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Understanding Residents' Perceptions of the Ecosystem to Improve Park–People Relationships in Wuyishan National Park, China

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Abstract: A healthy park–people relationship depends essentially on the fair and sustainable maintenance of rural livelihood. When a protected area is designated, rural people may face restrictions on access to land and resource use. In Wuyishan of China, we analyzed the role of traditional tea cultivation during consistent protected area management to find ways to maintain the stability of this social-ecological system in the new national park era. Based on the social-ecological system meaning perception, we used an intensive social survey to investigate residents' perception of the ecosystem in terms of tea cultivation and its interaction with conservation policies. Results showed that tea cultivation brought major household income and was associated with multiple cultural services. Protected area management affected land use, and conservation outcomes were more obvious to farmers than economic and social ones. We argue that the multi-functionality of the forest-tea system has the potential to benefit both the local people and the public through conservation-compatible activities at three levels: to regulate biophysical elements in the land plot, to link production and market at the mountain level, and to secure tenure and encourage community participation at the landscape level. This knowledge co-production approach revealed that to avoid a negative park–people relationship, traditional knowledge and people's right to benefit must be respected.

Keywords: national park; social-ecological system; ecosystem services; tea cultivation; protected area management



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1. Introduction

In the management of a national park (NP) and other protected areas (PAs), a healthy park–people relationship depends essentially on the fair and sustainable maintenance of rural livelihood [1]. Research abounds in the park–people relation that neglect of local culture and limit to access to resources significantly affect the local community's satisfaction with park management and the conservation outcomes [2–5].

A healthy park–people relationship is especially important to current protected area (PA) management in China, where a new National Park system is under construction starting from pilots. China's national parks are similar to the National Park in the International Union for Conservation of Nature (IUCN)'s PA category [6] but the system aims to reform the previously multi-headed management of various types of PAs by optimizing spatial planning and unifying management agencies. Since 2015, 10 piloting parks have integrated separate PAs for ecological integrity while forming a unified management unit. The integration and unification bring in the new institution that affects both the geographical location of communities relative to national parks, and the resource use of local people [7]. Thus, the local community's livelihood is now a focus of NP management in China because of the reflection on the somewhat fortress approach to conservation [7]. Studies of many

nature reserves, which are the main area-based conservation measures since 1956, provided evidence that the perception of cost-benefit of rural livelihoods strongly affected local people's acceptance of PAs, hence the management outcomes. Alternative livelihoods, job opportunities, eco-compensations, infrastructures, and social welfare were typical benefits rural people pursued [8–11], while restrictions on resources, energy, and productive activities, as well as human-wildlife conflicts, were frequently mentioned as major costs [12–14]. In addition, respect for local culture [10], the equity of benefits and compensation [15], and the degree of community participation [9] significantly affected the PA–people relationship. Therefore, conservation decision-making is oriented to benefit rural livelihoods through NP designation and management [16].

Rural livelihood is realized through the appreciation of multiple ecosystem services directly, or indirectly to benefit the local communities [2,17,18]. From agricultural systems adjacent to the protected area, local communities could provide ecosystem services beyond basic products to balance multiple benefits of stakeholders if they had a good relationship with the PA [19]. However, the disproportionate costs of livelihood and benefits from conservation may raise the counter effect of resource exploitation for livelihood and lead to the degradation of ecosystems and their capability of providing various ecosystem services [20,21]. Therefore, a healthy park–people relationship matters to the stability of the social-ecological system. Considering the NP piloting and the ongoing designation of official national parks, it is critical to regulate local people's activities regarding conservation goals without depriving them of their reasonable demand for ecosystem services, so that the desired park–people relationship can be built to maintain the resilience of the social-ecological system (SES) [22,23].

Perceptions and attitudes are an important approach to assessing the performance of conservation practices because they can affect people's conservation behaviors [24]. However, to assess the park–people relationship, most studies from the perspective of perceptions and attitudes of local stakeholders focused on revealing the multi-faceted costs and benefits of established PAs which have been operating for years, very few were concerned with the perceptions of a PA in designation, which could differ from the perception of a long-established PA because people had very limited experience of the new PA [25]. Furthermore, park–people relationships were seldom explored from the perspective of ecosystem services although trade-offs of certain goods and services among multiple stakeholders can define the park–people relationship as the main sources of costs and benefits to local people. This perspective on an NP in construction provides a solid theoretical base to broaden the scope of perceptions from focusing on the piecemeal cost-benefit factors associated with NP management to concerning the holistic human-nature interactions in the SES. All the various costs and benefits perceptions ultimately stem from rural individuals' perceptions of their territory and of its conservation history [26]. These perceptions can foresee their activities and provide a starting point for designing new rules to secure rural livelihoods in the NP era. Producing this knowledge with local people is also meaningful when stakeholder participation is officially promoted for NP management.

Therefore, the basic assumption is that local communities' perception of the meaning of their biophysical environment allows understanding and interpreting the human behaviors, because, during long-term interaction with nature, local communities have the ability to identify dynamic changes and multiple driving factors. Accordingly, this study aims to explore the meanings of tea cultivation to the rural people, how they interact with conservation, and how to adapt tea cultivation to conservation.

The paper focuses on three aspects of residents' perception of the ecosystem: (1) the role of tea as a major income source, (2) the role of tea beyond economic significance, and (3) previous protected area management and its impacts on the tea cultivation. By understanding the meaning of the human–nature interactions through tea cultivation, the paper provides a multi-scale NP management approach for a healthy park–people relationship. The study complements studies of the park–people relationship from a prescient perspective and

may serve as an example to facilitate community participation in PA establishment in developing countries.

2. Materials and Methods

2.1. Study Area: Wuyishan National Park as a Social-Ecological System

The Wuyishan National Park (WNP) is located in Southeast China as a part of the Wuyi Mountains (Figure 1). This NP is integrated from mainly three PAs: the Wuyishan National Nature Reserve (NNR) to the west, the Nine-Bend Stream Ecological Protection Area (NEPA) in the center, and the Wuyishan National Scenic Area (NSA) to the east, with a total area of 982.59 km² after spatial optimization in its piloting period when the research was conducted.

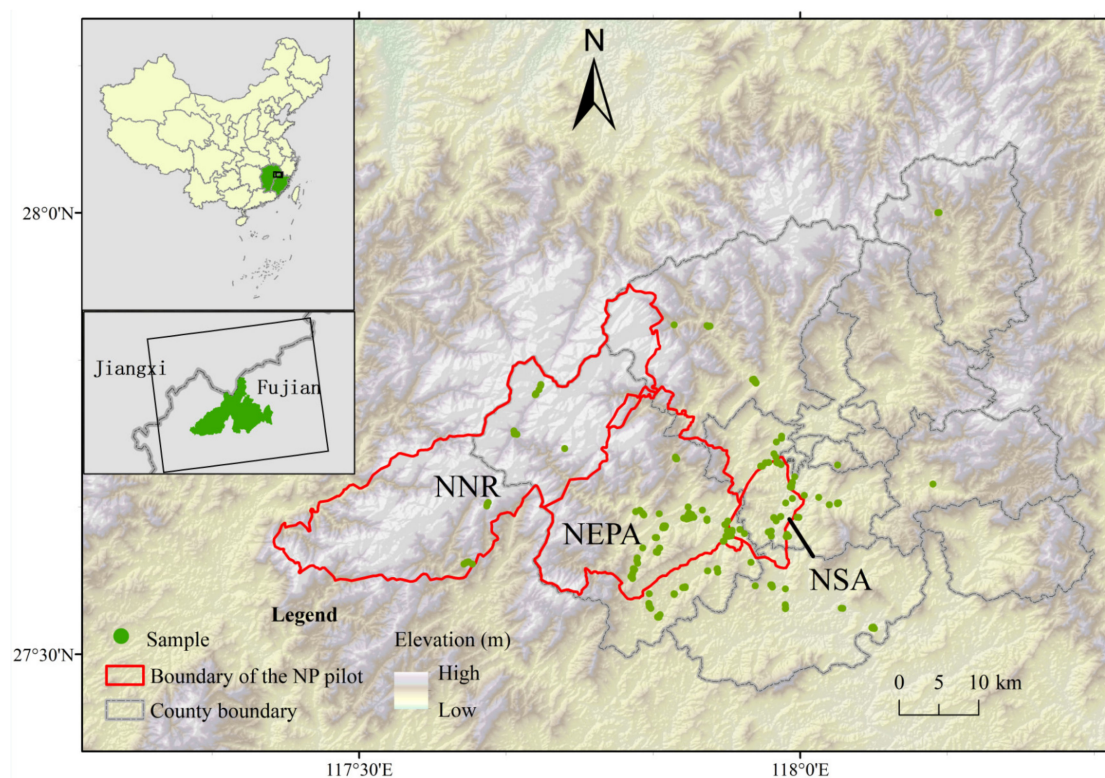


Figure 1. The location and composition of the Wuyishan national park pilot initiated in 2015.

Archaeological remains suggested that people settled in the Wuyi Mountains as early as 4000 years ago. Wuyi Mountains not only have preserved the abundant humid subtropical forest, provided suitable habitats to endangered species such as *Liriodendron chinense* and *Halesia macgregorii*, but the biophysical and geological conditions also have nurtured tea bushes dating back as least to the Tang Dynasty (618–907 AD). People's productive interaction with nature has transformed the landscape and created rich cultural landscapes such as the forest-tea system. This is a typical SES in which people adapted to the natural conditions with their traditional wisdom to keep a delicate balance with other non-human life forms [27]. Until now, this rural landscape still generates multiple ecosystem services that benefit not only locals but also domestic and international beneficiaries. Therefore, the role of humans in the past and present cannot be ignored in the study of the structure and function of the contemporary forest. In the 16th century, farmers were able to build terraces for tea cultivation with a system of dykes and drains [28]. There was also a synergy between tea bushes and natural forest [29], but the recent expansion of tea bushes and the intensification of land use can lead to forest degradation.

There are about 3000 inhabitants inside the NP and another 20,000 settled within 2 km of the park boundary. Most of the tea farmers live along the upstream zone of

the Nine-Bend Stream. Rural people keep transforming the landscape mainly through forest use. In the past three decades, rural households and individuals have responded to institutional change actively, especially to reform of collective forestry rights and the management of multiple PAs during the past 40 years, in a good or bad way. Under the forestry rights reform, the forest land was treated as “a bundle of rights” when the transaction and operation rights were under the control of individual households with a clarification of resource boundaries in the collective land tenure. This reform aims at stabilizing land tenure and improving forestry efficiency, however, the flexibility without a full understanding of ecosystem multifunction has led to monoculture plantation and forest degradation [30].

Meanwhile, a series of actions were also taken to protect the biodiversity and landscape in the form of the national nature reserve (1979) and the national scenic area (1982), which are generally prioritized for preservation and tourism, respectively. Wuyishan further entered the list of the UNESCO World Heritage Sites as a mixed site because of its cultural value, natural beauty, and biodiversity value in 1999. More land-use policies were issued in the new millennium to regulate human–forestland relationships alongside the designation of PAs, such as the ban on commercial logging in 2008, and the prohibition against the expansion of tea orchards in 2011. In addition, more forests were designated ecological forests. In 2015, the NP pilot was launched and the spatial integration leads to the inclusion of more rural landscapes adjacent to the boundary of the pilot, making the role of people in the social-ecological system more prominent when new rules and regulations occur.

2.2. Conceptual Framework

Local PA–people relationships are largely defined by perceptions and attitudes of communities toward PAs. With the growing recognition of community participation in PA management and the spreading of socially inclusive conservation approaches, the governance of PAs should recognize the role of conservation culture, knowledge, and agreement of local communities [31]. Thus, PA governance is now oriented in an adaptive way that enables NPs to adapt to spatial and temporal changes in social-ecological systems and establish and maintain desired park–people relations for ecological, social, and economic outcomes [32,33].

By understanding the national park as an SES, the literature suggests the provision of ecosystem services is seldom solely natural, but part of an SES in which resource users interact with the environment to shape both the ecosystem and their culture [34,35]. According to the SES meaning perception theory, good governance of NPs secures multiple ecosystem services required by competitive stakeholders by converging their different perceptions of the same ecosystem to the largest extent [36].

This theory pointed out that, people allocated meaning to many aspects of the ecosystem, which will lead to a perception of the ecosystem service or material as a benefit (positive meaning) or a perception that benefits are reduced (negative meaning). This perception will significantly affect their activities. For example, if local people perceive forests as a commodity, they may practice timber harvesting, but if perceived as natural beauty by others, recreational activities may be preferred [36]. Therefore, balancing multiple benefits of stakeholders will eventually have impacts on the provision of ecosystem services to many stakeholders in general, and local people’s livelihood in specific. Furthermore, the perception of ecosystem services is highly context-dependent; any change in the biophysical or socio-economic conditions may lead to a change in resource users’ behaviors because people modify their behavior based on their knowledge and expectation concerning future changes [37]. This is obvious when new conservation policies and practices are applied in rural areas, where local people face uncertainty in livelihood and may take action to secure their benefit, thus affecting park–people relations.

Therefore, upon this perspective of perception of SES, this study analyzes the fundamental perceptions of the forest ecosystem in which the local tea farmers dwell, concerning both the meanings and the changing context. By using the SES meaning perception theory,

our study demonstrates how the local residents' perception of SES contributes to a positive park–people relationship. We argue that the multi-functionality of the forest-tea system has the potential to benefit both the local people and the public by exploring its cultural meaning. The negative park–people relationship may persist if traditional knowledge and the right to benefit are still neglected. In this paper, we show how local tea farmers perceived the ecosystem during the ever-changing types of PAs and their management, and how this knowledge co-production helps build a good park–people relationship in a new NP.

2.3. Survey and Data Analysis

The research uses an intensive semi-structured interview with a sample of tea farmers living in and adjacent to the national park (Figure 1). The interview was widely used as an interactive method to gain information on specific conservation issues and understand the knowledge, values, beliefs, or decision-making process of stakeholders [38]. The semi-structured interview is more flexible for researchers to ask additional questions besides standard questions for complex issues in the studies of conservation science-policy interfaces [39]. It is also important for Wuyishan where local people are less represented in conservation decision-making. The interview was organized in different sections focusing on the following topics:

- (1) General data of respondents, including personal characteristics such as age, gender, householder status, education, length of residency, household size, and production characteristics such as tea cultivation experience, labor conditions, tea plot size, tea plot numbers, distance to tea orchards, annual household income.
- (2) Tea farmers' perception of the critical factors affecting the production of tea, in terms of land tenure, market competition, and natural conditions.
- (3) Tea farmers' preference and assessment of the importance of ecosystem services associated with the forest and how they value tea cultivation during the construction of an NP.
- (4) Tea farmers' perception of the efficiency of protected area management in terms of ecological, economic, and public welfare outcomes, considering potential land use conflict between community livelihood and ecological protection targets.

The questionnaire contained open-ended questions for topics 2, 3, and 4 to form a major part of a semi-structured interview and close-ended questions for topics 1 to 4 as a structured social survey. The respondents could answer “yes”, “no”, or “I don't know” to the closed questions; they could choose items all fitting their conditions from some multiple-choice questions; they could explain or provide examples to the open questions in detail. The average duration of each interview was about 40 min.

The interviews were conducted face-to-face by a team of trained volunteers from 18 to 31 July 2016. In total, 221 tea farmers participated in the study, with ages ranging between 21 and 75. This sample was a subset of a larger sample of local residents and a stratified random sampling technique was used and explained in detail in He et al., 2018 [39]. Most respondents answered all the questions. Only a few questions were left unanswered by very few people because they forgot certain numbers, did not like to comment, or had no idea of certain information. This does not affect qualitative analysis due to information saturation. In the quantitative analysis, numbers of valid data (e.g., $n = 218$) were provided to show how many people did not respond to certain questions.

Qualitative data collected from interview questions were analyzed by using the key information, and following a grounded theory approach by using the open coding and axial coding to categorize and describe tea farmers' perception of the meaning of ecosystem services and tea cultivation under PAs. Open coding is the process of decomposing, comparing, conceptualizing, and categorizing textual material and then recombining and manipulating the codes in new ways [40]. During the open coding process, the raw data from the open-ended questions were labeled to form concepts that reflect the multiple meanings of tea cultivation and the relationship with PAs. Similar concepts were further combined into

categories that scaled up scattered concepts to cover the major research questions that the research aim to answer, including basically economic meanings, social-cultural meanings, park–people synergies and conflicts, protected area management outcomes, etc., laying the foundation for axial coding and provide information for the Results section. The main purpose of axial coding is to discover and establish relationships between concepts to characterize the linkages between different categories [40]. With multiple concepts and categories, the relationship between multiple meanings of tea cultivation and the current park–people interactions was built from a perspective of ecosystem service trade-off. This basically provided information for the Discussion section.

Quantitative data from the survey were entered and analyzed using Statistical Package for the Social Sciences (Version 21) and the significance value is 0.05 if not specifically mentioned. The data were analyzed in terms of descriptive statistics for general data and perceptions of the management of tea and the PAs. The non-parametric correlation was used to reveal the relationship among those general data that reflect farmers' productive behaviors, and categorical regression was used to detect the impact of variables concerning natural and human assets on the household income based on previous research [39]. For example, high tea leaf yield and more labor in a family can bring higher income [41] (Section 3.1).

For the assessment of the importance of the ecosystem services, each respondent was provided with a list of 15 ecosystem services with illustrations to assist in understanding [39]. They were asked to select and ranked five ecosystem services from the list. Ecosystem services with ranks from one to five were given a score from six to two, respectively, and those not selected were given a score of one. An average weighted score of each specific ecosystem service was calculated according to all the respondents using the equation: $\sum(S_i \times f_i)$, where S_i was the given score of a specific ecosystem service by each respondent and f_i was the frequency of respondents making this choice, i was the six selecting results. $i = 1$ to 5 when the ecosystem service was ranked from the first to the fifth, and $i = 6$ when it was not selected.

A multiple correspondence analysis (MCA) was used to explore the synergy and trade-off of the social preference for ecosystem services among tea farmers. MCA is a descriptive method that reveals patterning in a complex dataset and is widely used in studies where a large amount of qualitative data is collected [42]. Each of the 15 ecosystem services was a variable with two categories of selecting this ecosystem service and not selecting it based on the ranking procedure, making it a total dimension of 15 (30 minus 15). The calculated total inertia was 1 (the maximum number of MCA dimensions ($n = 15$) divided by the number of variables ($n = 15$)). A solution was explored with two MCA dimensions: the first accounting for 12.3% ($0.123/1$) of the variance and the second for 11.2% ($0.112/1$), yielding a total variance of 23.4% ($0.234/1$). Discrimination measures and a joint plot of category points were obtained. In the plot, the coordinates of each category ((non-) selection of an ecosystem service) on each dimension were displayed to determine synergy and trade-off patterns of ecosystem services as perceived by tea farmers. The distance from an object to the origin is the reflection of the variation from the "average" pattern (the most frequent category for each variable). Thus, ecosystem services that were perceived almost unanimously as important or not lie near the origin, and vice versa.

2.4. Sample Description

The average age of the 221 respondents was 49, and 62% of them were between the age of 40 to 59 as a major labor force. Males and females represent 84% and 16% of the sample, respectively. Furthermore, 71% of the sample consisted of householders and the ratios of males and females were 97% and 3%, respectively (Table 1). Most of the respondents (47%) held a secondary school degree while 30% had finished primary education at best.

Table 1. Description of the tea farmers involved in the social survey.

Factor	Category	(%)	Factor	Category	(%)
Gender	F	16	Tea cultivation experience (years)	<5	10
	M	84		6–10	12
Age	18–24	1		11–20	26
	25–39	17		21–30	31
				>30	21
Householder	40–59	62	Labor proportion (%)	<30	13
	>60	20		30–40	15
	Yes (F, M)	71 (3, 97)		40–50	12
	No (F, M)	29 (49, 51)		>50	60
Education	Primary and under	30	Land Plots	1	10
	Junior	47		2–5	46
	Senior	17		5–10	36
	College and above	6		>10	8
Length of local residency (years)	<30	4	Land area (mu)	<5	6
	30–40	14		5–10	11
	40–50	37		10–20	23
	50–60	25		20–40	38
	>60	20		40–60	6
Household size	1–3	17	Walking distance (km)	>60	17
	4–6	65		<1	3
	7–9	13		1–5	69
	>10	5		5–10	19
				>10	9
			Annual household income (10,000 RMB)	<5	9
				5–10	17
				10–50	52
				50–100	11
				>100	12

The average family size was five people. Most of the respondents (83%) had a family size of at least four people. The average ratio of the labor force in a family was 55%, and the ratio was more than 50% for 60% of the respondents. The median length of engaging with tea cultivation in the household was 20 years ($n = 218$) with a range of one year to 60 years. The median length of local residency was 47 years ($n = 217$) with a range of five to 75 years. Most respondents (52%) claimed annual household income as between 100,000 and 500,000 yuan (about 16,000 to 80,000 USD) ($n = 218$).

For the ownership of tea orchards, the median number of land plots for a household was four plots, ranging from one plot to 60 plots ($n = 202$). The median number of the total area of tea plots of each household was about 20 mu (1.33 ha) ranging from one to 400 mu (0.067 ha to 26.67 ha) ($n = 216$). The longest walking distance from home to attend to the tea bushes was 20 km and the median distance was 2.8 km. Most of the respondents (72%) had tea plots within a walking distance of 5 km.

3. Results

3.1. The Importance of Tea Cultivation as Economic Benefits

Tea was essential for livelihood. Considering the entire sample, households who had a longer residency time also had a longer engagement with tea cultivation ($p < 0.01$). In addition, households that owned more plots tended to have a larger total area of land ($p < 0.01$, $n = 202$). Furthermore, households who had more plots and a larger area of tea orchard traveled longer to their land ($p < 0.05$, $n = 199$; $p < 0.05$, $n = 213$, respectively). Families with a larger scale and higher ratio of workforce tended to own a larger area of land ($p < 0.05$, $n = 217$; $p < 0.05$, $n = 217$, respectively).

For most respondents (97%), tea was mainly for sale on the market for income. Here, 46.6% of the respondents reported that they focused on the national market and 33.5% on

the local market. Tea farmers sold raw tea leaf, coarse tea, or refined tea with a certain proportion according to market conditions and their capacity. According to the respondents, one unit of refined tea was produced from two units of coarse tea dried from 10 units of raw tea leaf in the Wuyishan area. The market value of coarse tea and processed tea varied a lot due partly to the geographic location of tea orchards. The unit yield of raw tea leaves ranged between 100 to 750 kg/mu. Raw tea leaf was priced between 6 and 20 yuan/kg (0.96 to 3.2 USD/kg) and refined tea between 60 and 600 yuan/kg (9.6 to 96 USD/kg).

As tea cultivation was claimed, the most important income source (90% above), the categorical regression was used to reveal how the level of income depends on the multiple socio-economic factors specific to the tea farmers (Table 2). It was found that the annual household income level has been significantly affected by the total area of tea orchards, family size, the percentage of the workforce, the number of tea plots, and the distance of the farthest land plot, all indicating a positive relation. Therefore, the income was basically affected by land and labor.

Table 2. Impact on the household income from the analysis of categorical regression ($R^2 = 0.611$, $n = 194$).

Dependent	Independent	Beta
Annual Household Income	Residency time	−0.076
	Time of engagement with tea	0.068
	Family size	0.157 ^b
	The ratio of the workforce	0.159 ^b
	Number of plots	0.19 ^b
	Land area	0.553 ^b
	Longest walking distance	0.129 ^a
	Education	0.100

^a $p \leq 0.05$; ^b $p \leq 0.01$.

Respondents' perceptions of tea cultivation have revealed more details of their income dynamics and critical impacting factors besides those social-economic features.

They perceived income change differently (Figure 2a). Of the respondents, 44% perceived an increase in net income since their engagement with tea plantations, but 38% claimed a continuous market fluctuation. Some tea farmers who were engaged with tea cultivation for more than 30 years had identified several critical timing in the fluctuation of market value. They described a general increasing trend over the last three decades and ascribed it to the confirmation, registration, and issuance of certificates on the right to the contracted management of forested land; while a recent (ca. 2015) decreasing trend was attributed to the increasing cost of labor by tea farmers.

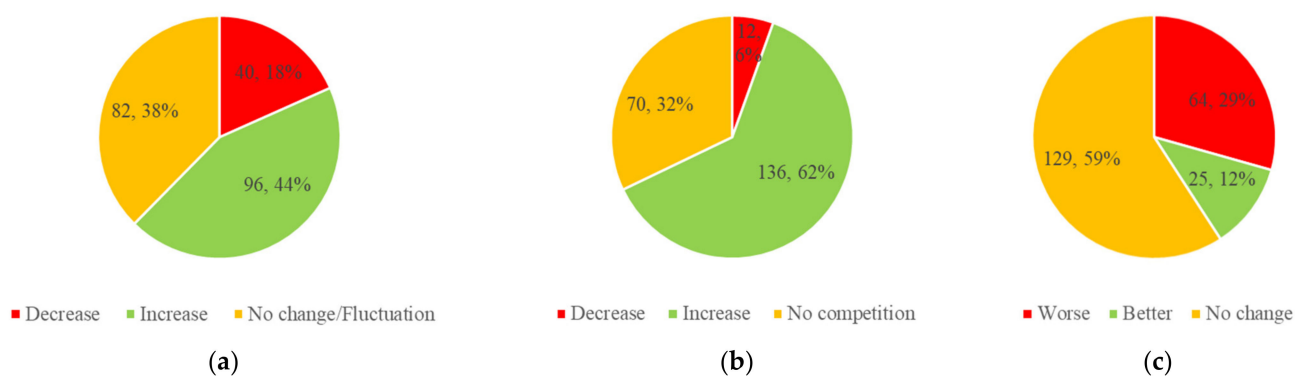


Figure 2. Tea farmers' perception of income (a), market competition (b), and environmental conditions (c) concerning tea cultivation and production. Illustrated by the number of respondents and the percentage.

For the intensity of market competition, more than 60% of respondents felt increasing pressure, compared to 6% who thought the opposite (Figure 2b). Interestingly, 32% of respondents reported no pressure as most of them said, “We had no feeling of competition at all because we only focused on what we can achieve”. They claimed to have a stable or even fixed source of customers and their land, that is, *shan chang* (literally “the mountain”) in specific geographical locations secured the tea quality. For those who had an experience of intensified competition, they ascribed it to several causes, such as unfair competition with fake commodities, farmers shifting from rice to tea planting, forcing the price down by buyers, no brand or green certificate for small-scale farmers, etc.

For the environmental conditions (Figure 2c), 59% of the respondents did not think there was a significant change regarding tea cultivation, especially regarding soil and weather conditions; but not many thought that the climate was getting any better (12%) either. Those who felt a change, especially a negative one, attributed it to climate change and human disturbance. They claimed to have experienced a higher frequency of heavy rain, drought, and spring frost, earlier warming, and more snowing days, all leading to the decrease in tea leaf yield. However, they also expressed satisfaction with the improvement of soil and water conditions due to human intervention such as weed control, fertilization, forestation, and water conservation. Furthermore, respondents mentioned that important environmental conditions for tea cultivation, including rock, soil, topography, and forest, cannot be separated but form an integrated system, the *shan chang*, which was suitable for tea bushes to gain sunshine and water.

Ownership of *shan chang* was very stable as thought by 96% of the respondents. Some pointed out that there was no way to own new land through land clearance and the only way to expand tea cultivation was to rent others’ land (which was not in the same production collective) or to get subcontracted land (which was in the same production collective).

3.2. The Social-Cultural Benefit Associated with Tea Cultivation

The assessment of the importance of typical ecosystem services in the Wuyishan area by tea farmers indicated meanings of tea cultivation beyond economic importance. For all the listed ecosystem services (Figure 3), tea as a product was perceived by 95% of respondents as an important one that should rank in the top five, followed by fresh water, which was chosen by 70% of the respondents. The few who did not rank tea cultivation among the top five important ones mostly perceive eco-tourism, air purification, and local culture as more important. Eco-tourism was the most chosen cultural service as 60% of respondents thought it important, followed by the local culture which was chosen by more than half of the respondents. For regulating services, the most chosen one was air purification (41%). The scores of each ecosystem service also indicated that tea farmers definitely thought the provisioning of tea was the most important ecosystem service to them (5.3), followed by fresh water (3.2), eco-tourism (2.5), and local culture (2.3).

The MCA revealed the relationship between different ecosystem services in terms of tea farmers’ perception (Figure 4). The first and second dimensions presented are, respectively, eigenvalue, 1.838 and 1.676; inertia, 0.123 and 0.112; and Cronbach’s alpha, 0.658 and 0.638, which were slightly lower than the generally accepted lower limit of 0.70; however, a smaller value is acceptable in exploratory research [43]. The locations of choosing tea were very close to the origin of the coordinates, indicating that respondents had an almost unanimous assessment of the importance of tea cultivation. By contrast, locations of ES decisions far from the origin of the coordinates indicated not a unanimous perception of importance among respondents, such as the NTFPs, rice, research, and environmental education.

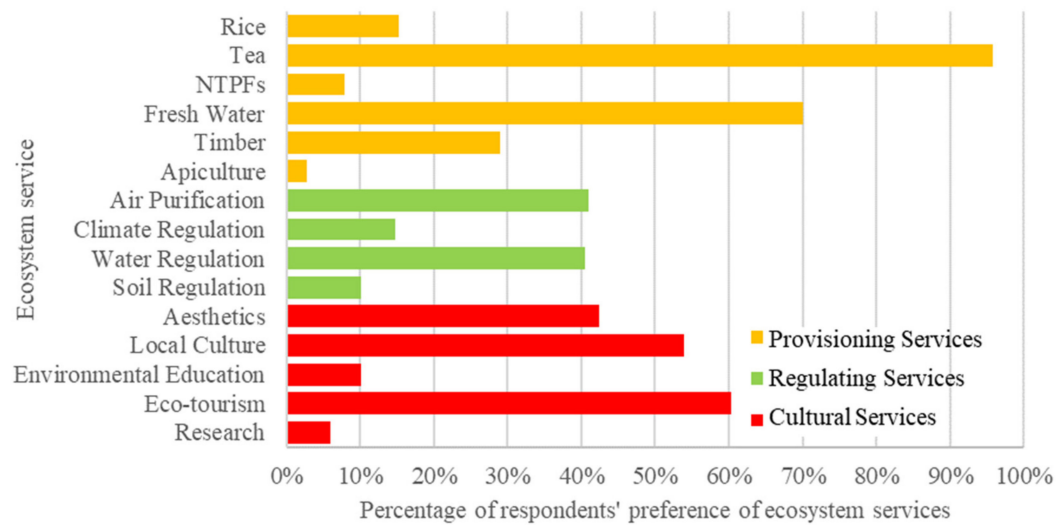


Figure 3. Tea farmers' preference of ecosystem services concerning their overall importance to life (NTPF: non-timber forest products).

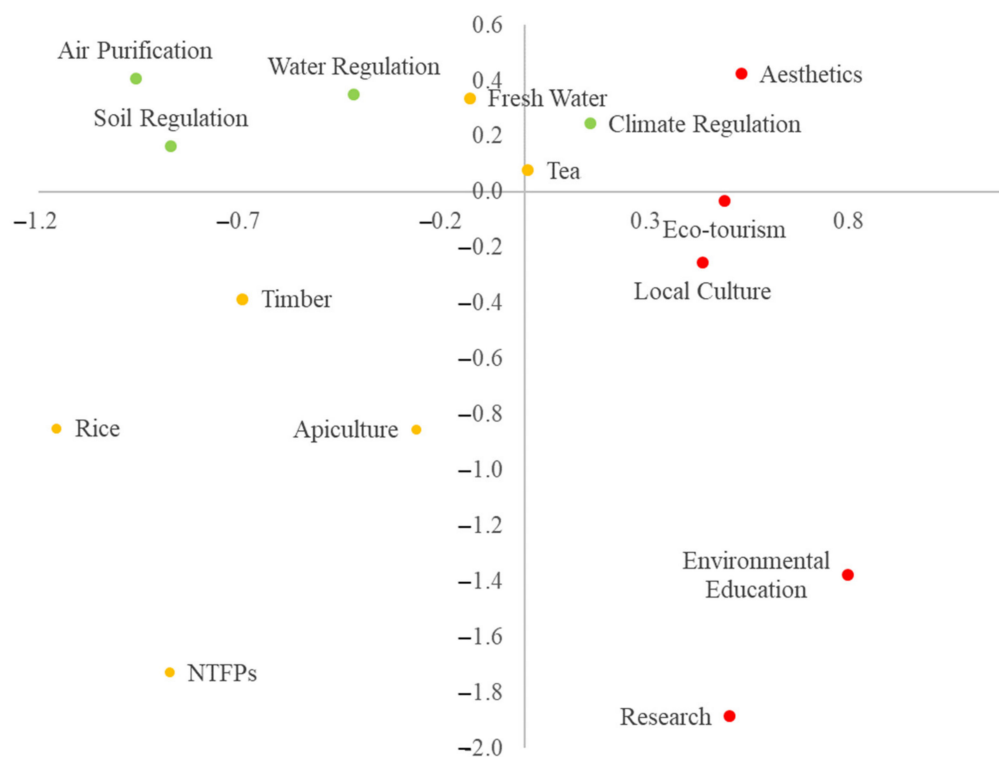


Figure 4. The MCA biplot of the preference of ES among tea farmers. Red: cultural services; yellow: provisioning services; green: regulating services.

The first axis revealed a trade-off between decisions of cultural services and other services except for tea cultivation or climate regulation, which indicates synergies between cultural services and the other two. The second axis revealed a trade-off between regulating services and other services except for fresh water, tea, and aesthetics to show synergies. Therefore, respondents who perceived tea cultivation as important or not also tend to perceive cultural services and regulating services as important or not.

Following the preference for ecosystem services beyond tea as a product, respondents identified many socio-cultural meanings of tea in the answers to the open-end question of

how tea farmers value their tea orchard under the construction of an NP. Three aspects were identified after coding all the expressions (Table 3). First, engaging with tea cultivation brought individuals with physical and mental health; second, it led to the social stability of the community; third, it facilitated inherit of cultural heritage. These aspects were all confirmed as taking effects all the time, although some traditional knowledge was gradually lost. It was especially obvious that when asked about the concrete expressions or records regarding traditions associated with tea cultivation and processing, most respondents acknowledged that ceremonies were no longer practiced and folk songs and sayings were not commonly mentioned in daily life.

Table 3. Socio-cultural benefits expressed by the respondents.

Social-Cultural Meaning	Sample Expression
Physical and mental health	My view was broadened through communication during the tea sale. The natural environment secured high-quality tea which satisfied me. Regular working in the field has improved my physical condition. Drinking tea was good for people's health.
Social stability	Courtesy was practiced during tea processing and ceremonies. Engaging with tea reduced time spent on gambling and drinking. Tea processing can absorb idle labor.
Cultural inheritance	The fame of Wuyishan was promoted. We can learn from historical experience. Tea culture can be promoted. New blending and flavor of tea can be invented.

Nevertheless, they had still provided some information on the tea culture. Abundant folk songs and sayings were describing the origin of tea, the timing for attending to tea bushes, the experience of tea production, the technology of tea planting and processing, and the value of tea. They agreed that inheritance and communication of relevant knowledge were still possible. When asked about tea cultivation and processing techniques, the 221 respondents provided 285 answers, of which 35% were “through communication with neighbors” and 29% were “passed on for generations”, compared to 13% of “government technology popularization” and 23% of “other sources”. The respondents also mentioned the mix of practicing religion with the production and enjoyment of tea. Finally, they confirmed that some traditions, such as the ritual of the initiation of tea picking, have been gradually resumed.

3.3. Perceptions of Protected Area Management and Expectations of Future Management

Respondents were aware of the existence of the PAs and the impact of their management on tea cultivation. 83.3% of the respondents were aware of the existence of the national nature reserve and the scenic area, and the rest were not sure about the exact name ($n = 221$). Concerning the awareness of the geographic location of their land (Figure 5), only 15 respondents said they were not sure of the exact location, and other respondents all confirmed that they had tea plots inside of the PAs (107, 48%) or not (99, 45%). For those who had land located inside of the PAs, 61 (57%) perceived no effect of conservation management while 46 (43%) pointed out different forms of control that they thought of as disturbances to their tea cultivation. These claimed disturbances were listed in Table 4. Generally, there were two types of control; the first was a complete banning of certain land use or production way, and the second was some specific development control. These identified as prohibition and restraints were all official policies other than collective actions as informal customs. A third disturbance was also mentioned as a side-effect or accidental injury to tea cultivation during the implementation of PA management policies, such as mistakenly removal of tea bushes, contamination of tea leaves by spraying insecticide on pine forests, and lack of control on tourists who affect tea bushes.

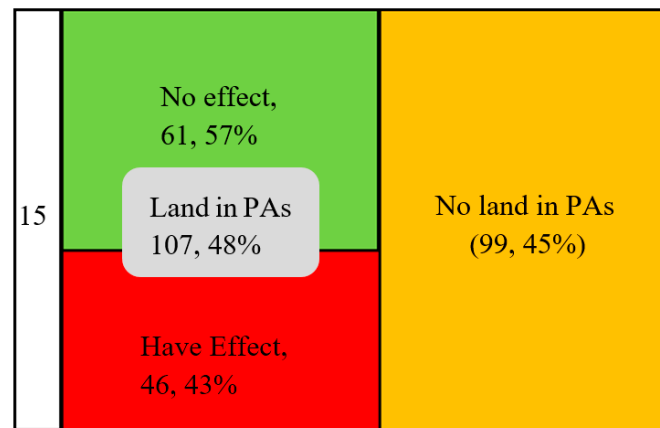


Figure 5. Perception of the impact of protected areas on tea orchard.

Table 4. Identified disturbances to livelihood activities within the protected areas.

Tea Relevant	Prohibition	Restraints
No	Harvesting Chinese fir; Collecting firewood;	Tourism; Collecting herbs;
Yes	Clearing forest; Pruning tree (to avoid shading tea bushes); Ketu (literally “guest soil”), replacing soils under tea bushes with new soils from nearby; Modernizing roads to tea terraces;	Fertilizer amount; Tea bush trimming; The flow of tea buyers; The flow of motor vehicles; The scale of the tea processing factory; Choice of varieties of tea bushes;

Respondents also hold diverse perceptions of protected area management concerning their ecological, economic, and social outcomes. Ecological outcomes were explained as direct protection results concerning elements of the ecosystem and itself. Economic outcomes were income, job position, commercial opportunities, etc., which can bring monetary benefit during PA management. Social outcomes were broader public welfare such as improvement in infrastructure and education with the existence of PA. In general, tea farmers were most happy with the ecological outcomes of conservation but the least with the realization of public welfare. For ecological outcomes, 68% of the respondents provided a positive reply (Figure 6a), while 45% of them claimed no enjoyment of any public welfare provided by the PAs (Figure 6c). Benefiting from the commercial operation of the PAs seems the most difficult to judge as the numbers of respondents holding negative, positive, and neutral attitudes were almost the same (Figure 6b).

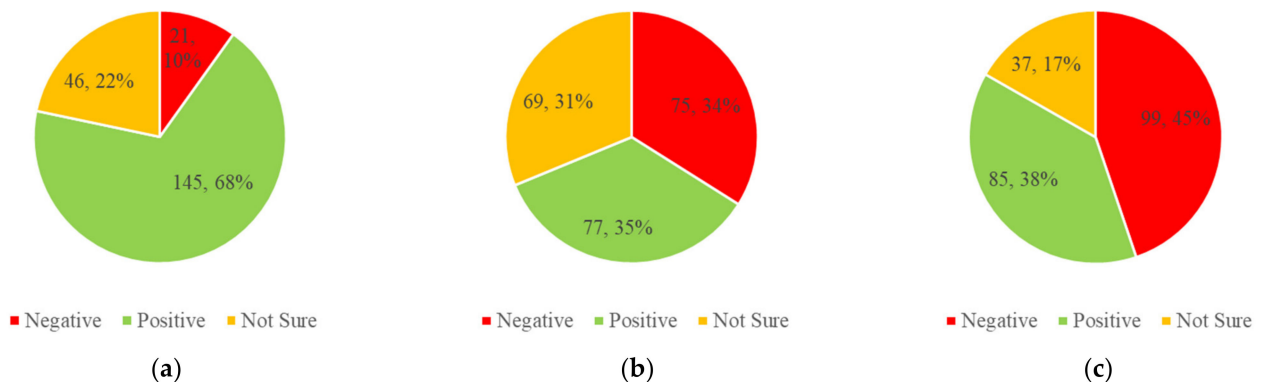


Figure 6. Tea Farmers' perception of conservation effectiveness: ecological outcomes (a), economic benefit (b), and public welfare (c).

Concerning the current establishment of the NP, respondents expressed their concern if tea plots would be returned to the forest. About 35% of the respondents held the attitude that there was no room for negotiation of any compensation fee as the tea orchard was the lifeline, and it was ridiculous to even think about land acquisition for other use. About 10% thought that giving up tea plantation was negotiable only if the compensation could satisfy them, the conditions included compensating according to the market value, the quality of land, and through land replacement, and the general expectation was that the living standard must not be lower than the current one. However, they acknowledged that negotiating conditions would be difficult based on their experience. The rest all preferred monetary compensation alone, 16% of the respondents asked for annual compensation, and another 39% proposed one-off compensation. However, there was a wide range of expected payments due to the productivity of the land. For the annual compensation, the expected value had a range between 7500 and 1,500,000 yuan/ha (1200 to 240,000 USD/ha); and for the one-off payment, that was between 3000 and 9,000,000 yuan/ha (480 to 1,440,000 USD/ha).

4. Discussion

4.1. Sustaining Traditions in a Protected Area under a Modern Market Economy

This study revealed how the tea farmers perceived the role of tea cultivation. One key finding is the dilemma between traditional farming and the market economy. Tea cultivation is still a traditional way of farming the forest as land and labor-intensive. Tea farmers have limited but enough access to the market by setting up a relatively fixed distribution channel in an acquaintance society. Therefore, they are eager to exploit more forested areas when engaging deeper with the market competition, but they are subject to even stricter land management rules. This dilemma is not uncommon globally [44,45], and significantly prominent in developing countries [46–48]. This study thus provides a way out of this dilemma to help conservation as well as rural development.

As in many agroforestry systems, tea cultivation in Wuyishan is not separated from the forest ecosystem, but together they formed coupled social-ecological systems generating different ecosystem services that benefit human well-being and development [49]. The provision of multiple ecosystem services is based on the agriculture of multi-functionality, which was widely supported top-down such as in the European Union (EU) [50,51] but is not well-studied in China [52]. To shed some light on this, this research showed that tea farmers think highly of local culture and eco-tourism, and tea cultivation is potentially clustered with cultural services. They all indicate that tea farmers may have the demand for commercialization of the traditional culture to fulfill other functions of tea cultivation beyond producing leaf. Thus, appreciation of cultural services can become a way of generating income besides tea production, and could possibly reduce the cases of illegal expansion of tea bushes to the forest. Concerning an even broader scope of social-cultural benefit, our study found that tea farmers cherish tea cultivation as a way of improving the well-being of a person, facilitating social stability, and sustaining a living culture. These functions of tea cultivation comply with the objective of a healthy park–people relationship and they were not unique to tea cultivation but many traditional practices in rural areas.

Therefore, farmers in rural areas can and will maintain traditional activities under PA management, if they understand the traditional culture and ecological protection concept can valorize many elements during goods production. This balance between farmers' interest and public welfare can be realized through the integration of multi-functionality and sustainability [53]: through the provision of multiple goods and services from the same social-ecological system, there is both an added-value over land expansion (ecological valorization) and diversity services over single products (cultural valorization) to resolve the dilemma of rural development and conservation.

4.2. Benefit-Sharing in the Protected Area

Equity and sustainability are important goals in natural resource management [54,55]. They also matter to the stability of a social-ecological system because resource users could perceive the benefit-sharing mechanism and react accordingly [36]. It is not surprising that tea farmers thought PAs have affected their benefit mainly because some traditions in tea cultivation were not respected, such as pruning and Ketu (Table 4). However, some of the disturbances are not true disturbances regarding “tradition”, such as the prohibition of “modernizing roads to tea terraces” and the restraint of the “flow of motor vehicles”. They are identified as “disturbances” usually because they affect income generation activities. Nevertheless, results from the perception of current conservation effectiveness show that PAs did not quite benefit tea farmers either through bringing income or providing more public welfare, although, at the same time, the biophysical conditions were improving. This indicates that a trade-off between maintaining the ecological functions and securing livelihood still exists.

In the newly designated NP, this issue is amplified as more working land is now within the boundary of the NP. To ensure the resilience of the system, there are three aspects of this social-ecological system worth further discussion based on the results. First, the stability and consistency of the land tenure system are important, as farmers cannot afford to lose land or affiliated products. Additionally, sustaining traditions in a market-oriented economy can benefit from treating the land property right as a bundle of rights. This means to constrain tea farmers’ use rights but respect the right to benefit, as is usually practiced in conservation easements [56–58]. Second, the co-existence of forest and tea orchards has brought to tea farmers, the user system, an impression that a healthy environment is good for both people and tea bushes. The well-preserved natural conditions can transform a common product of tea into a famous brand that brings added value [59,60]. Third, the resource system is not solely tea bushes, but the integrated forest ecosystem, that is, *shan chang*. This means unnecessary human disturbance to the forest from tea cultivation should be reduced.

Therefore, the case of tea cultivation indicates that constraints to land use do not necessarily lead to instability of the system if users can conduct conservation-compatible activities that have limited disturbance to the natural environment [7]. This idea is not new and has been practiced in some areas, such as restrictions on the owner’s use of land in a conservation easement. The difficulty is that this way of benefiting from conservation can be equitable and sustainable sometimes only in a long run, so some initiating stimulus and patient negotiation are necessary [61–63].

4.3. Making Community Livelihood Compatible with Conservation Goals under a National Park Concept

The national park idea promoted in the Chinese context strengthens the strict protection of large-scale ecosystems and their processes while respecting human activities conducted in harmony with nature, especially those practiced by local residents for hundreds of years. It was originated through reflection on the efficiency of fortress conservation and the need to secure multiple ecosystem services [64]. Under this idea, conservation can provide opportunities for benefit sharing through sustaining traditions if added values are realized through conserved nature instead of exploitation of forests and/or adding chemicals for quantity [16].

From tea farmers’ perception of the role of tea and the relation between tea cultivation and PAs, we feel that management should be implemented on three scales to help sustain tea cultivation under conservation goals (Figure 7). This management may apply to other agroforestry systems in mountainous areas as well. It is highlighted that an efficient solution to a healthy park–people relationship based on a fair distribution of ecosystem services should not be looked at the park scale alone, but instead, on plot, mountain, and landscape scales. This enables divergent strategies at different scales and provides potentially more scale-specific and also flexible options to integrate parks and people in fair ways.

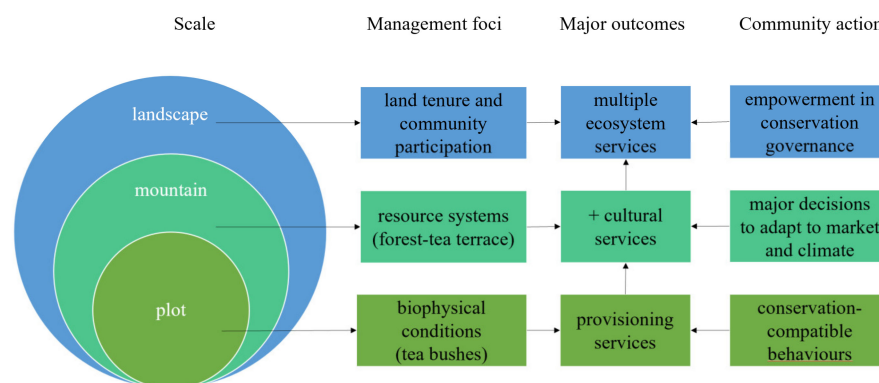


Figure 7. A scaling management strategy for adapting agroforestry systems to conservation in mountainous areas.

First, at the scale of the plot, attention should be given to species and biophysical elements for tea bushes, such as tea breeding, soil, and water conservation along the mountain slope. This is because these basic inputs sustain the growth of tea bushes and ensure the basic provisioning service. Conservation-compatible behaviors also start at this scale to avoid unfavorable activities such as killing trees.

Second, at the mountain scale, attention should be given to how the users manage the resource system. Major management decisions are made at this scale to link old wisdom with new technology to sustain the basic structure of the forest-tea terrace. Farmers are sensitive to land location and interactions with PAs mainly at this scale, and they are seeking ways to adapt to climate change and fluctuating markets. They also tend to combine provisioning services with cultural services to enlarge income sources.

Third, at the landscape scale, attention should be given to the land tenure system and the community's participation in conservation to varying degrees, such as conservation easement, payment for ecosystem services, conservation steward program, etc. Homogenization of the landscape resulting from the expansion of tea cultivation will be disastrous to the forest and is a violation of conservation goals.

5. Conclusions

National parks in China are very different from those in North America because it is difficult to find a large area of the wilderness without human activities perhaps except on the inner Tibetan Plateau. Finding ways out of the common dilemma of improving livelihood under conservation restrictions leads us to conduct this research when the newly proposed national park system provides opportunities to reflect on protected area management and learn from global experience. Wuyishan is a typical area where human activities have lasted very long with the remnant of the forest of high ecological values. This research found that conservation through setting up PAs has impacted local tea farmers' understanding of conservation regarding their demand for income. It also found that maintaining tea cultivation in harmony with the forest needs to find ways to add value to tea. In theory, this research proved that the SES meaning perception theory can reveal the potential synergies between local people and other stakeholders; in practice, the knowledge co-produced through local perception is reliable to form incentives for farmers to comply with conservation rules to secure the stability of the social-ecological system.

As revealed in this research, tea farmers are seeking equitable and sustainable benefit sharing in the PAs. The NP has the potential to secure the livelihood of tea cultivation and to promote cultural values which the tea farmers think highly of. Therefore, it is possible to maintain the stability of the social-ecological system if multiple ecosystem services can be provided, and their provision is facilitated in the management of multiple levels: the plot level where controlling and monitoring of biophysical elements are critical; the mountain

level where production and market are critical, and the landscape level where land tenure and community participation are critical.

The findings are encouraging for many cultural landscapes around the world which face a similar challenge in nature conservation activities. Understanding the potential of multiple ecosystem service provision through farmers' perception will be helpful in PA designation and other ecological policy design and implementation. This three-level management may also help guide compatible production behaviors for conservation targets while securing farmers' income in populated PAs. Further research is also needed to find critical factors that could turn the potential of provision of multiple ecosystem services into real provision and income to create real multifunctional agriculture embedded and connected to PAs.

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References

1. Dewu, S.; Røskoft, E. Community attitudes towards protected areas: Insights from Ghana. *Oryx* **2018**, *52*, 489–496. [\[CrossRef\]](#)
2. Abukari, H.; Mwalyosi, R.B. Comparing conservation attitudes of park-adjacent communities: The case of mole national park in Ghana and Tarangire national park in Tanzania. *Trop. Conserv. Sci.* **2018**, *11*, 1940082918802757. [\[CrossRef\]](#)
3. Allendorf, T.D. Residents' attitudes toward three protected areas in southwestern Nepal. *Biodivers. Conserv.* **2007**, *16*, 2087. [\[CrossRef\]](#)
4. Ite, U.E. Community perceptions of the Cross River national park, Nigeria. *Environ. Conserv.* **1996**, *23*, 351–357. [\[CrossRef\]](#)
5. Hough, J.L. Obstacles to effective management of conflicts between national parks and surrounding human communities in developing countries. *Environ. Conserv.* **1988**, *15*, 129–136. [\[CrossRef\]](#)
6. Dudley, N. (Ed.) *Guidelines for Applying Protected Area Management Categories*; IUCN: Gland, Switzerland, 2008; pp. 16–17.
7. He, S.; Gallagher, L.; Su, Y.; Wang, L.; Cheng, H. Taking an ecosystem services approach for a new national park system in China. *Resour. Conserv. Recycl.* **2018**, *137*, 136–144. [\[CrossRef\]](#)
8. Yan, S.; Li, Z.; Zhou, Z. Survey on attitude of community residents toward Jiugongshan Nature Reserve and countermeasures for reconciliation. *For. Inventory Plan.* **2007**, *32*, 162–167. (In Chinese)
9. Yang, J.; Zhao, Q.; Yang, X.; Ti An, L.H.; He, X.J. A survey on local people's perceptions and attitude orientation around Taibaishan Nature Reserve. *For. Inventory Plan.* **2007**, *32*, 41–45. (In Chinese)
10. Wu, W.; Liu, Q.; Liu, Z.; Zihan, L.; Libin, T.; Qiang, L. Determinants of farmer households' attitudes towards the construction of nature reserve in their neighborhood. *J. Zhejiang Agric. For. Univ.* **2014**, *31*, 97–104. (In Chinese)
11. Ma, B.; Shen, J.; Ding, H.; Wen, Y. Farmer protection attitudes and behavior based on protection perception perspective for protected areas. *Resour. Sci.* **2016**, *38*, 2137–2146. (In Chinese)
12. Li, X.; Wen, J. Study on peripheral community resident's dependence and attitude to nature reserves. *Cent. South For. Inventory Plan.* **2008**, *27*, 45–49. (In Chinese)
13. Duan, W.; Wen, Y.; Wang, C. Influence factors of farmers' attitude toward environment and Crested Ibis conservation in Crested Ibis National Nature Reserve. *Wetl. Sci.* **2013**, *11*, 90–99. (In Chinese)
14. Han, F.; Wang, C.; Zhao, Z. The combined influence of nature reserves from the perspective of farmer households in Shannxi. *Wetl. Sci.* **2015**, *37*, 102–111. (In Chinese)
15. Chang, L.; Watanabe, T. The mutual relationship between protected areas and their local residents: The case of Qinling Zhongnanshan UNESCO Global Geopark, China. *Environments* **2019**, *6*, 49. [\[CrossRef\]](#)

16. He, S.; Gallagher, L.; Min, Q. Examining Linkages among Livelihood Strategies, Ecosystem Services, and Social Well-Being to Improve National Park Management. *Land* **2021**, *10*, 823. [\[CrossRef\]](#)
17. Sirivongs, K.; Tsuchiya, T. Relationship between local residents' perceptions, attitudes and participation towards national protected areas: A case study of Phou Khao Khouay National Protected Area, central Lao PDR. *For. Policy Econ.* **2019**, *21*, 92–100. [\[CrossRef\]](#)
18. Wang, Q.; Yamamoto, H. Local Residents' Perception, Attitude and Participation Regarding Nature Reserves of China: Case Study of Beijing Area. *J. For. Plan.* **2009**, *14*, 67–77. [\[CrossRef\]](#)
19. Allendorf, T.D.; Aung, M.; Songer, M. Using residents' perceptions to improve park–people relationships in Chatthin Wildlife Sanctuary, Myanmar. *J. Environ. Manag.* **2012**, *99*, 36–43. [\[CrossRef\]](#)
20. Chen, X.; Lupi, F.; Liu, J. Accounting for ecosystem services in compensating for the costs of effective conservation in protected areas. *Biol. Conserv.* **2017**, *215*, 233–240. [\[CrossRef\]](#)
21. Zhang, L.; Luo, Z.; Mallon, D.; Li, C.; Jiang, Z. Biodiversity conservation status in China's growing protected areas. *Biol. Conserv.* **2017**, *210*, 89–100. [\[CrossRef\]](#)
22. Carpenter, S.; Walker, B.; Anderies, J.M.; Abel, N. From metaphor to measurement: Resilience of what to what? *Ecosystems* **2001**, *4*, 765–781. [\[CrossRef\]](#)
23. Holling, C.S. Resilience and stability of ecological systems. *Annu. Rev. Ecol. Evol. Syst.* **1973**, *4*, 1–23. [\[CrossRef\]](#)
24. Holmes, C.M. The influence of protected area outreach on conservation attitudes and resource use patterns: A case study from western tanzania. *Oryx* **2003**, *37*, 305–315. [\[CrossRef\]](#)
25. Nastran, M. Why does nobody ask us? Impacts on local perception of a protected area in designation, Slovenia. *Land Use Policy* **2015**, *46*, 38–49. [\[CrossRef\]](#)
26. Bennett, N.J. Using perceptions as evidence to improve conservation and environmental management. *Conserv. Biol.* **2016**, *30*, 582–592. [\[CrossRef\]](#)
27. Halliday, A.; Glaser, M. A management perspective on social ecological systems: A generic system model and its application to a case study from Peru. *Hum. Ecol. Rev.* **2011**, *18*, 1–18.
28. Bunker, N. *An Empire on the Edge: How Britain Came to Fight America*; Knopf: New York, NY, USA, 2014.
29. Zou, X. *Wuyi Zheng Shan Xiao Zhong Hong Cha (The Wuyi Lapsang Souchong)*; Zhong Guo Nong Ye Chu Ban She: Beijing, China, 2006. (In Chinese)
30. Cai, J. *Collective Forest Tenure Reform under the Perspective of Sustainable Social-Ecological Systems: The Empirical Study of Fujian Province*; Zhong Guo She Hui Ke Xue Chu Ban She: Beijing, China, 2012. (In Chinese)
31. Borrini-Feyerabend, G. Governance of protected areas—Innovation in the air. *Policy Matters* **2003**, *12*, 92–101.
32. Campese, J.; Sunderland, T.; Greiber, T.; Oviedo, G. *Rights-Based Approaches: Exploring Issues and Opportunities for Conservation*; CIFOR and IUCN: Bogor, Indonesia, 2009.
33. Timkoa, J.A.; Satterfield, T. Seeking social equity in national parks: Experiments with evaluation in Canada and South Africa. *Conserv. Soc.* **2008**, *6*, 238–254. [\[CrossRef\]](#)
34. Castonguay, A.C.; Benjamin, B.; Müller, F.; Horgan, F.G.; Settele, J. Resilience and adaptability of rice terrace social-ecological systems: A case study of a local community's perception in Banaue, Philippines. *Ecol. Soc.* **2016**, *21*, 14. [\[CrossRef\]](#)
35. Fischer, A.; Eastwood, A. Coproduction of ecosystem services as human–nature interactions—An analytical framework. *Land Use Policy* **2016**, *52*, 41–50. [\[CrossRef\]](#)
36. van Wyk, E.; Breen, C.; Freimund, W. Meanings and robustness: Propositions for enhancing benefit sharing in social-ecological systems. *Int. J. Commons* **2014**, *8*, 576–594. [\[CrossRef\]](#)
37. Young, O.R.; Berkhout, F.; Gallopin, G.C.; Janssen, M.A.; Ostrom, E.; Van der Leeuw, S. The globalization of socio-ecological systems: An agenda for scientific research. *Glob. Environ. Chang.* **2006**, *16*, 304–316. [\[CrossRef\]](#)
38. Young, J.C.; Rose, D.C.; Mumby, H.S.; Benitez-Capistros, F.; Derrick, C.J.; Finch, T.; Garcia, C.; Home, C.; Marwaha, E.; Morgans, C.; et al. A methodological guide to using and reporting on interviews in conservation science research. *Methods Ecol. Evol.* **2018**, *9*, 10–19. [\[CrossRef\]](#)
39. He, S.; Gallagher, L.; Su, Y.; Wang, L.; Cheng, H. Identification and assessment of ecosystem services for protected area planning: A case in rural communities of Wuyishan national park. *Ecosyst. Serv.* **2018**, *31*, 169–180. [\[CrossRef\]](#)
40. Holton, J.A. The coding process and its challenges. In *The SAGE Handbook of Grounded Theory*; SAGE: Los Angeles, CA, USA, 2007; pp. 265–289.
41. Zhang, X.; Liu, X.; Zhang, B.; Xie, Y. Will the Establishment of Nature Reserves Inevitably Lead to Low Household Income—An Empirical Study on Household Income within and nearby the Fujian Wuyishan National Nature Reserve. *Sci. Silvae Sin.* **2020**, *56*, 165–178. (In Chinese)
42. Greenacre, M.; Blasius, J. *Multiple Correspondence Analysis and Related Methods*; Chapman & Hall/CRC: London, UK, 2006.
43. Johnson, R.A.; Wichern, D.W. *Applied Multivariate Correspondence Analysis*, 6th ed.; Prentice-Hall: Upper Saddle River, NJ, USA, 2007.
44. Belsky, J.M. Community forestry engagement with market forces: A comparative perspective from Bhutan and Montana. *For. Policy Econ.* **2015**, *58*, 29–36. [\[CrossRef\]](#)
45. Brown, S.; Shrestha, B. Market-driven land-use dynamics in the middle mountains of Nepal. *J. Environ. Manag.* **2000**, *59*, 217–225. [\[CrossRef\]](#)

46. Li, Z.; Kang, A.; Gu, J.; Xue, Y.; Ren, Y.; Zhu, Z.; Liu, P.; Ma, J.; Jiang, G. Effects of human disturbance on vegetation, prey and Amur tigers in Hunchun Nature Reserve, China. *Ecol. Model.* **2017**, *353*, 28–36. [\[CrossRef\]](#)
47. Yu, P.; Liu, H.; Chen, S. Influences of human disturbances on vegetation of Songshan National Level Nature Reserve. *Sci. Silvae Sin.* **2002**, *38*, 162–166. (In Chinese)
48. Zeng, H.; Sui, D.Z.; Wu, X.B. Human disturbances on landscapes in protected areas: A case study of the Wolong Nature Reserve. *Ecol. Res.* **2005**, *20*, 487–496. [\[CrossRef\]](#)
49. Parrott, L.; Meyer, W.S. Future landscapes: Managing within complexity. *Front. Ecol. Environ.* **2012**, *10*, 382–389. [\[CrossRef\]](#)
50. Brunstad, R.J.; Gaasland, I.; Vårdal, E. Multifunctionality of agriculture: An inquiry into the complementarity between landscape preservation and food security. *Eur. Rev. Agric. Econ.* **2005**, *32*, 469–488. [\[CrossRef\]](#)
51. Kohler, F.; Thierry, C.; Marchand, G. Multifunctional agriculture and farmers' attitudes: Two case studies in rural France. *Hum. Ecol.* **2014**, *42*, 929–949. [\[CrossRef\]](#)
52. Song, B.; Robinson, G.M. Multifunctional agriculture: Policies and implementation in China. *Geogr. Compass* **2020**, *14*, e12538. [\[CrossRef\]](#)
53. Hediger, W.; Knickel, K. Multifunctionality and sustainability of agriculture and rural areas: A welfare economics perspective. *J. Environ. Policy Plan.* **2009**, *11*, 291–313. [\[CrossRef\]](#)
54. Brock, W.A.; Carpenter, S.R. Panaceas and Diversification of Environmental Policy. *Proc. Natl. Acad. Sci. USA* **2007**, *104*, 15206–15211. [\[CrossRef\]](#) [\[PubMed\]](#)
55. Smith, P.D.; McDonough, M.H. Beyond Public Participation: Fairness in Natural Resource Decision Making. *Soc. Nat. Resour.* **2001**, *14*, 239–249. [\[CrossRef\]](#)
56. Güneş, Y. Conservation Easement and Common Law Easement as a Nature Conservation Tool within the Context of Property Rights and the Economic Trade Off. *Ann. Fac. Droit D'Istanbul.* **2007**, *39*, 279.
57. Rissman, A.R. Rethinking property rights: Comparative analysis of conservation easements for wildlife conservation. *Environ. Conserv.* **2013**, *40*, 222–230. [\[CrossRef\]](#)
58. Watson, R.; Fitzgerald, K.H.; Gitahi, N. Expanding options for habitat conservation outside protected areas in Kenya: The use of environmental easements. *Afr. Wildl. Found. Tech. Pap.* **2010**, *2*, 7–29.
59. Egelyng, H. Informed Markets as Policy Instrument for Environmental Governance of Buffer Zones around Protected Areas: A global context and European cases. In Proceedings of the ECPR Joint Sessions, Salamanca, Spain, 10–15 April 2014.
60. Owusu, A. Alleviating Rural Poverty in Ghana through Marketing of Tourism Sites and Protected Areas. *Eur. J. Bus. Manag.* **2013**, *5*, 238–245.
61. Berkes, F. Community-based conservation in a globalized world. *Proc. Natl. Acad. Sci. USA* **2007**, *104*, 15188–15193. [\[CrossRef\]](#) [\[PubMed\]](#)
62. Ingram, J.C.; Wilkie, D.; Clements, T.; McNab, R.B.; Nelson, F.; Baur, E.H.; Sachedina, H.T.; Peterson, D.D.; Foley, C.A. Evidence of Payments for Ecosystem Services as a mechanism for supporting biodiversity conservation and rural livelihoods. *Ecosyst. Serv.* **2014**, *7*, 10–21. [\[CrossRef\]](#)
63. Jamal, T.; Stronza, A. Collaboration theory and tourism practice in protected areas: Stakeholders, structuring and sustainability. *J. Sustain. Tour.* **2009**, *17*, 169–189. [\[CrossRef\]](#)
64. Xu, W.; Xiao, Y.; Zhang, J.; Yang, W.U.; Zhang, L.U.; Hull, V.; Wang, Z.; Zheng, H.; Liu, J.; Polasky, S.; et al. Strengthening protected areas for biodiversity and ecosystem services in China. *Proc. Natl. Acad. Sci. USA* **2017**, *114*, 1601–1606. [\[CrossRef\]](#)