. Cooperating with the authority's activity to increase exposure.	Disadvantages (Weakness) The lack of marketing ability and negative attitude. Price competition of industry results in decrease of operating profit. Limited dock space causes dispute of area. Routine interpretation without new ideas. The lack of experiential activities of water itineraries. The lack of corporate image and innovative activity. The low paid caused talents were not willing to stay long
External Environment	Opportunity (Opportunity) Southwest Coast National	Threat (Threat) Regulations for

	Scenic Area Administration and Taijiang National Park were set up and increasing public facilities and professional seminars and other eve. Regulations related to recreational fishy industry were modified to moderately extend the recreational maritime space Broadened road and quality improvement of construction. The rise of cross-industry alliance or model of union cooperation Increase of tour guide in foreign to attract oversea visitors. Regulations for Environmental Education were passed to increase the visiting motivation and frequency from government offices and schools. A spread of recreation departments in university provides diversified business management and resource planning advisory services and collaboration opportunities. Blue Highway network was established and connect a series of scenic spots to provide convenient transport vehicles.	Recreational Fishery have many restrictions on coastal recreation. Unpredictable climate changes affect the substantial profit. The government budget cannot be placed on time, lack of public facilities and improvement of sanitation. Fail to control visitors amount caused crowded situation and lower quality of tourism... Visitors failed to fulfill the responsibility of environment protection endanger the landscape resources, forming negative examples. The lack of accommodation facilities to retain consumers attracted by other tour spots in the same region, reducing the revenue. Marine pollution, decreasing fish resources, channel deposition, sea sand loss, etc. problems to be overcome. Tour bus asked for commission, causing bad cycle and profit erosion.

Conclusions and Recommendation

Conclusions of the study are as follows:

For actual operation demand and with vessel's permission of innovative raft material and safe structure, it is suggested to modify "Tainan City Lagoon District Authority Regulations for Recreational Fishery Vessel and Management" of which Article 8, second 1 and 2 , the limit of 45 people carried by recreational fishing vessels in order to improve operational efficiency of the industry.

According to results of quay depth in tide difference of this study: Xiliao pier is danger of stranding low tide there and Hailiao pier and South Bay pier are within safety coefficient; among four channels, only South Bay whole course is within the safety factor. As to management of fishing rights, the responsible authority should introduce principle of "Protecting the legal and prohibiting the illegal" to ensure sustainable development of fishery resources.

To cooperate with the implementation of the Regulations for Environmental Education, the industry must strengthen the service personnel's content and expression skills of interpretation in order to let visitors understand the interdependence relationship between the individual and the environment for achieving reasonable usage of resources and ecologically sustainable development.

For resource integration of (a) government authority should reach one universe administrative functions of environment improvement of the lagoon, development objectives and public constructions, etc. public policy aspect to make the best integration; (b) the industry should set up an industrial alliance to reach requirement of tourism satisfaction and secure industry services at reasonable profit gains.

For ecological sustainability (a) The authorities should consolidate ecological resources category in Cigu Lagoon and draw ecological resources distribution map to list the ecological resources and species that are vulnerable, rare and needing protection; (b) use LAC (acceptable change of the theory of constraints) to provide innovated services content and guide visitors recognize the ecological resources and its particularity and deeply understand the importance and necessity of ecologically sustainable development.

Recommendations to relevant Administrations

Fishery agency should timely propose a more objective calculation formula to replace current maximum numbers of passenger inference. In counselling relationship of aquaculture industry management, agricultural authorities should follow the Regulations for Fishery with the principle of "Protecting the legal and prohibiting the illegal" to perform public right to build a reasonable and effective management system, and maintain the natural ecological cycle of lagoon. As to channel dredging works, water resource agency should appoint y professional units to conduct a comprehensive survey of deposition status of lagoon in details to deal with the problems and set up monitoring systems and channel benchmarking system to improve the safety of raft course for ensuring the safety of tourists.

As to integration of administrative operations, each agency should regularly review issues in their own jurisdiction and establish an emergency contact window for quick response to avoid waste of administrative resources.

For public construction, it is recommended to do the short, medium and long-term planning based on overall demand of the lagoon not just the case of construction requirements. Also, management agency should make manage guide or use regulations for use of public facilities maintenance and based on "user pays "principle to charge a fee as a source of funds in order to reduce the burden on the government budget provision.

Available resources of environmental education will be provided by interpretation guide service, education seminars and academic seminars, of which guide material, methods, personnel training and educational place will be planned by experts and scholars with most natural ways to allow visitors to understand the true meaning of sustainable utilization of resources.

Recommendations to the raft industry

Changing mindset: the government provides public facilities and parking equipment of pier for the industry, and they should do their best to maintain responsibility of management.

Utilizing resources properly cherishing the operating environment, improving professional service skills and training professional personnel in system are the key success factors for the lagoon raft industry to compete with others.

To improve the operating facility and provide high quality service environment are the goals for the industry to continuously work on.

The industry also need to cooperate with the government's education policy advocacy of ecological maintenance and sustainable use of resources concept to design the content of tours and interpretations to take responsibility of engaging business in recreational leisure industry of ecological tourism and guide visitors to know the environment and experience it for tourists to care for the environment from the bottom of their heart.

Suggestions for Future Research

It is suggested that the following study can explore the imbalance of sand’s sources and its amendment for improvement and solution.

It is s suggested that the following study can modify or well-use aimed tools, such as utilizing high-resolution space images to locate and mark out the channel siltation location, or hiring assistant surveying personnel to give advance training in order to increase the surveying accuracy of data and provide reference to the relevant units and industry for raise the discrimination degree of safety.