International Journal of Development and Sustainability
ISSN: 2186-8662 – www.isdsnet.com/ijds
Volume 15 Number 3 (2026): Pages 274-291
https://doi.org/10.63212/IJDS25111101

Ecotourism development and tour guide ecological awareness in Chinese national parks: Evidence from Wuyishan and Hainan Tropical Rainforest

Fangyuan Chen [1], Masahiko Ota [2*], Xieyu Han [3]

[1] *Graduate School of Fisheries and Environmental Sciences, Nagasaki University, Nagasaki, Japan*
[2] *Institute of Integrated Science and Technology, Nagasaki University, Nagasaki, Japan*
[3] *Graduate School of Integrated Science and Technology, Nagasaki University, Nagasaki, Japan*

Abstract

China started a new national park system in 2021. However, there is a lack of empirical investigation into how the national park system has affected ecotourism implementation. The present study examines ecotourism development and ecological awareness of ecotour guides focusing on Wuyishan National Park and Hainan Tropical Rainforest National Park. It combines qualitative and quantitative research methods, including interviews and questionnaires. The findings, based on cross-sectional survey data, indicate that guides and travel agency representatives perceive limited changes in ecotourism development and their professional roles after the introduction of the new national park system. The self-reported ecological awareness among tour guides remains at a moderate level, with no strong indication of perceived improvement attributed specifically to the new system. Travel agencies should focus on tour guide personnel management and environmental education, changes in the job responsibilities of tour guides, and the career development of tour guides.

Keywords: Ecotourism; Ecotour Guide; Stakeholder; National Park System; China

Published by ISDS LLC, Japan | Copyright © 2026 by the Author(s) | This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Chen, F., Ota, M. and Han, X. (2026), "Ecotourism development and tour guide ecological awareness in Chinese national parks: Evidence from Wuyishan and Hainan Tropical Rainforest", *International Journal of Development and Sustainability*, Vol. 15 No. 3, pp. 274-291.

[*] Corresponding author. *E-mail address:* masahikoota@nagasaki-u.ac.jp

1. Introduction

The concept of ecotourism was officially introduced by the International Union for Conservation of Nature (IUCN) in 1983. It specifically refers to the dual function of conservation and development, aiming to achieve environmentally, socially, and economically sustainable development by benefiting stakeholders such as the natural environment, local communities, tourism operators, and tourists (Song, 2003). Ecotourism, serving as an effective tool for sustainable environmental development, aims to preserve the environment and generate economic benefits for local communities. It focuses on providing a natural, scenic, and culturally immersive experience while minimizing its impact on the environment (Kiper, 2013; Najibullah et al., 2020).

Protected areas including national parks are major places to implement ecotourism. Ecotourism in national parks serves as a sustainable means for the development of the tourism industry, aiming to minimize negative environmental and cultural impacts (Rhama et al., 2020). Ecotourism in national parks can have beneficial effects on improving community livelihoods and providing employment opportunities for local residents (Anggraini and Gunawan, 2021; Meilani et al., 2019). However, negative impacts can also happen including the generation of waste, soil erosion, and vegetation destruction due to the increasing number of tourists and natural trails in the environment (Obua, 1997; Chin et al., 2000). Ormsby and Mannle (2006) reports that ecotourism in Madagascar' s Masoala National Park within national parks focuses on the benefits of ecotourism and the role of local guides in raising awareness for nature conservation. Bansal and Kumar (2011) and Anindisa et al. (2017) have both examined the perspectives of stakeholders in national parks including local communities, tourists, ecotourism operators, and government officials, highlighting a lack of community knowledge and awareness regarding ecotourism and its benefits.

In recent years, China has been developing a new national park system, regarding national parks as an important place for implementing ecotourism. During the 15th Conference of the Parties (COP15) of the Convention on Biological Diversity held in 2021, Chinese President Xi Jinping announced the first national park list. In China, national parks are defined as a type of nature reserve, fundamentally aiming to protect ecosystems and provide opportunities for scientific, educational, and recreational purposes (Zhao, 2022). In 2023, the State Forestry and Grassland Administration and the People' s Government of Qinghai Province jointly hosted the 'Second National Park Forum' where the national park comprehensive plan for 2023-2030 was announced. These policies emphasize the importance of developing ecotourism based on the national park system as a strategy to protect the integrity of ecosystems, prioritize the public benefits of parks, promote economic development, and enhance people's livelihoods. This indicates that national parks, as one of the most important natural conservation areas, achieve large-scale effective protection through small-scale moderate development. It is proposed that ecotourism be used as an effective means for regional development and environmental protection in national parks, integrating ecological environment, natural resource conservation, and moderate tourism development as fundamental strategies (Tang, 2020).

There are several studies about ecotourism in Chinese national parks. Zhou et al. (2016) and Rui et al. (2019) explored the development strategies of ecotourism in national parks and the economic growth of local residents. Liu and Li (2022) has analyzed the internal requirements for national parks to develop ecotourism, such as local participation and integration, proposing development strategies based on these requirements.

Furthermore, an analysis has been conducted on the sustainable economic development of surrounding residents and the protection and evaluation of the park's tourism resources. Particularly, a study on five national parks' community development strategies from the residents' perspective has been conducted, verifying the framework of community management and the effectiveness of its implementation (He et al., 2023; Liao, 2022; Lu and Shan, 2023).

However, these studies have primarily concentrated on the economic development of regional residents, with a notable absence of research concerning the current status and training of local tour guides (Chen and Ota, 2024). Yamada (2011) emphasizes the significance of qualified tour guides in the implementation of ecotourism. In addition, few case studies have examined to what extent China's newly established national park system has changed perceptions of ecotourism in the region. Given that one of the improvement goals of the national park system is to enhance ecotourism, it is crucial to examine the actual implementation of ecotourism, and to identify recommendations for enhancement. Against this backdrop, the present study aims to provide empirical evidence of the current status of ecotourism development and ecological awareness of ecotour guides in Chinese national parks.

2. Methods

2.1. Study site

There are five national parks in China as of 2024, i.e., Sanjiangyuan National Park, Giant Panda National Park, Northeastern Tiger and Leopard National Park, Hainan Tropical Rainforest National Park, and Wuyishan National Park. Of these, the present study focuses on Wuyishan National Park and Hainan Tropical Rainforest National Park (Figure 1). In these two areas, before the designation as a national park, eco-tourism projects had been developed. Since being designated as a national nature reserve in 1987, Wuyishan has been imposing restrictions on large-scale commercial development and has established tourism projects and itineraries that combine the natural landscapes and cultural tourism resources of the reserve. In 1998, Hainan Province formulated and implemented the "Hainan Province Ecological Province Construction Outline," aiming to enhance the development of scenic areas with ecological tourism characteristics and actively promote environmental protection through education and awareness campaigns (Chen, 2007). The two parks therefore have had mature tourism facilities and management practices, offering well-rounded eco-tourism products and tour guide services.

The Wuyishan National Park includes various protected areas such as the Wuyishan National Nature Reserve, national scenic spots, and Wuyishan National Forest Park. This national park has rich biodiversity and unique natural landscapes; however, due to the large proportion of collective land, there are obstacles in the development of eco-tourism projects. The Hainan Tropical Rainforest National Park includes 19 nature reserves and was selected as one of the first national parks due to its unique tropical rainforest system which plays a vital role in maintaining global biodiversity. Nevertheless, the high population within the park has led to long-term disturbances from human activities, resulting in deforestation, loss of vegetation, and migration of animal and plant species (Table 1). Therefore, implementation of eco-tourism would be an important step toward balanced economic development and conservation.

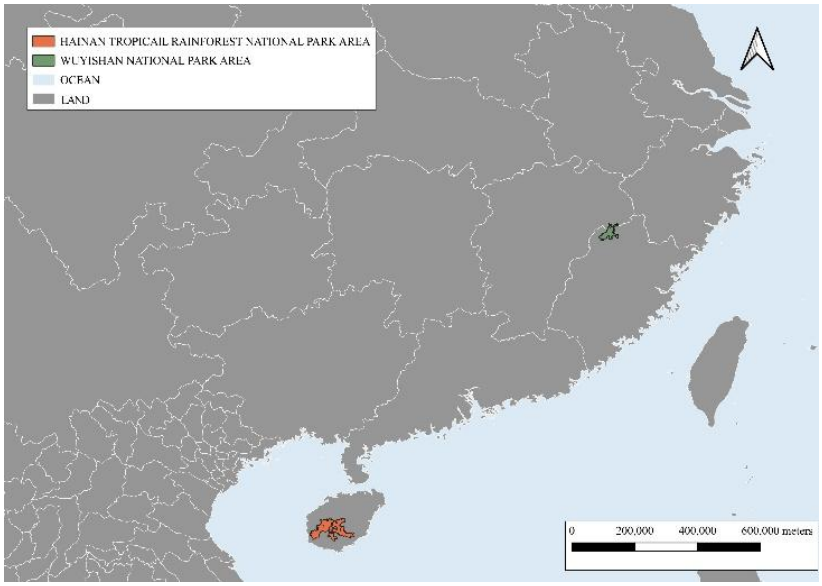


Figure 1. Location of Wuyishan National Park and Hainan Tropical Rainforest National Park. (Source: Natural Earth (1:10m). The map uses the WGS 84 geographic coordinate system (EPSG:4326).

Table 1. Basic overview of the two national parks.

	Wuyishan National Park	**Hainan Tropical Rainforest National Park**
Geographic Distribution	Located in the northern part of the Wuyi Mountains, it involves Wuyishan City, Jianyang District, Guangze County and Shaowu City in Fujian Province.	Located in the south-central part of Hainan Island, it includes the eastern branch of the south-central mountain range and the western branch of the Limuling mountain range, with the highest point of the park being Wuzhishan .
Area	1,001 km^2 (Area within Fujian Province)	4,269 km^2
Condition of Biological Resources	There are 3,404 species of higher plants, 126 species of nationally protected wildlife, including *Tragopan caboti* and *Teinopalpus aureus*	The park now counts 432 kinds of protected plants, eight kinds of rare and endangered protected species and 67 kinds of national secondary protected organisms.
Typical Ecosystem Types	Central subtropical broad-leaved evergreen forest	Tropical rainforests, monsoon rainforests
Governing Bodies and Modalities	Vertical management by the Fujian Provincial Government and the formation of the Wuyishan National Park Management Bureau	Hainan Forestry Bureau plus Hainan Tropical Rainforest National Park Authority license, vertical management by the Hainan Provincial Government

	Wuyishan National Park	Hainan Tropical Rainforest National Park
Settled Population in the National Parks' region	There are 29 administrative villages in the park with a population of about 3,000, and 20 administrative villages within 2km of the park.	The permanent population of the park involves 47 administrative villages with a population of 30,400 people.
Land Use	33.4%- Area of State-owned Land 66.6%- Collective Land Area	80.7%- Area of State-owned Land 19.3%- Collective Land Area
Zone Management	Special Protection Areas, Strictly Controlled Areas, Ecological Exhibition Areas, Traditional Use Areas	Core Conservation Areas, General Control Areas, Traditional Use Areas

Source: National Forestry and Grassland Administration (2023a; 2023b)

2.2. Data collection and analysis

We combined secondary data analysis, interviews with travel agencies offering ecotours, and a questionnaire survey for ecotour guides. For the secondary data analysis, we consulted the General Program of China' s National Park System Construction, National Park Management Regulations, and the National Park Development Plan, and confirmed the national parks' measures for developing ecotourism.

Interviews with travel agencies revolved around the current ecotourism routes and contents offered, changes anticipated in routes and contents after the establishment of national parks, training programs for eco-tour guides, and future business directions.

For Wuyishan National Park, a purposive sampling approach was employed, targeting travel agencies operating along ecotourism routes in SanGu Town, located approximately four kilometers from the park entrance. Through map-based searches, 33 travel agencies were identified and contacted sequentially. The first author contacted these agencies by phone for requesting interview permission. In total, four agencies consented to participate in interviews. We interviewed two travel agency owners, one of whom is also the vice president of the Wuyishan Tourist Guides Association, and three managers of the travel agency's business department in Wuyishan. Regarding Hainan Tropical Rainforest National Park, a similar process was employed, targeting 21 travel agencies located in Wuzhishan City—the nearest city to the park. After first author's contacts, three agencies consented to participate in interviews; the interviewees were staff of agencies' tourism sales department. The visits were made in June 2024.

In addition to qualitative interviews to learn about tour agency perspectives, we conducted questionnaire surveys to tour guides. Firstly, we requested permits to the seven travel agencies to which we interviewed to distribute the questionnaire to tour guides they hire; all of them consented to our request. With authorization from the travel agency managers, we distributed printed questionnaires to guides present at the agency offices, obtaining approximately 17 valid responses. Additionally, we disseminated QR codes via the agency's WeChat guiding guide group, assuring participants of anonymity and voluntary participation; 66 valid responses were obtained. Thus, the final sample size becomes 83, 52 from Wuyishan and 31 from Hainan. At each travel agency, we surveyed tour guides who have experiences of group guiding in recent years.

According to the travel agencies, all respondents we sent questionnaires hold an interpretation certificate or guiding permit from the city where they work. We did not differentiate full-time and part-time guides from the questionnaire; both types of guides are likely to be included in our sample, and yet the numbers of each are unknown. In addition, it was difficult to confirm the population of target tour guides in both regions. We should acknowledge that there could be selection biases, because the sampling procedure relied on the cooperation of selected travel agencies and the voluntary participation of guides. Well-structured management agencies and guides with a focus on professional development may be more inclined to participate. Consequently, simple generalization of the results to all guides operating within Chinese national parks should be refrained.

The questionnaire contents included awareness of guides about ecotourism, effects of national park establishment on tour guides, and self-evaluation of tour guides' skills. Questions were basically structured with a 4-point Likert scale, i.e., strongly agree, agree, disagree, and strongly disagree. For analysis, we firstly summarized data with descriptive statistics using mean values. Then, we performed exploratory factor analysis (SPSS Statistics 25) to analyze guides' perceived changes resulting from the establishment of national parks. All 83 survey responses underwent comprehensive data integrity validation, with no missing values detected in the final dataset. The limited sample size in this study (n=83) may constrain the robustness of polychoric correlation analyses. Hence, the four-point Likert scale data was treated as interval-scale data for the purposes of analysis. Due to the inherent measurement limitations of this approach from a strict psychometric perspective, we acknowledge that further research is needed by adopting more rigorous methodologies to enhance measurement validity.

Another limitation inherent in this study design is that all data were cross-sectional, collected at a single point of time (June 2024), the assessment of changes in the national park system pre- and post-establishment relies on participants' retrospective perceptions rather than prospective longitudinal measurements. Consequently, the findings primarily reflect perceived changes rather than causal effects.

3. Results

3.1. Current status of ecotourism development in the two national parks

Overviewing recent regulations or plans related to the national park system, a policy direction toward the appropriate park management and the promotion of ecotourism is confirmed. The recent promulgation of China's "Several Fiscal Policy Opinions on Promoting the Construction of National Parks" (Ministry of Ecology and Environment of the People's Republic of China, 2022) mandates increased financial investment to bolster national park development. Apart from this, the "Specification for national protected areas ecotourism" (National Forestry and Grassland Administration, 2022) underscores the imperative of resource conservation and utilization, advocating for enhanced zoning management. The "Special Plan for Ecotourism in Tropical Rainforest National Parks (2023-2030)" (Department of Natural Resources and Planning of Hainan Province, 2023) stipulates that ecotourism activities must remain within environmental carrying capacity, while also enhancing the educational functions of the parks. Finally, the section on ecotourism within the "Wuyishan National Park Master Plan (2023-2030)" (National Forestry and Grassland Administration, 2023a) addresses the promotion of novel ecotourism products.

At the national park level, according to the documents about the overall planning of Wuyishan National Park, there has been a strong promotion of ecotourism within the park to encourage travel agencies to develop related tourism packages and provide training for ecotour guides. Penalty regulations and legal liabilities for the zoning management system were introduced with the Wuyishan National Park Ordinance, which took effect in October 2024. This ordinance signifies the prohibition of certain tourist activities and routes in the core protection area. Apart from this, to enrich and strengthen the eco-tourism routes in the general protected areas of the park, an official decision was made in May 2024 to develop the Wuyishan No.1 Scenic Road. Spanning approximately 100 kilometers, this road will pass through various ecological and cultural attractions such as Swallow' s Nest and the former residence of Zhu Xi. A travel agency executive stated during our interview that the road is more suitable for self-drive tours, where the person in charge drives themselves rather than being accompanied by a tour guide. Currently, there is a lack of infrastructure such as accommodation, catering, and sightseeing buses. In the future, if the government vigorously develops related facilities, travel agencies will also independently develop related routes and products.

Regarding the Hainan Tropical Rainforest National Park, based on the "Special Plan for Ecotourism in Tropical Rainforest National Parks (2023-2030)" (Department of Natural Resources and Planning of Hainan Province, 2023) approved by the expert group in Hainan Province in April 2024, the future development of ecotourism has been defined as follows. 1) The concept of regional coordination has been introduced to classify and regulate the core protection areas and general control areas. By integrating the national park tourist roads with the coastal tourist roads, a comprehensive spatial layout of a large loop consisting of seven major zones has been formed. 2) Vigorously explore resources points within the general control area that meet the requirements for conversion. 3) Guide local residents to become participants in eco-tourism as boundary elements and environmental protection supervisors. 4) Transform existing fire prevention trails and management stations into educational and sightseeing trails, transportation hubs, and other supporting facilities for cultural and creative experiences.

Inquiries regarding the impact of the government's "Highway Line Around the Mountain and the Sea", a new road development project, on travel agencies, a travel agency in Wuzhishan city indicated that the highway has not significantly increased tourist volume. Currently, most visitors are self-driving tourists who primarily visit during cultural festivals such as the Li ethnic group's "SAN YUE SAN" festival, resulting in shorter stays and reduced accommodation durations.

3.2. Perceptions of the ecotour agencies

During the interviews, in response to the question of "Do you understand the concept and content of ecotourism?", all eight travel agencies indicated that they had heard of ecotourism, and that they considered ecotourism to be tourism activities in nature. In addition, most of the agency heads had reviewed government documents outlining tourism route development requirements. However, regarding national park-led workshops, briefings, and training sessions for ecotourism project development and guide training, the heads indicated that, due to the absence of mandatory requirements, their agencies had not specifically designed or developed unique ecotourism routes, nor had they enhanced ecological knowledge training for guides within the national parks. The heads did not believe that the establishment of the park had led to substantial changes in their operations.

Regarding the question of "What is the impact on the operation and status of travel agencies before and after the establishment of the national park system?", a travel agency owner pointed out that since the establishment of the Wuyishan National Park system, according to the tourism policy promulgated by the Wuyishan government, the main scenic area of Wuyishan Park in 2024 to open a ticket-free preferential policy. After the increase in the number of tourists, the travel agency's business has increased, but the number of tour guides has decreased due to a variety of reasons, such as wages. On the other hand, all the heads of Hainan's travel agencies said that because of the low visibility of Hainan Tropical Rainforest National Park, hiring guides is currently not mandatory, and is only suitable for hiking enthusiasts. One of the Hainan travel agencies said that tourists visit the national park not all year round; their visits are concentrated in October. Hence, the travel agency was not arranging full-time guides for national park ecotours; it offered ecotour guides only for the period of concentration of tourists.

Other qualitative information derived through interviews includes the following. Currently, there are over 1,500 tour guides (who obtain their tour guiding qualifications by passing exams held by the local tour guide association) in Wuyishan Scenic Area. The interviews revealed that the turnover rate of tour guides is high due to the low income and status of tour guides. In addition, nowadays, the travel routes in Wuyishan have become mature, hence, the government is also vigorously developing new eco-routes along Wuyishan No.1 Scenic Road. However, the lack of infrastructure has resulted in fewer tourists and a lower demand for tour guides, which poses a challenge for tour operators to develop excellent products that focus on ecotourism and cultural experiences. Furthermore, the saturation of the Wuyishan tourism market has resulted in diminished economic returns, rendering travel agencies more susceptible to the influence of governmental planning, which in turn impacts the management and education of tour guides.

Interviews with three travel agencies operating within the Hainan Tropical Rainforest National Park revealed that low brand recognition results in limited business volume, thereby precluding the allocation of dedicated park guides. In-service tour guides in Hainan Province are primarily responsible for explaining the main attractions. This means that travel agencies specializing in training them face greater difficulty in imparting ecological awareness and skills for explaining the ecology of scenic spots. In addition, even though the Hainan Tropical Rainforest National Park has a significant ethnic minority population, particularly The Li ethnic group, there is a notable deficiency in cultural activities and tourism products specifically tailored to attract visitors interested in Li culture. Visitors to the park mostly opt for self-driving tours, with low participation from indigenous people. This lack of interaction between tourists and the local community is at odds with the ecotourism objectives of increasing local resident income.

3.3. Ecological awareness among tour guides in the two national parks

Table 2 shows the basic characteristics of the 83 respondents in the questionnaire survey. In particular, regarding the educational level, around 77% were lower than high school. In the case of Wuyishan, the tour guide model is mainly facilitated by the local tour guide association, where individuals can obtain guides' licenses by passing an examination, leading many local residents to pursue employment directly after completing junior high school or high school. Consequently, the overall educational attainment was relatively low. On the other hand, in Hainan, due to limited educational resources on the island and the localized nature of tour guide career development, many tour guides opt for local employment without seeking higher education opportunities elsewhere.

Table 3 shows the ten questions used to assess respondents' ecological awareness and the average values. The mean value for ecological awareness of the 83 respondents was 2.1, with minimum and maximum values being 1.2 and 3.0, respectively. The standard deviation was 0.3. Considering that the questions were based on a 4-point Likert scale (strongly agree for 4 points, agree for 3 points, disagree for 2 points, and strongly disagree for 1 points), the ecotour guides' overall awareness falls short of a good level.

Table 2. Characteristics of the respondents (n=83).

Item		Number	Percentage
Gender	Men	30	36.1
	Women	53	63.9
Age	Under 18	3	3.6
	18-25	14	16.9
	26-30	28	33.7
	31-40	23	27.7
	41-50	11	13.2
	51-60	4	4.8
Educational attainment	Junior high school and below	30	36.1
	High school/secondary school	34	41.0
	College	15	18.1
	University undergraduate course	3	3.6
	University postgraduate and above	1	1.2
Length of time in guiding business	Less than 1 year	4	4.8
	1-2 years	21	25.3
	2-5 years	31	37.3
	5-10 years	15	18.1
	More than 10 years	12	14.5
Monthly income from tour guiding	Less than 3000RMB (Chinese Yuan)	2	2.4
	3000-4000RMB	19	22.9
	4000-5000RMB	36	43.4
	More than 5000RMB	26	31.3
Percentage of the income from tour guiding to total household income	25%	30	36.1
	50%	25	30.1
	75%	11	13.3
	100%	17	20.5

Table 3. Ecological awareness of the respondents (n=83).

Item	Average value in a 4-point Likert scale	Standard deviation in a 4-point Likert scale
Do you agree that ecotourism is defined as an activity where tourists engage in environmental education while interacting with ecological resources through explanations of natural environments and historical culture?	2.2	0.64
In your work as a guide, are you often involved in ecotourism-related routes and activities?	2.1	0.81
Are you familiar with local environmental regulations and ecosystem protection policies (such as national park protection rules)?	2.2	0.71
Do you believe that a tour guide can have a positive impact on the environment during a tour?	2.2	0.80
As a guide, do you voluntarily communicate concepts of environmental protection and sustainable tourism to tourists during the tour?	2.0	0.73
As a guide, do you focus on introducing the natural environment and ecological features of the area?	2.2	0.77
Do you think there is a clear distinction between the work of a general guide and that of an ecotour guide?	2.1	0.80
In general, do you think that general tour guides focus more on explaining the history and culture of tourist destinations, while ecotour guides focus more on the natural environment?	2.2	0.73
As a guide, do you feel that you play an active role in environmental protection during ecotours?	2.2	0.81
Do you want to learn more about ecotourism?	2.0	0.73
Total	2.1	

3.4. Analysis of cognitive changes among tour guides after the establishment of the national park system

Table 4 shows respondents' perceptions about the changes after the introduction of the national park system, covering situations in guiding in the national park and perceptions about ecotourism. Most of the values are in the lower 2 range (from 2.0 to 2.3) on a 4-point Likert scale. This indicates that, according to tour guides' retrospective accounts, the implementation of the national park system has had minimally perceived changes in their working environments.

However, of these, the average score for the need for more ecological interpretation work among tour guides (Question No. 9) was 2.3, indicating a relatively high level of understanding of environmental conservation and ecological principles in the implementation of the national park system. The average score for the increase in the number of peers (Question No. 8) was 2.3, the highest among the averages in the survey, indicating that with the end of the pandemic and the recovery of the tourism industry, the demand for tour guides in these two national parks is increasing, posing higher requirements regarding the quality of tour guides.

Before performing a factor analysis, the validity of the data was assessed, as shown in Table 5, with a KMO(Kaiser-Meyer-Olkin) value above 0.5 indicating suitability for factor analysis. The Bartlett sphericity test yielded a chi-square value of 109.191 with a significant p-value of 0.000, rejecting the sphericity assumption and indicating that the questions in the survey were not independent (Table 5). Hence, the data was deemed valid, allowing for exploratory factor analysis to be performed.

This study conducted an exploratory factor analysis on the ten perceived-change items within the questionnaire. Factors were extracted using principal component analysis (PCA) from the correlation matrix, retaining components with eigenvalues greater than 1. The initial solution suggested three factors (Table 4), which was also supported by the scree plot (the slope flattened after the third factor). The three-factor solution explained 52.43% of the total variance (20.20%, 17.53%, and 14.70% for Factors 1-3, respectively). The variance contributions were relatively balanced, suggesting acceptable structural validity for this scale.

Subsequently, orthogonal rotation was applied to the three extracted factors using Varimax rotation. Post-rotation, factor loadings with an absolute value greater than or equal to 0.40 were treated as meaningful for interpretation. No problematic cross-loadings were observed across multiple factors for any items. To assess the internal consistency within each factor, we calculated McDonald's ω reliability coefficient, yielding values of 0.79 for Factor 1, 0.79 for Factor 2, and 0.73 for Factor 3. These values indicate acceptable internal consistency for each factor.

Factor 1 encompasses aspects of tour guide work environment, training, personnel management, and environmental policy education. Hence, we name this factor “Tour guide personnel management and environmental education.” Changes in national park management and planning policies determine the requirements for tour guide training and professional certification, and hence ecological knowledge and interpretive skills are more emphasized. Factor 2 involves ecological tourism routes, group guiding frequency, workload, and income. Therefore, Factor 2 has been extracted to represent “Changes in the job responsibilities of tour guides.” The average score for the question “Once the national parks system is established, do you think it will be necessary for tourism companies to add new training in areas such as the national parks system and knowledge?” was 2.0. This indicates that tour guides hold a passive attitude towards the new system of national parks and do not see the need to enhance their understanding of related regulations and ecological knowledge through training. Interviews with tour guides reveal their skepticism about the practicality of ecological knowledge and institutional learning, believing that these aspects do not significantly contribute to their actual job performance. Factor 3 encompasses the number of guides (peers), interpretation, and economic changes, which we collectively refer to as “The career development of tour guides.”

Table 4. Perceptions about the changes after the national park system and factor analysis with post-rotation matrix results (n=83).

Item	Average value	Standard deviation	Factors load coefficient		
			Factor 1	Factor 2	Factor 3
Eigenvalue (after rotation)			2.020	1.753	1.470
Variance Explained Rate (%)			20.20	17.53	14.70
1. Has the ecology of the working area been significantly improved and expanded since the implementation of the national park system?	2.2	0.76	**0.741**	-0.071	-0.010
2. Once the national parks system is established, do you think it will be necessary for tourism companies to add new training in areas such as the national parks system and knowledge?	2.0	0.84	**0.672**	0.060	0.150
3. After the implementation of the national park system, do you think that the number of tourists and their behavior should be more strictly required and regulated?	2.0	0.82	**0.588**	0.125	0.127
4. Do you think you have increased your knowledge of the national park system environmental policies to better educate and influence visitors?	2.2	0.81	**0.695**	0.195	-0.117
5. Since the implementation of the national park system, do you work from the perspective of experiencing a better ecological environment in the travel itineraries you undertake?	2.0	0.84	0.241	**0.586**	-0.214
6. Do you think the workload and the number of tours you take has increased compared to before the national park system was implemented?	2.2	0.71	0.046	**0.778**	0.070
7. Have guides' incomes increased compared to before the establishment of the national parks system?	2.1	0.80	0.025	**0.778**	0.194
8. Has the number of guides (peers) increased since the implementation of the national park system?	2.3	0.75	0.150	0.217	**0.723**
9. After the implementation of the national park system, do you think more interpretive work on ecological conservation needs to be done?	2.3	0.82	0.301	-0.297	**0.578**
10. With the implementation of the national park system, I think the overall economic situation of guides will improve.	2.2	0.73	-0.130	0.038	**0.686**
Principal component score (of a function)			0.385	0.334	0.280

Table 5. KMO Values and Bartlett Sphericity Tests (n=83).

KMO	0.605
Bartlett's test of sphericity approximates the chi-square（x^2）	109.191
df	45
sig	0.000

3.5. Self-perceptions of guides in national park areas

Figure 2 shows respondents' self-evaluation of their abilities in tour guiding, based on 14 questions (Wuyishan National Park: n=52, Hainan Tropical Rainforest National Park: n=31). Different from the perceptions about changes after the national park system, some questions marked values near the 3 range in a 4-point Likert scale, e.g., b, c, and d in Wuyishan or j in Hainan. The analysis of the chart reveals that the tour guides in both locations generally rate themselves between "fair" and "good." At the same time, the overall self-assessment of the tour guides in Wuyishan is higher than those in Hainan Tropical Rainforest Park. This can be attributed to the popularity of the scenic area and the years of experience of the personnel. In particular, regarding foreign language reception and driving skills, Hainan scored only 1.3 and 1.9, whereas Wuyishan scored 2.7 and 2.6. The only aspect in which Hainan guides outperformed Wuyishan guides is in deepening the understanding of the local area and making contributions to the local community, with a self-assessment average of 3.2, the highest among all self-ratings.

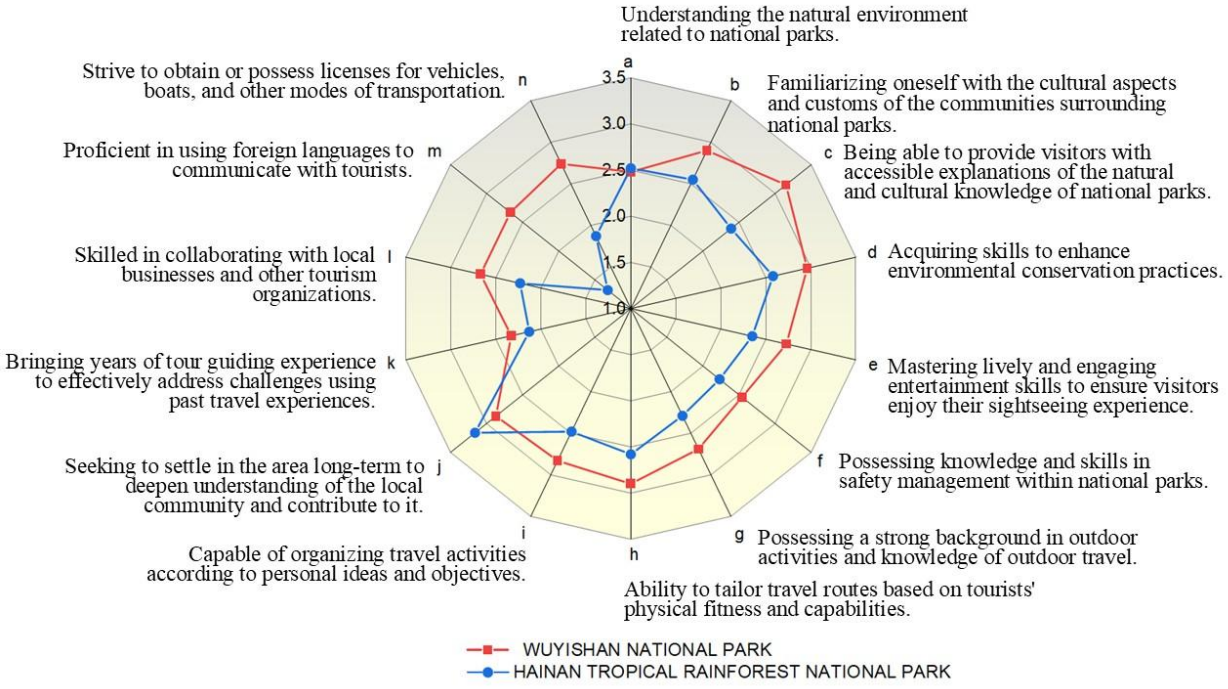


Figure 2. Self-evaluation of abilities among tour guides (n=83).

4. Discussion and conclusion

4.1. Summary

The present study has examined the current status of ecotourism development as well as the quality and conditions of ecotour guides in the two Chinese national parks with multifaceted data. Firstly, although ecotourism is emphasized in national park-related policy documents, representatives of tour agencies as well as tour guides perceived that the significance of the national park system is still limited within the current tourism industry. Additionally, based on retrospective evaluations, they perceived that the integration of the national park system has not profoundly altered their professional practices.

At the same time, with the enactment of ecological tourism policies within national park frameworks, the government was augmenting its investment in ecological infrastructure and product development; the Wuyishan No.1 Scenic Road and Highway Line Around the Mountain and the Sea of Hainan were the examples confirmed. Such investment can be precipitating enhancements in the operational standards of travel agencies and the ecotour guiding sector.

Secondly, the ecological awareness of tour guides showed an overall unsatisfactory level. In particular, there was less understanding of the essence of ecotourism among tour guides. Many of the tour agents and tour guides merely recognized that ecotourism is tourism activities in nature reserves, and they were unlikely to be aware of the importance of environmental and ecological explanations and educational functions. Furthermore, during interviews, it was observed that the guides did not exhibit proactive attitudes towards enriching their knowledge of national parks and enhancing their skills in natural geography. Interviews with travel agencies also revealed a lack of specialized ecological skills training for guides after the establishment of the national park system.

This lack of understanding can be attributed to two reasons. First, ecotourism is relatively new in China, resulting in limited environmental education programs and tourism courses focusing on ecotourism. Second, daily training for tour guides places excessive emphasis on cultural tourism knowledge related to national parks, while neglecting subjects such as geography, zoology, botany, and ecology that are relevant to ecotourism. There is also a lack of effective supervision and evaluation of tour guides' ecological literacy, indicating that the current national park system's policies related to ecological tourism development lack operability. The implementation standards and specific execution methods are lagging behind and have not been effectively communicated to grassroots communities.

At the same time, there were differences in tour guide self-perceived abilities among the two national park areas. Self-perceived abilities were overall lower in Hainan. This could be explained that tour guides in Hainan did not solely focus on the national park and were engaged in guiding in other areas of Hainan Island, knowledge and attitudes were not quite focused on the national park. In addition, tour guides in Hainan were not convinced with language skill and necessity for transportation licenses. This implies that training tailor-made for each area is desirable.

Thirdly, the factor analysis performed identified three key factors influencing tour guides following the establishment of national parks, i.e., Factor 1: Tour guide personnel management and environmental education; Factor 2: Changes in the job responsibilities of tour guides; and Factor 3: The career development

of tour guides—provides actionable recommendations for travel agencies. In the conclusion section, we make policy recommendations referring to these factors.

4.2. Policy implications

The policy implications of this research are derived directly from interview data with travel agencies, tour guides surveys, and the three factors identified through exploratory factor analysis. Given the absence of significant perceptual shifts following the establishment of the national park system, priority should be given to enhancing human resource capabilities, including tour guide knowledge, skills, and motivation, alongside the development of capacity-building initiatives and incentive mechanisms.

Firstly, regarding Factor 1 (Tour guide personnel management and environmental education) of the PCA, the ecological awareness scores were low. Interview results in Section 3.2 indicate that travel agencies and guides perceived a lack of clear, operational ecotourism standards within the park system, as well as the absence of mandatory training requirements. National park management authorities should move beyond broad policy declarations toward more specific and practical ecological interpretation standards, such as defining minimum knowledge requirements for guides such as local biodiversity, geological conservation, and park regulations. Given the significant influence of travel agencies' management, training, and operational models on tour guides' professional identity and career trajectories (Ap and Wong, 2001), it is also recommended that travel agencies develop targeted, mandatory ecological training modules. For training module developments, specific ecosystems in Wuyishan National Park or Hainan Tropical Rainforest National Park can be taken up focusing on flagship species and conservation values.

Regarding Factor 2 (Changes in the job responsibilities of tour guides), research findings and interview data indicate that guides perceived minimal alterations in their workload, income, and professional roles. Therefore, national park management agencies and related tourism authorities are recommended to prioritize licensing and provide preferential treatment in market promotion to certified ecological guides and travel agencies. Then, performance-based bonuses could be linked to completion of ecological training certifications and positive tourist feedback. This would encourage tour guides to develop exclusive adventure, tea tourism, and hiking videos to attract tourist patronage and bookings for ecological routes. In the era of big data, travel agencies may be able to leverage the synergy between national park branding and technology.

Finally, concerning Factor 3 (The career development of tour guides), the research indicates that tour guides had less intrinsic motivation for continuous learning for career advancement. Hence, park management authorities and tourism agencies are recommended to consider well-defined career pathways for tour guides. For example, travel agencies can establish specialized guiding roles, such as cultural and natural heritage interpreters and rainforest ecology specialists, with better remuneration standards. This could directly address the guides' expanded ecological interpretation responsibilities outlined in Table 4, Question 9, thereby enhancing their professional identity. Travel agencies also can empower guides by granting them autonomy and decision-making authority, enabling them to independently manage segments of itineraries and develop their own routes. This shift can facilitate a transition from passive learning to proactive empowerment (Ryan and Deci, 2000). Post-autonomy, innovative training methods could be an option, such as peer-to-peer exchange, best-practice sharing with scoring, and ecological knowledge competitions within travel agencies.

Through these improvements, ecological competencies of tour guides and their ecological consciousness can be enhanced.

Ethical Statement

For data collection in this study, the authors obtained an approval from the Ethics Review Committee at the Faculty of Environmental Science, Nagasaki University (No. R060611ENV-02). Informed consent was obtained from all subjects involved in the study.

Acknowledgement

This study was partially funded by JSPS KAKENHI under grant number JP23K21808.

References

Anggraini, R.I. and Gunawan, B. (2021), "Ecotourism development in national parks: A new paradigm of forest management in Indonesia", *E3S Web of Conferences*, Vol. 249. https://doi.org/10.1051/e3sconf/202124903010

Anindisa, M., Basuni, S. and Sunarminto, T. (2017), "Stakeholders of nature tourism management in SPTN Area II Majalengka, Gunung Ciremai National Park", *Media Konservasi*, Vol. 22 No. 3, pp. 230-241.

Ap, J. and Wong, K.K. (2001), "Case study on tour guiding: Professionalism, issues and problems", *Tourism Management*, Vol. 22 No. 5, pp. 551-563. https://doi.org/10.1016/S0261-5177(01)00013-9

Bansal, S.P., and Kumar, J. (2011), "Ecotourism for community development: A stakeholder's perspective in Great Himalayan National Park", *International Journal of Social Ecology and Sustainable Development (IJSESD)*, Vol. 2 No. 2, pp. 31-40. https://doi.org/10.4018/jsesd.2011040103

Chen, H.Y. (2007), "Research on the sustainable development of ecological tourism in Hainan province", MA thesis, Central China Normal University. Available at: https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD2007&filename=2007112137.nh (Accessed 26 January 2026)

Chen, F. and Ota, M. (2024), "Status and challenges for ecotour implementation in Chinese national parks: A case study from Wuyishan", *International Journal of Development and Sustainability,* Vol. 13 No. 8, pp. 713-729.

Chin, C.L., Moore, S.A., Wallington, T.J., and Dowling, R.K. (2000), "Ecotourism in Bako National Park, Borneo: Visitors' perspectives on environmental impacts and their management", *Journal of Sustainable Tourism*, Vol. 8 No. 1, pp.20-35. https://doi.org/10.1080/09669580008667347

Department of Natural Resources and Planning of Hainan Province and China Railway Consulting Group Beijing Architectural Planning and Design Co., Ltd. (2023), "Special Plan for Ecotourism in Tropical Rainforest National Parks (2023-2030)", available at:

https://lr.hainan.gov.cn/IGI/upload/file/2023/11/30/20231130060450546Zpn.pdf (accessed 15 March 2025).

He, X., Wang, X., Shen, l. and Zhuang, Y.B. (2023), "A framework for adaptive collaborative governance of national park communities and its effectiveness in practice: A case study of Community A in Tangjiahe area of Giant Panda National Park", *Landscape Architecture*, Vol. 30 No.10, pp. 42-48.

Kiper, T. (2013), "Role of ecotourism in sustainable development", In: M Özyavuz (Ed.), *Advances in Landscape Architecture*, IntechOpen, London, pp. 773-802. https://doi.org/10.5772/55749

Liao, M. (2022), "Research on public participation mechanism of national park planning--A case study of Hainan Tropical Rainforest National Park", MA thesis, Beijing University of Civil Engineering and Architecture. Available at: https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202301&filename=1022643774.nh (Accessed 26 January 2026)

Liu, Y.X. and Li, J. (2022), "Study on ecotourism development strategy of national parks in China", *Forestry Construction*, Vol. 40 No. 5, pp. 13-17.

Lu, Y.L. and Shan, Y.J. (2023), "Optimization of national park system and its community governance system: Based on the experience of Three-River-Source National Park", *Sociological Theory and Method Research Center, Renmin University of China.* Vol. 25 No. 4, pp. 67-76.

Meilani, M.M., Andayani, W., Faida, L.R.W. and Maryudi, A. (2019), "Ecotourism in Sebangau National Park: An avenue to enhance local community livelihoods while protecting the ecosystem", *IOP Conference Series: Earth and Environmental Science*, Vol. 399. https://doi.org/10.1088/1755-1315/399/1/012112

Ministry of Ecology and Environment of the People's Republic of China. (2022) , " Several Fiscal Policy Opinions on Promoting the Construction of National Parks", available at: https://www.mee.gov.cn/zcwj/gwywj/202209/t20220930_995403.shtml (accessed 15 March 2025).

Najibullah, M., Shafiullah, G. and Habib, U.R.S. (2020), "A review of ecotourism and its economic, environmental and social impact", *Journal of Emerging Technologies and Innovative Research.* Vol. 7 No. 8, pp. 1739-1743.

National Forestry and Grassland Administration (2022), " Specification for national protected areas ecotourism", available at: http://www.china-npa.org/uploads/1/file/public/202208/20220826100517_t3j96kefbm.pdf (accessed 15 March 2025).

National Forestry and Grassland Administration (2023a), "Wuyishan National Park Master Plan (2023-2030)", available at: http://www.forestry.gov.cn.cdn20.com/u/cms/www/202404/12180229zi7w.pdf (accessed 19 December 2025).

National Forestry and Grassland Administration. (2023b), "Hainan Tropical Rainforest National Park Master Plan 2023-2030", available at: http://www.forestry.gov.cn.cdn20.com/u/cms/www/202404/12181420x55l.pdf (accessed 19 December 2025).

Obua, J. (1997), "Environmental impact of ecotourism in Kibale National Park, Uganda", *Journal of Sustainable Tourism*, Vol. 5 No. 3, pp. 213-223. https://doi.org/10.1080/09669589708667286

Ormsby, A. and Mannle, K. (2006), "Ecotourism benefits and the role of local guides at Masoala National Park, Madagascar", *Journal of Sustainable Tourism*, Vol. 14 No. 3, pp. 271-287. https://doi.org/10.1080/09669580608669059

Rhama, B., Timang, J.H., Palangka, J.R. and Raya, K.P. (2020), "The meta-analysis of ecotourism in national parks", *African Journal of Hospitality, Tourism and Leisure*, Vol. 9 No. 1, pp. 1-17.

Rui, Y., Xiaoli, S. and Keping, M. (2019), "Recommendations on building up China's national-park-centric protected area system", *Biodiversity Science*, Vol. 27 No. 2, pp. 137-139. https://doi.org/10.17520/biods.2019065

Ryan, R.M. and Deci, E.L. (2000), "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being", *American Psychologist*, Vol. 55 No. 1, pp. 68-78. https://doi.org/10.1037/0003-066X.55.1.68

Song, R. (2003), "A multifaceted analysis of ecotourism", *Journal of Beijing Second Institute of Foreign Languages,* Vol. 3, pp. 33-38.

Tang, X. (2020), "The establishment of national park system: A new milestone for the field of nature conservation in China", *International Journal of Geoheritage and Parks*, Vol. 8 No. 4, pp. 195-202. https://doi.org/10.1016/j.ijgeop.2020.11.006

Yamada, N. (2011), "Why tour guiding is important for ecotourism: Enhancing guiding quality with the ecotourism promotion policy in Japan", *Asia Pacific Journal of Tourism Research*, Vol. 16 No. 2, pp. 139-152. https://doi.org/10.1080/10941665.2011.556337

Zhao, W. (2022), "Beginning: China's national park system", *National Science Review*, Vol. 9 No. 10. https://doi.org/10.1093/nsr/nwac150

Zhou, R., Zhong, L.S., Liu, J.M., Tang, C.C., and Sun, L.G. (2016), "Establishing a national park category system in China", *Resources Science*. Vol. 38 No. 4, pp. 577-587.