

Ecotourism Perceptions, Impacts, and Carrying Capacity: The Case of Walami Trail in Yushan National Park

You-Jie Huang, Chieh-Lu Li, and Kui-Hua Chen

Abstract—On-site visitor ecotourism perception and impact surveys were conducted on the Walami trailhead in August of 2019. The findings revealed that the visitors were most agreed that ecotourism is a responsible travel that conserves the natural environment, and most agreed ecotourism is a sustainable tourism. For the positive ecotourism social impact, visitors most agreed that ecotourism may improve or upgrade the community image, and ecotourism may increase the opportunity for young people to return their hometown, and reduce the aging population and population outflow phenomenon. We also found significant differences regarding negative environmental impact, negative economic impact and negative social-cultural impact between professional mountaineers and general visitors. The general visitor were likely to agree the aforementioned impacts. The frequency of visiting Walami Trail had significant differences among visitors regarding negative ecotourism environmental impact, negative economic impact and negative socio-cultural impact. The first time visitors were likely to agree the aforementioned impact than those visitors who have been to Walami Trail 2 to 4 times. Finally, we found the more visitors were aware of ecotourism perceptions, the more visitors agreed both ecotourism positive and negative impacts. Findings of this study may provide implications for ecotourism development on the Walami Trail in the future.

Index Terms—Ecotourism perception, ecotourism impact, environmental impact, economic impact, social cultural impact, Walami Trail, Yushan National Park.

I. INTRODUCTION

The Ecotourism Society [1] made a widely accepted note for ecotourism in 2015: "Ecotourism is an environmentally responsible way of tourism that protects the natural environment and continues the well-being of local residents for ecological development. The ultimate goal of tourism, including explanation and education." Yan Jia zhi [2] defined ecotourism as the attitude that tourists should respect the local culture and return their economic interests to the local people. Based on the original ecological or

human environment, they should establish an interaction with the environment under minimal impact.

When developing tourism, there are three main items that should be evaluated: social, environmental, and economical impacts. Kuei-chu Huang [3]: Due to the increase in the number of people participating in outdoor tourism activities, the natural resources in the tourist area are subject to varying degrees of human interference or changes. These impacts are called environmental impacts. It has a positive impact and a negative impact. According to the definition of the above-mentioned people, "environmental impact" refers to the changes caused by human activities in the natural resources environment of the sightseeing and recreation area. It covers a relatively small scope, and only discusses the environment of recreational shock; "recreation shock", "recreation shock" or "tourism shock" can be regarded as "direct or indirect changes caused by sightseeing and leisure activities".

Luo Shaolin [4] once distinguished recreational impact into two types of positive and negative effects. The positive effects include the following five types. The first two belong to the personal range, and the latter three belong to the social level:

1. Psychological benefits: Recreational can improve their physical and mental balance development or stability after psychological and experience satisfaction.
2. Behavioral benefits: can improve the behavior of individuals or groups and lead to higher-level behavior.
3. The effect of civilizing society: it can establish social ethics, morality and order.
4. Promote local or regional economic prosperity: promote the development of smokeless industries and increase employment and income.
5. The interaction between individuals and society can be more peaceful and profitable.

In addition to the above-mentioned five positive shocks, there are also four negative shocks, which often cause social reversals, imbalances or poor environmental quality, and adverse interactions between the shocks themselves. Stated separately as follows:

1. Impact on the ecological environment: It can cause damage to resources and the environment, including soil loss, road compression, air and water pollution, noise, plant damage, forest fires caused by careless amusement, or the invasion of alien species due to improper induction. Even deliberately or unintentionally man-made destruction of antiquities or monuments.
2. The impact of landscape psychology: the destruction of special landscapes and beautiful landscapes produces incoordination, lack of beauty or unnatural phenomena. For example, improper logging results in poor visibility or

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exposed soil and rock due to mining, which constitutes an obstacle to the landscape.

3. Economic and social impact: abnormal community development and unreasonable investment have caused abnormal economic development, which indirectly affects the instability of social work such as medical care, health, education, and security.

4. The impact of politics and law: Because of the different operating objectives and principles in the recreation area, it is easy to cause internal conflicts, and different management or coordination units have different interests and levels, and there are conflicts and incompatibility. It will cause shocks at the ecological, operational, economic, legal and political levels.

In addition to the above distinction methods, recreational impacts can generally be distinguished from three levels: economic impact; physical environmental or ecological impact; and social and cultural impact [5]-[9]. The three aspects of recreational shocks are further divided into positive and negative shocks. Based on this structure, data are collected and discussed.

Carrying capacity was originally derived from the field of biology. It was used for the management of pasture ecology and animals. Under the maintenance of the pasture environment, it should be controlled to feed an appropriate number of animals, which can protect the original resources and growth of the pasture, and can feed the animals. Therefore, the maximum number of animals that can be kept under the long-term stable operation of natural resources will be defined [10]. The types of carrying capacity are as follows:

1. The types classified by Lapage [11] are derived from the concept of farm management. The aesthetics of recreational carrying capacity shows that from the point of view of tourists, in the process of developing resources, it is necessary to allow most tourists to engage in recreational activities to achieve satisfaction Above; the biological capacity is based on the premise of maintaining natural resources and providing guests with a satisfactory recreational experience.

2. Pigram [12] proposed four categories. The actual carrying capacity is the allowable quantity measured according to the area size; the economic carrying capacity refers to a resource used for outdoor recreation and economic activities, such as domestic water supply reservoirs; ecology Carrying capacity uses the impact of the ecological environment to measure the impact of tourists' recreational activities on animals and plants, soil, water and air quality, to determine the maximum allowable amount; the social carrying capacity takes the personal experience of tourists as an example, and the experience feels choked. Crowded to measure the allowable number of tourists.

3. The Shelby & Heberlein [13] classification also has four relatively, among which the ecological, physical, and social carrying capacity are similar to the former; and the facility carrying capacity is similar to the physical carrying capacity. The main man-made construction and utilization are to the greatest extent as examples, such as parking lots, Bus seats, etc., to measure the allowable number of tourists.

Yan-zhou Lin [14] evaluated the social and psychological carrying capacity of camping sites in Yushan National Park

in Yushan National Park Recreation Carrying Capacity Research. Among them, the questionnaire distribution method is based on the crowdedness of tourists as an indicator to establish the proportion of crowdedness, and It is a function of the number of tourists, and sets the standard that the crowded tourists cannot exceed 50% as the social psychological carrying capacity. This study will use the photo simulation method as a carrying capacity questionnaire to understand whether tourists with different ecotourism perceptions and different recreational shock perceptions have different views on carrying capacity.

II. RESEARCH METHOD AND PROCEDURE

This study is based on the literature review, and mainly discusses the relationship between ecotourism cognition, recreational shock cognition and social carrying capacity. Fig. 1 is the research framework of this research.

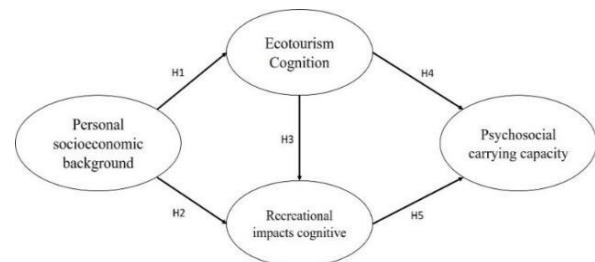


Fig. 1. Research Framework.

The questionnaire survey time is from August 16th to 18th, August 28th to September 1st, 2019, a total of 8 days, including weekdays and weekends, from 08:00 to 17:00 daily at the climbing entrance of Walami Trail A total of 317 questionnaires were distributed to the local tourist questionnaires, deducting 13 incomplete answers, and a total of 304 valid questionnaires were recovered. The effective recovery rate was 95.90%. There are 13 English questionnaires in the valid questionnaires. Investigate tourists' willingness to participate in ecotourism and types of recreation for comparative analysis.

The content of the questionnaire in this study is divided into four parts. The first part is personal basic information-demographic profiles of respondents, with a total of 8 questions. It mainly asks 8 questions such as gender, age, marriage, place of residence, ethnic group, education level, occupation, and monthly income to investigate; The second part is about tourism characteristics and behavioral variables. There are 11 questions in total, including motivation for recreation, partners who travel together, several times of hiking, the average time of each trip of hiking, what kind of activities are engaged, how long did they spend, and how many people did they meet. Whether it is a professional climber and whether you want to know more information about the Walami Trail; the third part is eco-tourism cognition and impact, of which there are 11 questions in eco-tourism cognition; recreational impacts cognitive, divided into 3 aspects, respectively: "Environmental impact ", "Economic impact" and "Social and Cultural impact", a total of 21 questions, The fourth part is the carrying capacity, a total of 21 questions, using 5 point likert scale 1 very disagree to 5 very agree, and

translate the questionnaire into English to facilitate foreign tourists to answer.

In this study, the data collected by the questionnaire survey of tourists is analyzed statistically using SPSS18.0 software package, including descriptive statistical analysis, reliability and validity test analysis, descriptive statistical analysis, independent sample T test and single factor variance analysis, etc. statistical methods. If there are significant differences in the single-factor variance analysis, then use the Scheffe post-mortem test for multiple comparisons.

III. RESULTS AND DISCUSSIONS

A. Demographic Profiles Analysis

The study subject features are as follows: women(51.5%); the age group was between 46-55 years old (29.6%); marriage is married (69.2%); north of residence (39.0%); the ethnic group is mostly Minnanese (63.0%); the highest level of education is university (37.4%); most occupations are other (21.4%); the average monthly personal income is 20,001~40,000 yuan (26.1%).

In the tourism characteristics, the reason why the respondents went to the Walami trail is to enjoy the beautiful scenery (63.8%); the family partners (43.4%) are the most in this trip; the number of peers is 3-5 (25.5%) And 6-20 people (25.5%) have a higher proportion; in the past 12 months, the total number of hiking trips to the Walami trail was 1 (76.6%), and in the past 12 months, the maximum number of people 1~2 hours (47.0%) is the most; this activity is mainly about hiking and walking (80.3%); the time spent in this activity is 1~2 hours (48.7%), followed by half a day (30.6) %. The number of tourists who came to the Walami Trail this time was mainly 16~30 (30.8%); the majority of tourists believed that the trail use density was just right (51.0%). Most of the interviewees did not consider themselves to be climbers (86.7%), and most of them wanted to obtain information related to the Walami trail (69.9%). Many eco-tourism activities planned for future trails were also willing to participate (63.1 %).

B. Analysis of Ecotourism Cognition and Recreational Impacts

The respondents agree that "A responsible way of tourism to the natural environment", with an average value of 4.53; while the "Must rely on national parks and protected areas" is relatively low, with an average of 4.09.

The current status of respondents' perception of recreational shocks, with "positive environmental impacts" and "positive social and cultural impact" being the highest, and "negative economic impacts" being the lowest. In addition, tourists have the highest recognition of " Natural environmental resources are more valued and protected due to increased visibility ", "Increase youth returning opportunities and reduce population aging and outflows" and "Improve or enhance the image of the local community"; The recognition of the three items of "deteriorated air quality", " rising cost of living made residents lives more difficult " and " Quality of life decrease, security problems increase " is relatively low.

C. Difference Analysis of Demographic Variables on Ecotourism Cognition and Recreational Impact

1) Different educational levels, occupations, and monthly income income have different impacts on ecotourism and recreation

According to the analysis of the data, we can find that there are no significant differences in the differences of all projects in different occupations. Tourists representing different occupations have the same views on ecotourism cognition and recreational shock cognition; and different education levels ($F=3.038, P<0.05$), tourists with monthly income ($F=3.865, P<0.05$) have significant differences in positive economic shocks and eco-tourism cognition respectively.

TABLE I: CORRELATION ANALYSIS OF ECOTOURISM COGNITION ON FRONTAL AND SURFACE RECREATIONAL IMPACTS

Facets	Positive impact recreation	negative impact of recreation
Ecotourism Cognition	0.396**	0.184**

Further analysis was carried out with the Scheffe post-test and found that different education levels are in the positive economic shocks. Less than the different ethnic groups, and in the perception of eco-tourism from different monthly incomes, tourists who earn less than 20,000 yuan feel greater than those who earn 40,001~60,000, and tourists with low income may have relatively few opportunities to engage in eco-tourism activities, So the feeling in this respect will be stronger than that of tourists with higher income.

2) Differences in perceptions of impacts on ecotourism and recreation between peace, holidays and whether they are professional climbers

According to the analysis of the data, we can find that there are no significant differences in the comparison of all the items of the tourists on weekdays, which means that the perception of ecotourism and the perception of recreational shocks are the same on all holidays; and whether tourists who are professional mountaineers are "Negative environmental impact" ($T=-2.319, P<0.05$), "negative economic impact" ($T=-2.266, P<0.05$), "negative social and cultural impact" ($T=-2.584, P<0.05$), 3 There are significant differences between them, and tourists who are not professional climbers are higher than professional climbers.

3) Cognitive differences between the number of peers, the number of trips a year and the number of tourists encountered on the impact of ecotourism and recreation

According to the analysis data, tourists who have traveled several times in a year are aware of ecotourism ($F=3.823, P<0.05$), negative environmental impact ($F=3.877, P<0.05$), and negative economic impact ($F=3.197, P<0.05$) and negative social and cultural shocks ($F=3.382, P<0.05$) have significant differences. Scheffe's post-examination test found that in ecotourism cognition and negative environmental shocks, the degree of recognition is that the number of tourists is 1 for each visit is greater than 2 to 4 for tourism Tourists; while in social and cultural shocks and economic shocks, you can't find the different ethnic groups, indicating that tourists who have traveled several times a

year have no different ideas about social and cultural shocks and economic impact.

D. Correlation Analysis of Ecotourism Cognition and Recreational Shock Cognition

Pearson performance difference correlation analysis was carried out among the three facets of ecotourism cognition, positive recreational shock and negative recreational shock to examine the relationship between the various facet factors. It can be seen from the results in Table I that the correlation coefficient between tourists' ecotourism cognition and positive recreational shocks is 0.396, and the correlation coefficient with negative recreational shocks is 0.184, both of which are significantly correlated. It can be seen that tourists' ecotourism perceptions do affect When they have positive and negative views on the impact of recreation, and both are positively correlated, it can be seen

that the tourists' understanding of ecotourism, the higher their awareness of positive and negative recreational impacts.

E. Regression Analysis of Ecological Tourism Cognition and Recreational Shock Cognition on Carrying Capacity

Using multiple regression analysis to analyze the relationship between tourists' perceptions of ecotourism, recreational shocks and carrying capacity, as shown in Table II, the results show that the explanatory ability of independent variables to dependent variables is 1.5%, and only the recognition of recreational shocks has a significant effect on carrying capacity ($\beta=0.138, P=0.022$), It can be seen that different eco-tourism cognitions will not have any impact on tourists' sense of crowdedness in scenic spots, and different recreational impact cognitions have a low ability to explain the sense of crowdedness.

TABLE II: REGRESSION ANALYSIS OF ECOLOGICAL TOURISM COGNITION AND RECREATIONAL SHOCK COGNITION ON CARRYING CAPACITY

Eco-tourism awareness, recreation cognitive impact on the carrying capacity	Unstandardized coefficient β	Standardized coefficient β	T	VIF
(constant)	0.356		6.924***	
Eco-tourism awareness	-0.020	-0.101	-1.695	1.092
recreation cognitive impact	0.020	0.138	2.311*	1.092
$F=3.243^*$		$R=0.015$		

IV. CONCLUSION

This study explores tourists' perceptions of ecotourism and recreational shocks, and understands the difference between cognitive levels and tourist attributes, and the relationship between different ecotourism perceptions and recreational shocks on social carrying capacity, with a view to the management of recreational areas Helpful. In this study, the conclusions obtained after empirical statements are as follows:

(1) Tourist attributes have significant differences in monthly tourism income in ecotourism cognition. It can be seen that tourists with low income and low travel frequency have fewer opportunities to engage in eco-tourism, so their feelings in this regard will be stronger than other tourists; in tourism characteristics, they consider themselves to be professional mountaineers, and their negative cognitive aspects of recreational shocks all have significant differences. In several trips of Walami, there is a significant difference between the perception of ecotourism and the perception of negative environmental impact. It can be seen that tourists with less mountaineering experience will have a stronger negative feeling about the impact of recreation than tourists with more mountaineering experience

(2) Tourists' ecotourism cognition does have a certain degree of positive impact on recreational impact perception, which also shows that the higher the tourists' perception of ecotourism, the higher their recreational shock perception. Regarding the impact of ecotourism perception and recreational impact perception on the degree of crowding of tourists, they do not affect both at the same time, but only recreational impact perception has an influential effect. Therefore, the hypothesis of this part of the research is not valid.

V. RECOMMENDATIONS

A. Recommendations for Management

a. The field survey of this research found that there are obviously 5 times more tourists on holidays than usual tourists, and most of them are tourists on tour buses. It is recommended that operators communicate with tourism operators and disperse their tourists at different times to avoid traffic Excessive crowds have caused the impact of local animals and plants.

b. In view of the current status of tourists' perceptions of ecotourism and recreational shocks, the average recognition of tourists in recreational shocks is around 3, indicating that tourists' awareness of local recreational shocks is slightly lower. It is recommended that operators can organize some environmental education related Recreation activities can prevent and reduce the impact of tourists on local recreation in the management of tourist behavior.

B. Suggestions for Subsequent Research

a. After research and analysis, it is found that the number of positive and negative items differs greatly in the recreational impact cognitive questionnaire. Therefore, in the analysis of the difference in social and economic background, it is mostly insignificant. Therefore, it is recommended that future researchers should design again when dealing with related questionnaire questions, avoid the difference between the number of positive and negative items so much that the difference analysis is less able to compare whether tourists from different socioeconomic backgrounds have different perceptions of recreational impact.

b. In the photorealistic questionnaire for carrying capacity, the size of the people placed on the photos is not

standardized, so many tourists are more likely to fill in the answers. It is recommended that when carrying out social carrying capacity research in the future, the pictures can be standardized and Explain how to fill in the question before visitors fill out the question, and also reduce the error rate of the questionnaire.

CONFLICT OF INTEREST

This research was supported by the 108-year commissioned research project of Yushan National Management Office. We declare that we do not have any commercial or associative interest that represents a conflict of interest in connection with the work submitted.

AUTHOR CONTRIBUTIONS

This research is assisted by three authors. The collection of literature and research framework is for You-Jie Huang and Chieh-Lu Li, and Kui-Hua Chen is for collecting questionnaires, analysis results and conclusions, and all authors have approved the final version.

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