

Avitourism as an aspect of sustainable mountain development: a case study from Southern China

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Abstract

Birdwatching has become increasingly popular over the past two decades. Because of its potential to meet both economic and conservation needs, birdwatching tourism (or avitourism) has been considered a tool for sustainable regional development. To date, very few studies have examined the impacts of avitourism in mountainous protected areas in China. We therefore conducted a case study of the Nonggang avitourism project in Southern China to explore the impacts of the activity on livelihoods and conservation. By investigating 197 local households using a structured questionnaire, we found that avitourism has improved and diversified mountain people's livelihoods, by providing employment opportunities, and increased household incomes. Moreover, it has supported biodiversity conservation by raising mountain people's awareness of sustainability and their willingness to conserve biodiversity. Community participation, government support and collaboration between stakeholders are important for the success of this project. We conclude that, when implemented adequately, avitourism can support sustainable mountain development.

Profile

Protected area

Nonggang National

Nature Reserve

Mountain range

Sino-Vietnamese

Limestone area

Country

China

Introduction

Mountains are both cradles and sanctuaries of the world's biodiversity and home to hundreds of millions of people (FAO 2015). Sustainable mountain development is essential for both biodiversity conservation and human wellbeing (FAO 2011; Payne et al. 2020; Walzer & Plassmann 2021). Defined as “*responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education*” (TIES 2015), ecotourism is one of the most popular sustainable development strategies, because it promises to meet both economic and conservation needs (Kiss 2004; World Tourism Organization 2018).

Avitourism, is the fastest-growing segment of the ecotourism market and has the potential to generate economic benefits and conservation outcomes (Cordell & Herbert 2002; Şekercioğlu 2002). Earlier research predicted that avitourism would generate considerable economic benefits for post-conflict Colombia (Ocampo-Peñuela & Winton 2017). An investigation of the North American market suggests that, for Colombia, avitourism could generate an annual profit of \$9 million and 7,516 new jobs (Maldonado et al. 2018). Moreover, birdwatching is a non-consumptive activity, with low environmental impact (Connell 2009). Birdwatchers are often characterized as male, middle-aged, well-educated, and ecologically aware (Carver 2013), and avitourism is regarded as one of the most sustainable nature-based tourism activities.

Mountain regions with rich biodiversity and endemic bird species have advantages in developing

avitourism (Birinci 2018; Rahbek et al. 2019). Because of the fragility of mountain ecosystems, however, development activities should be monitored carefully for their impacts. As a sustainable development strategy, avitourism has been poorly investigated in mountain regions (Basnet et al. 2021), but because of its growing popularity, its impacts on livelihoods and conservation, particularly in mountain communities, need to be evaluated.

Over the past two decades, birdwatching has spread rapidly in the context of China's booming economy, improved educational level, and people's rising environmental awareness (Lin 2006; Ma et al. 2013). The emergence of birdwatching as a mass-participation leisure activity in China brings opportunities for mountain development, but its impacts also need to be assessed (Walther & White 2018). Therefore, to support avitourism and its development in mountain regions, we conducted a case study in southern China exploring its livelihood and conservation outcomes. Specifically, this study aims to 1) explore the extent of the community's participation, as service-providers, in tourism-related activities; 2) identify the household factors that impact participation in tourism-related activities; 3) examine the livelihood outcomes of avitourism; 4) examine the changes in mountain people's attitude to conservation.

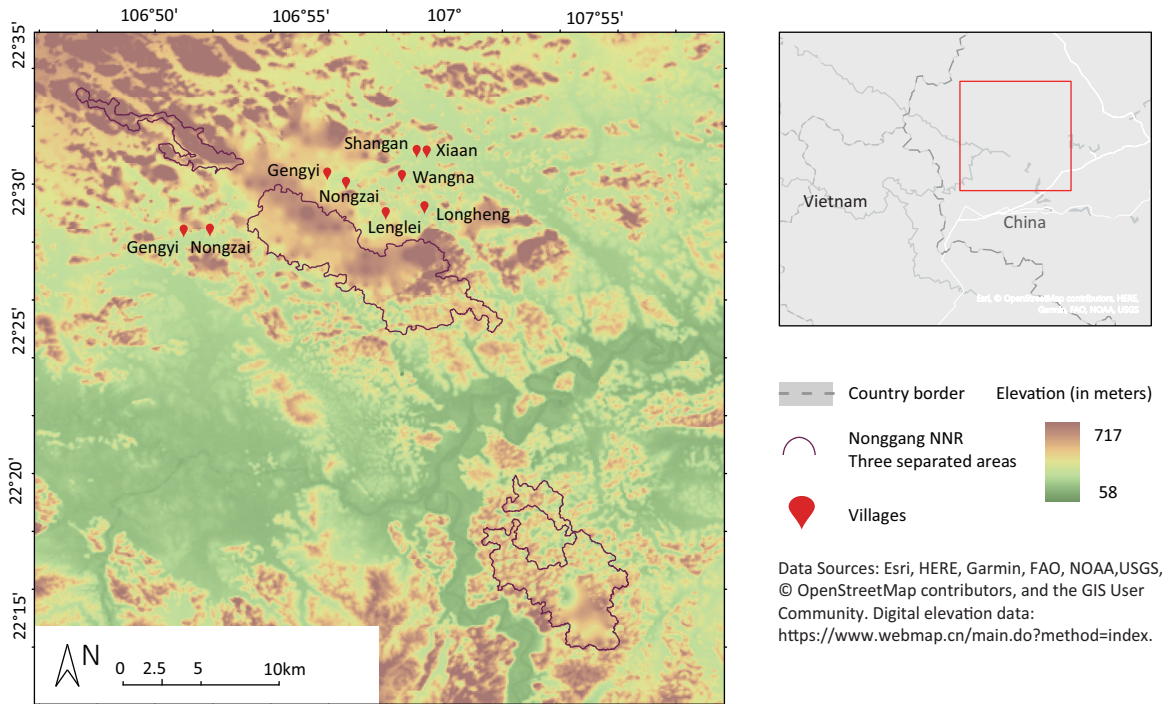


Figure 1 – Location and topography of the Nonggang National Nature Reserve (Nonggang NNR); the nine villages (Longheng, Lenglei, Xiaan, Shangnan, Pucha, Gengyi, Nongzai, Pona, Wangna) that participated in tourism selected for the household survey.

Methodology

Study area

The Nonggang avitourism project, in the area around the Nonggang National Natural Reserve (Nonggang NNR, 弄岗国家级自然保护区, 22.467° N 106.830° E, within an altitude range of 124 to 632 meters) was evaluated to understand the livelihood and conservation impacts of avitourism. The Nonggang NNR was established in 1979 to preserve the rainforest ecosystems and the rich flora and faunal diversity of this limestone region (Guangxi National Nature Reserve 2021) (Figure 1). The Nonggang NNR and its surroundings have been identified as conservation hotspots because they are particularly rich in endemic bird species and medicinal plants (Hu et al. 2017).

We selected the Nonggang avitourism project, in the area around the Nonggang NNR, as a case study for the following reasons. First, the bird resources in this neighbourhood support tourism, but the conservation of these resources also needs residents’ support. Second, the Nonggang community is an economically under-developed, traditional agricultural community. Before the advent of avitourism, local people near the reserve relied on agriculture, which provided us with a framework for assessing the livelihood impacts of tourism. Third, the community used to be marginalized from questions of conservation. Policies and laws that take into account only protection but exclude people’s needs have caused conflicts near the reserve between the use and the protection of natural resources. Local people used to trap wild

animals, especially birds for sale. This provided us with an opportunity to understand changes in attitude to conservation after the advent of tourism.

Data collection

A questionnaire (in Chinese) was designed to interview 197 selected households (42% of 469 households in the community), including 42 individual *tourism participants* (i.e. people who were involved in providing tourist-related services and activities), and 155 *tourism non-participants*. From April to June 2017, we interviewed every second household along the main roads in 9 villages to understand demographic and household characteristics, people’s perceptions of livelihood changes, household incomes, and changes in attitude to conservation. Perceptions of respondents were rated using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Data analysis

All analyses were performed in R version 4.0.5, using the *rpart* function of the package *rpart* for classification tree building (Atkinson & Therneau 2022). First, respondents were divided into tourism participant and the non-participant groups. Then, we used descriptive statistics to analyse the respondents’ profiles. Second, to understand the effects of demographic and household characteristics on participating in providing services for tourism, we built a classification tree with participation status as the dependent variable. Classification trees can easily handle qualitative predictors without creating dummy variables, thus providing a good explanation of data. Third, to un-

Table 1 – Respondents' demographic and household characteristics ($N=197$).

Variable	Total N=197	Participant N=42	Non-participant N=155
	%		
Gender			
Male	58.9	66.7	56.8
Female	41.1	33.3	43.2
Age (years old)			
18–27	13.2	16.7	12.2
28–37	17.8	23.8	16.1
38–47	26.4	28.6	25.8
48–57	25.9	11.9	29.7
More than 58	16.8	19	16.1
Household size			
Less than 3	2.5	4.8	1.9
3	8.1	4.8	9
4	28.9	28.6	29
5	29.4	23.8	31
6	19.3	19	19.4
More than 6	11.6	19.1	9.7
Education level			
Uneducated	24.4	19	25.8
Primary school	35	28.6	36.8
Junior high school	34	40.5	32.3
Senior high school/ vocational school	6.6	11.9	5.2
Occupation			
Peasant	84.3	83.3	84.5
Migrant worker	15.7	16.7	15.5
Average household farmland area (in mu^*)	16.93	21.82	15.62

* Mu is a Chinese unit of area; $1 mu = 0.0667 ha$.

derstand the livelihood impacts, we used descriptive statistics to analyse respondents' perceptions of livelihood changes. We also applied independent-sample t -tests to compare the annual household incomes of the two groups. Fourth, to understand the changes in attitudes to conservation, we used descriptive statistics and independent-sample t -tests to identify differences between the two groups.

Results

Demographic and household profiles of the respondents

Of 197 respondents, 42 (21.3%) participated in tourism, and the other 155 (78.7%) did not. 58.9% of the respondents were male, and 41.1% were fe-

male. The majority of respondents (69.1%) were over 38 years old. 69.0% had spent either 6 or 9 years in education; 24.4% were uneducated. Respondents were either peasants (84.3%) or migrant workers working in various sectors (15.7%). Over half of the respondents (58.4%) lived in households of 4 or 5 people. The respondents' average household farmland area was 16.93 mu (approximately 1.13 hectares) (Table 1).

The classification tree for predicting participation

We split data into a training dataset ($N = 140$) and a test dataset ($N = 57$) to build and test the classification tree. The misclassification error rate was 0.15 for the training dataset and 0.175 for the test dataset, which indicated good reliability of the classification tree.

Which village people lived in was the most important factor determining whether or not they were involved in tourism. The villagers of Lenglei, Longheng and Wangna engaged in tourism more actively. The greater the area of the household's farmland, the more likely the household was to participate in local tourist activities (Figure 2).

Avitourism has made positive livelihood changes

The impacts of tourism on livelihood related to natural resource use, farmland assets, livelihood diversification, employment opportunities and income changes (Table 2). 32% of the respondents perceived the use of natural resources as having been restricted by the development of tourism and biodiversity conservation. 10.6% considered that their available farmland area had been reduced. 38.6% agreed that tourism had diverted villagers from agriculture. 53.8% agreed that tourism had increased employment opportunities, and 24.4% agreed that tourism had improved their income (Figure 3).

Tourism-related activities included acting as a birdwatching guide, and providing accommodation and / or food and transport. Some created small ponds (and hides for rental) to attract birds, generating opportunities for birdwatching and photography. Among 42 tourism participants, 19 (45.2%) engaged in 2 or more of these particular tourism-related activities; most participants (25 individuals, 59.5%) acted as birdwatching guides (Figure 4).

Respondents had four (general) income sources: sugarcane cultivation, tourism-related activities, waged labour (as migrant workers elsewhere), and other. Sugarcane cultivation was the primary source of income

Table 2 – Livelihood changes.

Items	Description
Natural resource use	The development of avitourism and conservation regulations restricted my use of natural resources.
Farmland assets	My available farmland was reduced because of avitourism.
Livelihood diversification	The development of avitourism diverted villagers from agriculture; some who had worked elsewhere as temporary migrant workers returned to start family-owned businesses.
Employment opportunity	As tourism developed, I got more employment opportunities.
Income increment	As tourism developed, my income increased.

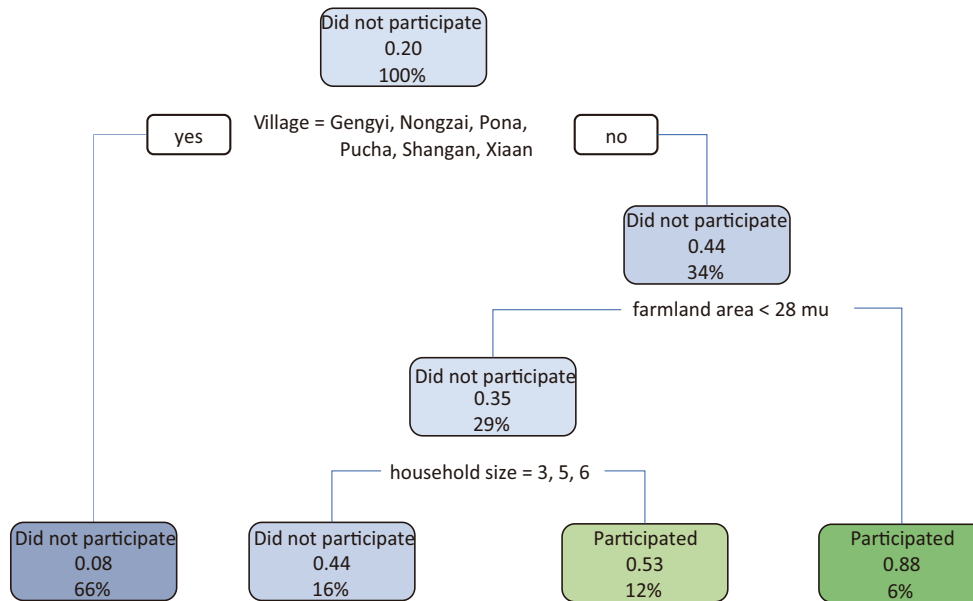


Figure 2 – The classification tree for predicting respondents’ participation status (N = 140). The villages and farmland areas are the most important predictors of respondents’ participation status. Each node (coloured box) shows the predicted class (participated or did not participate); the predicted probability of participation; the percentage of observations in the node.

for tourism participants and non-participants alike. The economic benefits of tourism-related activities were restricted to participants only. The mean annual household incomes were 96,772 and 71,779 RMB for the participating and non-participating groups respectively. Tourism participants had higher incomes from both sugarcane (*t*-test, *p* = 0.005) and tourism (*p* < 0.001). Tourism-related activities contributed a mean annual income of 12,817 RMB to the participants (Figure 5).

Avitourism has made positive changes in attitudes to conservation

Changes in attitudes to conservation related to knowledge of birds, affinity for birds, willingness to conserve birds, attitudes to wildlife more generally, awareness of conservation issues, and willingness to conserve wildlife (Table 3). Most of the respondents liked birds (90.4%) and were willing to conserve birds (89.4%); for wildlife more generally, most respondents recognized the importance of wildlife (69.5%) and were willing to conserve wildlife (86.8%). These high conservation-attitude scores indicated respondents’ improved conservation attitudes (Figure 6) compared to their former harmful behaviours (41.2% of the respondents admitted having once harmed birds; 30% admitted that they had once harmed wildlife). Although tourism participants tended to score higher for conservation attitudes, the differences between the two groups were non-significant, except that participants had acquired more knowledge of birds (Figure 7).

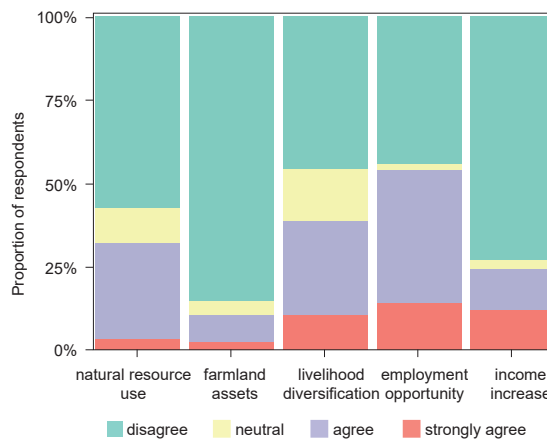


Figure 3 – Respondents’ perception of livelihood changes (N = 197). Positive changes include livelihood diversification, employment opportunity, and increases in income; negative changes include restrictions in the use of natural resources, and reductions in the area of farmland.

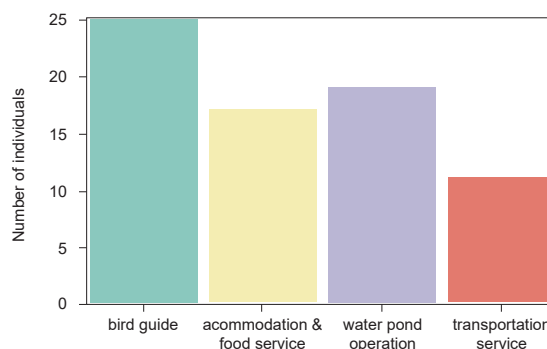


Figure 4 – Respondents’ engagement in tourism-related activities (N = 42).

Table 3 – Changes in attitude to conservation.

Items	Description
Knowledge of birds	As tourism developed, I acquired more knowledge of birds.
Affinity for birds	I like birds.
Willingness to conserve birds	As tourism developed, my view of birds changed and I started to protect birds consciously.
Attitudes to wildlife	Wildlife plays an important role in nature.
Conservation awareness	It is necessary to protect endangered animals.
Willingness to conserve wildlife	As tourism developed, my view of wildlife changed and I started to protect wildlife consciously.
Previous behaviour in relation to birds	I once harmed birds (e.g., stealing eggs, hunting, selling or consuming birds).
Previous behaviour in relation to wildlife	I once harmed other wildlife (e.g., hunting, selling or consuming wild animals).

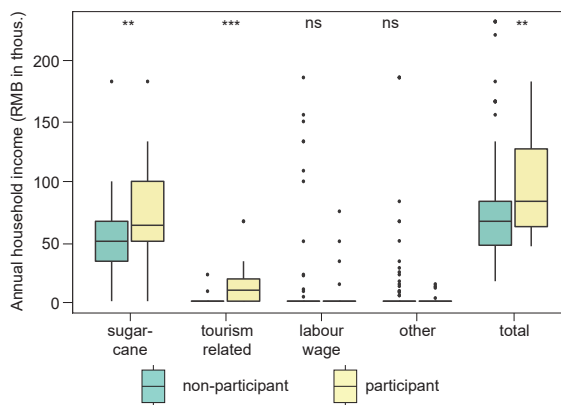


Figure 5 – Respondents' sources of income and annual income. Tourism participants have higher incomes from both sugarcane and tourism activities. RMB is the currency of Mainland China. 6.3 RMB = 1 USD; ***, ** and * denote statistical significance at the 0.001, 0.01, 0.05 levels; ns represents not significant.

Discussion

Avitourism contributes to sustainable mountain development

Avitourism as practised by the Nonggang community can serve as a sustainable mountain development strategy. From a developmental perspective, this form of tourism can improve mountain livelihoods by generating employment opportunities, diversifying local livelihoods, and increasing household income (Qian et al. 2017; Zambrano et al. 2010). This diversification of livelihoods makes mountain communities more adaptive to the fragility of mountain ecosystems and enhances their capacity to cope with environmental and global changes (Loison 2015). Avitourism has generated considerable economic benefits for local people (Lonn et al. 2018; Ma et al. 2019). Investigating the background of local tourism practice reveals that the positive livelihood changes can be attributed to three components. First, the economic benefits of tourism were local ones, affecting local people (Lee & Jan 2019). Second, the local government's support and investment helped build community capacity in tourism operations. Third, the collaboration between the mountain community and the government enhanced mutual understanding (Osman et al. 2018).

From a conservation perspective, avitourism has raised mountain people's awareness of sustainability and improved their willingness to conserve biodiversity (Hunt & Harbor 2019; Masud et al. 2017). Harming wildlife used to be common but has gradually diminished, for three reasons. First, the mountain community and the local government cooperated and established a system for monitoring the mountain ecosystem. Second, the community-based management of an ecological protection zone increased local residents' responsibility and ownership. Third, environmental education enhanced people's awareness of sustainability. Avitourism therefore supported biodiversity conservation both directly and indirectly.

In conclusion, avitourism offers great potential for sustainable mountain development when implemented with community participation, government support and collaboration between stakeholders (Conradin & Wiesmann 2014; Ruoss 2016).

Limitations in local practice and suggestions for improvement

The tourism participation rate was 21.3% of the community. The geographical location of the villages and the smallholding were the most important factors in determining participation (Avila-Foucat & Rodríguez-Robayo 2018). The geographical position of a village determined the chance of tourism participation, while farmland assets decided a household's ability to participate. Because sugarcane was the primary income source for the majority, households with less land have limited financial capital to diversify their livelihoods and might be marginalized in tourism development. Broadening the engagement of mountain people will therefore need more investment in households that enjoy less favourable economic conditions. Expanding tourism-related activities (e.g., providing organic food products, selling souvenirs) will also provide opportunities for local engagement. In addition, avitourism should be introduced to complement existing livelihoods and support traditional farm activities (Tao & Wall 2009).

A few respondents mentioned negative impacts on livelihood, restrictions on the use of natural resources, and reductions in arable farmland. Because mountain communities in China often depend on the land for their livelihoods, mountain people's reliance on land

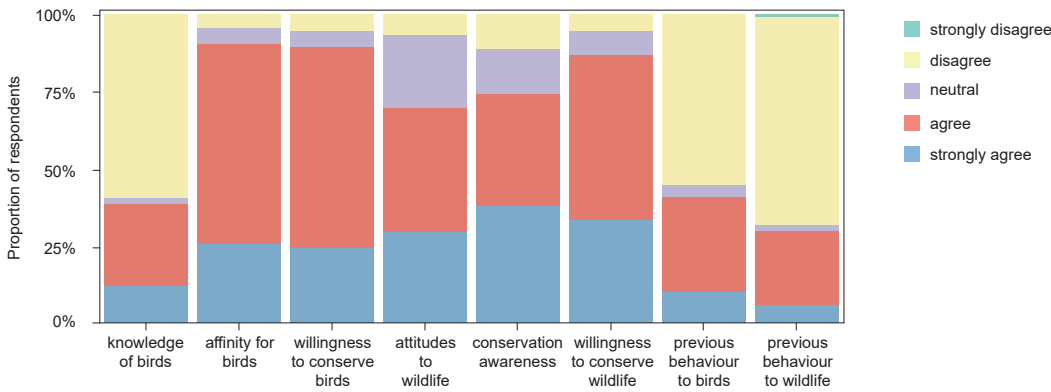


Figure 6 – Respondents’ conservation attitudes changes (N = 197). Most respondents show positive conservation attitudes.

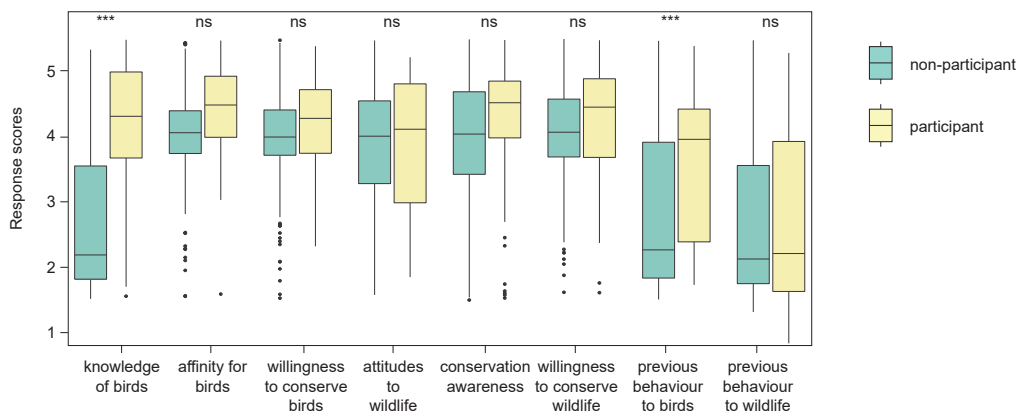


Figure 7 – Differences between participants and non-participants in changes in attitude to conservation. The participants show higher scores in conservation attitudes. The differences between the two groups are not significant, except for participants’ increased knowledge of birds. ***, ** and * denote statistical significance at the 0.001, 0.01, 0.05 levels; ns represents not significant.

and natural resources should be emphasized. In many countries, failure to recognize the community’s rights to land and natural resource use has led to conservation conflicts (De Pourcq et al. 2017; Görmüş 2016). Interventions that mediate conservation conflicts, such as community-based land rights and conservation, should therefore be adopted (He et al. 2020; Inglés-Yuba et al. 2016). Mountain people will have a greater interest in managing local resources sustainably if they have access to, and responsibility for, them.

The economic benefits of tourism privileged the participant group in particular, an inequality of benefit distribution that could widen the wealth gap. Avitourism as a tool for sustainable development requires equality of benefit sharing and empowerment of all local people (Coria & Calfucura 2012). Income derived from tourism should therefore be used to establish public facilities such as schools and clinics for more comprehensive and equitable benefit sharing. Training in skills that increase people’s ability to participate in tourism, the development of opportunities for community participation, and practical co-operation between government and community will support disadvantaged populations in the long term and ultimately help achieve sustainable mountain development.

Conclusion

This study explored the livelihood and conservation outcomes of avitourism in a mountain community. Our results suggested that avitourism, if suitably implemented, can support sustainable mountain development. This form of tourism has improved mountain people’s livelihoods by providing employment opportunities, diversifying livelihoods, and increasing household incomes. It has also supported conservation by raising people’s awareness of sustainability and their willingness to conserve biodiversity. In view of the limitations of current practice, we would make the following recommendations: 1) expanding tourism-related activities and investing in economically disadvantaged households in order to broaden tourism participation and support disadvantaged populations; 2) community-based land rights and conservation should be adopted to support the sustainable use of natural resources; 3) the economic benefits of tourism should be shared with equality.

While we found promising effects of avitourism for mountain development in southern China, similar studies in other regions are required before the results can be generalized to all settings. The effectiveness of avitourism could be improved by studying it in dif-

ferent contexts, such as with and without community participation, and with different benefit-sharing systems. The empirical evaluation of avitourism projects will benefit tourism development more broadly, in theory and practice.

Our conclusions that avitourism has improved mountain people's livelihoods and conservation attitudes are based on respondents' perceptions. However, these effects were only inferred from the literature and from our analysis of the results of the questionnaire; they have not been demonstrated empirically. Thus future work testing causal relationships would help to strengthen the scientific base for the impacts of avitourism, while longitudinal studies comparing the different stages of (avi)tourism (Butler 2006) would help to give a more complete view.

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