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Does Public Environmental Education and Advocacy Reinforce Conservation Behavior Value in Rural Southwest China?

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Abstract: The integrity of the natural habitat benefits the harmonious coexistence of nature and humans. However, a negative anthropogenic impact on natural habitats exacerbates the ongoing decline of global biodiversity, further undermining ecosystem services for human well-being, and making it difficult to reach the UN sustainability development goals (SDGs). Understanding people's willingness to engage in habitat conservation is essential to provide realistic recommendation and coordination for building environmentally sustainable rural communities. We conducted social field interviews in rural communities and evaluated how external factors, individuals' perceptions, and attitudes impacted villagers' willingness to conserve nature by using structural equation modeling analysis method. Particularly, we examined the influence of the Chinese government's two mountains theory (TMT) propaganda campaign, which encourages environmentally sustainable behavior and appreciation of ecosystem services. Our surveys examined behavior in the context of the theory of planned behavior (TPB) in Menglun town in rural Southwest China in 2020. The results indicated that villagers had a basic understanding of the two mountains perceptions and tended to be willing to engage in conservation. The path analysis revealed that villagers' willingness to conserve nature was directly influenced by external factors, mainly containing policy advocacy and environmental education, and was indirectly influenced by their perceived ability through identification and assessment of local habitats' ecosystem services. We identified the importance of TMT slogan advocacy with natural conservation perceptions and local traditional culture as key drivers for the impact paths. These factors can achieve the SDGs 4, 8, 13, and 14. We also identified the importance of social perceptions of villagers' willingness to conserve nature as a way to bring insights into habitat conservation in rural emerging areas of other regions and achieve the SDGs 13, 14. The study suggests that government and stakeholders should fully consider villagers' demands for acquiring material benefits and recreational pastimes when optimizing ecosystem services of the natural habitat. Certainly, considering public environmental education and environmental advocacy can be a complementary strategy for rural development and conservation.

Keywords: habitat conservation; rural development; structural equation modeling; theory of planned behavior; interviews; ecosystem services; sustainability literacy

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1. Introduction

Maintaining global biodiversity relies on the conservation of natural habitats, which are areas on Earth that provide native, undisturbed, or low-disturbed survival and reproduction for wild species [1,2]. However, natural habitats face many excessive anthropogenic-driven threats, and their fragmentation and natural degradation directly or indirectly lead

to a continuous decline in biodiversity [3,4]. Human behavior is considered one of the greatest threats to the habitat conservation [5].

The focus on biodiversity and habitat conservation in terms of social behavior should consider local ecological functions that genuinely benefit the local people, such as forest resources with medicinal, edible, or economic values, and forests used for cultural and recreational services, because regionalized ecosystem provisioning service differ greatly in space [6,7]. As the United Nations (UN) 2030 Agenda commitments are implemented, human behavior is receiving increased attention because it can slow down the harmonious coexistence of the environment and society [8,9].

Therefore, besides a clear understanding of the drivers of habitat destruction, local people's behaviors and motivations should not be ignored [10]. Exploring and understanding the social perceptions of local villagers living near forest habitats is the initial step in understanding their behavior, which is necessary for establishing habitat conservation interventions [11,12]. Here, social perception is defined as a human organization, understanding, and interpretation of biodiversity or forest habitat conservation information from the surrounding world, producing mental impressions, which will help shape their behaviors and actions [13].

The theory of planned behavior (TPB) is widely used to assess the social–psychological components influencing human behavior and behavioral motivations [11,14]. The theory states that behavioral intentions precede behaviors and are governed by attitudes, subjective norms, and perceived abilities [15,16]. Coon et al. [17] and Meijer et al. [18] have also indicated that the decision-making process is affected by external factors (e.g., geographical setting, social culture, attitudes, perceptions from others, economic stability, and personal sense of safety).

In detail, behavioral intentions refer to an individual's propensity to perform a specific behavior and play an important role in explaining and predicting behavior. Behavioral attitudes refer to an individual's persistent preconceived position toward a particular object. The more positive an individual's attitude toward the behavior is, the higher the behavioral intentions are [16]. Subjective norms refer to an individual's perception of social pressure to take certain specific actions. Social psychologists also argue that individuals' behavior is limited by their social environment [10,19]. Perceived ability refers to an individual's ability to control the opportunities and resources needed for particular behaviors. If their previous experiences are more enriched or positive, they are more willing to perform similar behaviors [15]. In addition, the personal economic condition likely has an impact on performance behavior. Boardman et al. [20] found that farmers' decision-making on agricultural conservation management was strongly influenced by economic incentives, and personal wealth was positively associated with environmental behaviors such as less fuelwood use and the likelihood of tree planting [21].

The TPB has been widely used to support and deepen understanding of conservation behavior, (e.g., local people's conservation behavior and motivation in protected areas [11,22,23]), deforestation [24], rural villagers' livelihoods in relation to hunting behavior [12,25], landowners' intentions to restore native area based on ecosystem services [10], an affinity for wildlife, and willingness to conserve by contact with nature [26], biodiversity conservation on farms, or natural grasslands [17,27].

In tropical areas, forest habitats are incomparable sources of ecosystem services, constitute a unique aesthetic landscape, and are also influenced by the local development history of villagers and leading national corporations [28,29]. However, our understanding of why people who take for granted the need to prioritize their own gain act in deforestation, poaching, and acquiring usable resources in natural habitats goes far behind social perceptions, focusing on ecological knowledge, the pleasure of acquiring material benefits, and traditional culture and beliefs associated with local villagers [6,12,19,30]. We are prone to neglecting those influences to the detriment of habitat conservation management [17,31]. For example, local people (refers to villagers, government, and stakeholders) lack or misun-

derstand knowledge of ecosystem services provided by local natural habitats (representing benefits of the ecosystem to human beings) [32].

Meanwhile, local communities should participate in and drive habitat conservation and management. In terms of social advocacy in China, the two mountains theory (Chinese name refers as 绿水青山就是金山银山) and its slogan "lucid waters and lush mountains are invaluable assets" have been promoted for 15 years. This slogan aims to increase social perception of ecosystem services, promote the achievement of sustainable development goals (SDGs), and has increased individual knowledge and awareness of environmental conservation under local community policy initiatives [8,33–35]. Our approach involves combining the assumptions made by the TPB, including personal attitudes, knowledge of social norms and factors, and perceived ability. Structural equation modeling (SEM) is a well-established model for exploring intrinsic links in this aspect, and it can play a predictive and helpful role in providing conservation decisions [15,23,36]. Hence, we brought in ecosystem services contents and drew on useful, well-established SEM to map out the inner impact paths.

Our study was placed in a rural town in Xishuangbanna Prefecture, Yunnan Province, China. This tropical region is one of the biodiversity hotspots [37]. It is also one of the most biodiversity threatened areas, where there is a trend of expansion of rubber plantations, overexploitation of native forests, and local hunting culture [38]. The area is dominated by the Dai and Akha ethnic groups. There exist traditional religious (e.g., devotional attitude to nature), cultural beliefs (e.g., sacred woods or forests), and achieving material benefits (e.g., mushroom hunting/foraging and fishing) underpinning their environmental behaviors [6,39,40]. They have traditionally subsisted on agricultural livelihoods, and the expansion of rubber plantations in recent decades has driven them out of poverty. However, rubber has also deprived them of ecosystem services they receive from natural forests [32,41,42]. Because of the impact of the outside cultures and the change from the traditional natural economy to the market economy, their lifestyles and traditional cultural education have changed dramatically [43].

We aimed to uncover how their environmental behaviors are driven. We measured environmental behaviors as motivation to conserve nature, livelihood practices, perceptions, and attitudes. This research aims to provide government and stakeholders with information on villagers' demands for acquiring usable resources and recreational pastimes from local natural habitats for rural development projects. We emphasized the importance of utilizing knowledge from the analysis of questionnaire measures involving ecosystem services, and we noted that semi-structured interviews were key to understanding villagers' perceptions and attitudes and focusing on driving paths that characterize the willingness to conserve.

Hence, in this study, we used questionnaire and interview data to reveal specific objectives: (1) evaluate local villagers' willingness to conserve and their response propensity; (2) determine the main influencing factors that contribute to their willingness to conserve nature; and (3) evaluate the local villagers' perspectives on conservation reflected in attitudes towards natural resource benefits.

2. Materials and Methods

2.1. Study Area and Sample

Our study area is located in Menglun township, Xishuangbanna Dai Autonomous Prefecture in Southwest China [44]. The map shown in Figure 1. Xishuangbanna's indigenous people are traditionally engaged in hunting and collection of other non-timber forest products. Hunting has caused local biodiversity loss, while the destruction of local primary habitats caused by rubber plantation expansion compounded this threat [12,38]. However, primary forest patches (e.g., nationalized forests and a small portion of community forests) have been protected by government-led ecological redline policy (i.e., the ecological baseline area needed to provide ecosystem services to guarantee and maintain ecological safety, living environment safety, and biological safety) in China since 2014 [42,45,46]. Catching fish, including electrofishing, netting, and using explosives and poison, in the local Luosuo

river is restricted or prohibited except for encouraging using the fishing pole method (http://extwprlegs1.fao.org/docs/pdf/chn166487.pdf, accessed on 1 August 2020). Local villagers' livelihood depends mainly on agricultural production, mainly including rubber tapping, livestock farming, fruit and crop cultivation [47]. Ethnic groups in Menglun town and its nearby areas are mainly Dai, Akha, and Jinuo minorities, among which the Dai people live near rivers and at lower altitudes, while the Akha and Jinuo people mainly in the high-altitude mountains.

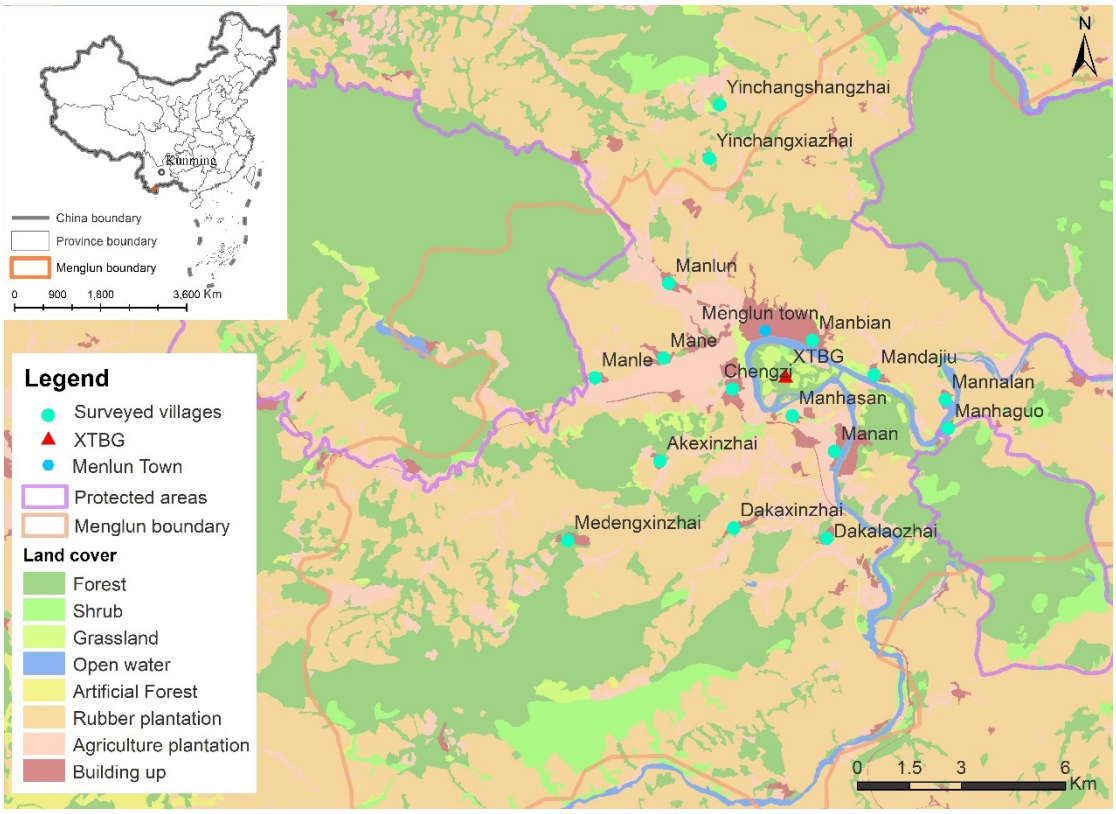

Figure 1. The surveyed rural villages around Menglun township near natural habitats and protected areas, in Southeast China. XTBG (Xishuangbanna Tropical Botanical Garden).

Our samples were drawn from fieldwork, including questionnaires and semi-structured interviews. Interviews and questionnaires were voluntary and anonymous. In total, we collected 7 valid interview text transcripts for qualitative analysis, and 211 valid questionnaires as sample sizes for further quantitative analysis, with a validity rate of 96%.

All basic demographic information were shown in Table S1. The proportion of those aged 15–29 years and 30–39 years were 27.0% and 37.4%, respectively, followed by those aged 40–49 years with 19.9%. Most samples were mainly middle-aged. Of the respondents, 37.9% had a junior high school education, and 31.8% had a primary school education. A total of 74.8% of respondents were farmers. The proportion of annual family incomes varies widely by household, with 38.8% of households within the CNY ¥20,000–39,999/year income range. Our survey included a total of four ethnic minority groups, with the Dai being the most numerous at 55.5%, followed by the Akha at 35.5%.

2.2. Field Survey

Our general population was villagers from surrounding villages in Menglun town, who are indigenous or have lived there for a long time and are familiar with the local natural environment. The general population ranges from those aged 15 and above. We determined the sample size based on the village households and the distance of ethnic people between villages and their nearby original forest habitat and rivers, with the closer

the distance the larger the sample surveyed (e.g., 19 for the Manhaguo samples and 11 for the Dakaxinzhai samples), 10–20 samples per village. The sampling size and method also refer to the previous study's guidance in the Xishuangbanna [12,42]. We visited the local village in September and October of 2020. During this time, we wore masks and followed local epidemic prevention policies and protective measures against COVID-19. To improve the fieldwork's representativeness, we used mixed methods including quantitative surveys and semi-structured interviews. We conducted the survey process in Mandarin Chinese, and invited a local university student to participate in assisting us.

Firstly, the quantitative survey was conducted using a randomized sampling design, supplemented by snowball sampling. Before conducting each survey, the investigators sought permission from the villagers' committee and then walked along village roads, interviewing only one person per household and taking about 20 min on average to complete the questionnaire.

Secondly, recorded semi-structured interviews were conducted with willing interviewees (see Table S4 for key interview prompts). The average length of the interviews was about 35 min. Recordings were subsequently organized into textual data. Snowball sampling was used based on the closeness and understanding of the villagers' relationship (i.e., the interviewees were asked to recommend trustworthy contacts to interview).

The questionnaire was written in Chinese, and minor adjustments were made to the text during a preliminary survey in August of 2020, taking into account interviews and villagers' habits of expression and understanding. For the adjusted questionnaire form, in doing the questionnaire survey we provided a short explanation in conjunction with poor reading comprehension of respondents, but did not disclose the content of questions that may bring the risk of influencing answers. We first obtained the letter of introduction from our research institute in response to inquiries from village administrators. Before formally conducting a survey, we identified ourselves and stated interview intention, in order to obtain the respondent's consent.

2.3. Questionnaire Design and Data Screening

2.3.1. Theoretical Assumptions

The TMT emerged from knowledge of ecosystem services, defined as how to maximize the value of ecosystem services and minimize negative impacts on acquiring natural resources [34]. The TMT slogan's content related to ecosystem services was incorporated into the questionnaire layout, and thus combined with the TPB. It is an enriching research approach to habitat conservation [7,10]. Combined with the TMT content, we constructed a new structural model based on the theory of planned behavior (TPB), which is a behavioral decision model proposed by Icek Ajzen, used to predict and understand human behavior [15]. In the theory, an individual's behavioral propensity is informed by perceived ability, personal attitudes (including beliefs and attitudes), and subjective norms [17,23,25].

Specifically, in terms of perceived ability, we asked respondents about their intuitive perceptions of local natural resource endowments, such as "Do you feel that the domestic water of your living environment has become cleaner?". Personal attitudes are enduring preconceived positions that individual makes towards a specific object [22]. The scale asks respondents about a number of components, requiring translation of the perception of ecosystem services into common expressions that are relevant to the respondent's life. Then respondents were asked to give a rating on a scale of 1–9 to characterize their attitudes toward local resource endowments of provisioning, regulating, and cultural services. The score references the analytic hierarchy process (AHP)'s 1–9 scale, because it supports obtaining the relative weights of the decision process [48]. Higher scores denoted more positive attitudes. We also measured social pressures from external factors, mainly from the influence of the surrounding environment, economic income, and TMT propaganda, such as impact of the beautiful countryside policy (it aimed at accelerating the green countryside development and building an ecological, civilized, and beautiful living environment through multiple approaches) [49]. We measured behavioral intention

as respondents' past conservation behaviors and their willingness to conserve in the future. Then we designed our model in two stages.

Firstly, behavioral intentions are influenced by either or both an individual's attitudes and subjective norms. Secondly, attitudes are influenced by external factors (refers to subjective norms). The following hypotheses were proposed:

Hypothesis 1 (H1): *Villagers' economic situation positively and significantly affects behavioral willingness to conserve the natural habitats.*

Hypothesis 2 (H2): *Villagers' economic situation positively and significantly affects attitudes toward ecosystem services.*

Hypothesis 3 (H3): *Villagers' perceived ability positively and significantly affects attitudes toward ecosystem services.*

Hypothesis 4 (H4): *Villagers' willingness to conserve nature is influenced by external factors.*

Hypothesis 5 (H5): *External factors affect villagers' attitudes toward ecosystem services.*

Hypothesis 6 (H6): *Villagers' attitudes toward ecosystem services affect their willingness to conserve nature.*

2.3.2. Measures

Each variable was measured in the construct using multiple question items, and each question was scored on a 5-point Likert scale, where a scoring scale of 1–9 was used for the behavioral attitudes variable (see Table 1). Five categories of variables were designed: personal economics, external factors, awareness of the two mountains theory, attitude towards ecosystem services, and willingness to conserve nature. We asked respondents to have a full understanding of question items before making a ticked selection. Measurement constructs are shown in Table 1.

Table 1. Measurement constructs.

Latent Variables	Description	Item	Mean	Std. Deviation
Personal Economics	Measures the extent to which respondents acquire their economic level of household living	E1: Approximate annual household income in 2019	4.11	2.04
		E2: The area of arable land that is the main source of household income in 2019	41.37	29.77
External factors	Measures the extent to which respondents' external environment affects their personal life	EF1: How does the government's beautiful countryside policy for villages affect or change your perception of the local natural environment?	3.05	1.42
		EF2: What are the thoughts and opinions of family and friends that would influence doing something beneficial or good for the local natural environment?	2.92	1.36
		EF3: Will the village environmental education activities conducted by the XTBG or public welfare organizations increase your knowledge of the natural environment or change your historical ideas or opinions?	3.09	1.42

Table 1. *Cont.*

Latent Variables	Description	Item	Mean	Std. Deviation
Awareness of the Two Mountains Theory	Measures the extent to which respondents understand connotations of the two mountain theory under its popularity in recent years	A1: In recent years, the level of greening in your living environment has become better	4.12	0.83
		A2: In recent years, the level of air quality in your living environment has become better	3.93	0.99
		A3: In recent years, the domestic water of your living environment has become cleaner	4.09	0.87
		A4: In recent years, the soil fertility of your living environment is getting better (e.g., the crops grown in the field are growing better)	3.42	1.09
Attitude towards ecosystem services	Measures the extent to which respondents confirm their attitudes toward common ecosystem services (supporting, provisioning, regulating, cultural services) by AHP's 1–9 scale scoring	AES1: Please rate the impact of reduced or no use of pesticides on the yield of vegetables, fruits, rubber and other agricultural products in recent years (refers to regulating services)	7.06	2.15
		AES2: Please rate how well the local environment has provided the basic conditions for various living resources such as water, timber or agricultural products grown in recent years (refers to provisioning services)	8.05	1.68
		AES3: In recent years, please rate the local environment for the development of recreational activities, farming, tourism, fruit picking, etc. (refers to cultural services)	7.97	1.79
		AES4: Please rate the capacity for passing on the culture of local villages to future generations in recent years: ethnic language, costumes, rituals, etc. (refers to cultural services)	8.01	1.99
		AES5: Please rate the ecological protection of public welfare forests or primary forests near local villages in recent years (refers to supporting services)	8.72	1.52
Willingness to conserve nature	Measures the extent to which respondents tell of conservation behaviors they have done in the past or their willingness to participate in conservation in the future	W1: Do you usually pay attention to saving water and electricity?	4.40	0.96
		W2: Are you usually or have you ever been restrained in your acquisition of wild edibles, fishing, and other wild usable species to avoid becoming less available?	3.67	1.44
		W3: The scenery around the village is beautiful and has its own ethnic characteristics that you will recommend to your friends for tourism	4.40	0.97

Note: XTBG (Xishuangbanna Tropical Botanical Garden).

2.4. Data Analysis

For quantitative data, we used the structural equation modeling analysis method recommended by Lee et al. [36]. Firstly, we performed factor analysis and validity testing on the measures (see detail in Table S2). Then a structural analysis constructed from the TPB was performed to measure the potential relationships between different variables [11,15,23].

To ascertain the goodness of fit of each model, we followed Bolen's [50] suggestion to examine multiple fit metrics. Key several statistics of goodness-of-fit for each model and their corresponding fit threshold criteria needed to be determined [36], including the chi-square test value of the overall model ($p < 0.05$), chi-square (CMIN, the main measure of model performance, compares the covariance matrix in the model with the covariance matrix of the observed data), the rate of chi-square to degrees-of-freedom (CMIN/DF, 1 < CMIN/DF < 3), and goodness-of-fit index (GFI, >0.9), comparative fit index (CFI, >0.9), adjusted goodness-of-fit index (AGFI, >0.9), and the root-mean-square error of approximation (RMSEA, <0.08 was adopted), the incremental fit index (IFI, >0.9). We used standardized coefficients to facilitate the interpretation of the relationship between variables, where the path coefficient β is to infer the impact path that exists between latent variables. They described a single response corresponding to a dependent variable when a given independent variable received a single increased standard deviation [51]. Currently, equation model analyses were all performed using AMOS v22.0 software. In addition, we obtained the results of demographic characteristics on the willingness to conserve nature by the ANOVA method.

For qualitative data, the main results were summarized or interpreted directly after semi-structured interviews were organized into textual data as an interview text transcript.

3. Results

3.1. Survey Demographic Characteristics Relating to Conserving Willingness

We obtained results on the percentages of willingness to conserve nature on education, age, and annual family income scales. The results show that the above three scales of villagers' characteristics all varied significantly with their willingness to conserve nature (Figure 2; for a detailed analysis see Table S3). For education, there was a significant difference between higher grades (senior high school) and lower grades (primary school). As shown in Figure 2, higher education levels are more likely to be associated with a greater willingness. On the age scale, there was a significant difference between older villagers (50–59 years old) and those under aged 40 years. Overall, senior villagers showed lower willingness to conserve nature. For annual family income, the ANOVA method showed that the results are not significant and do not differ significantly on the willingness result at different income levels.

3.2. Structural Models Examining the Key Constructs

We tested the significance of the overall model structure and inferred impact relationships between multiple variables. Modeling results showed that the chi-square *p*-value was 0.03, and thus the original model assumption was accepted. Overall, the model was highly significant ($\chi^2 = 139.59$, df = 110, *p*-value of path's highest significant up to 0.001) and had a chi-squared statistic of 1.16, meeting standard requirements. Additional analyses also showed that the model was well-fit to the data (Table 2).

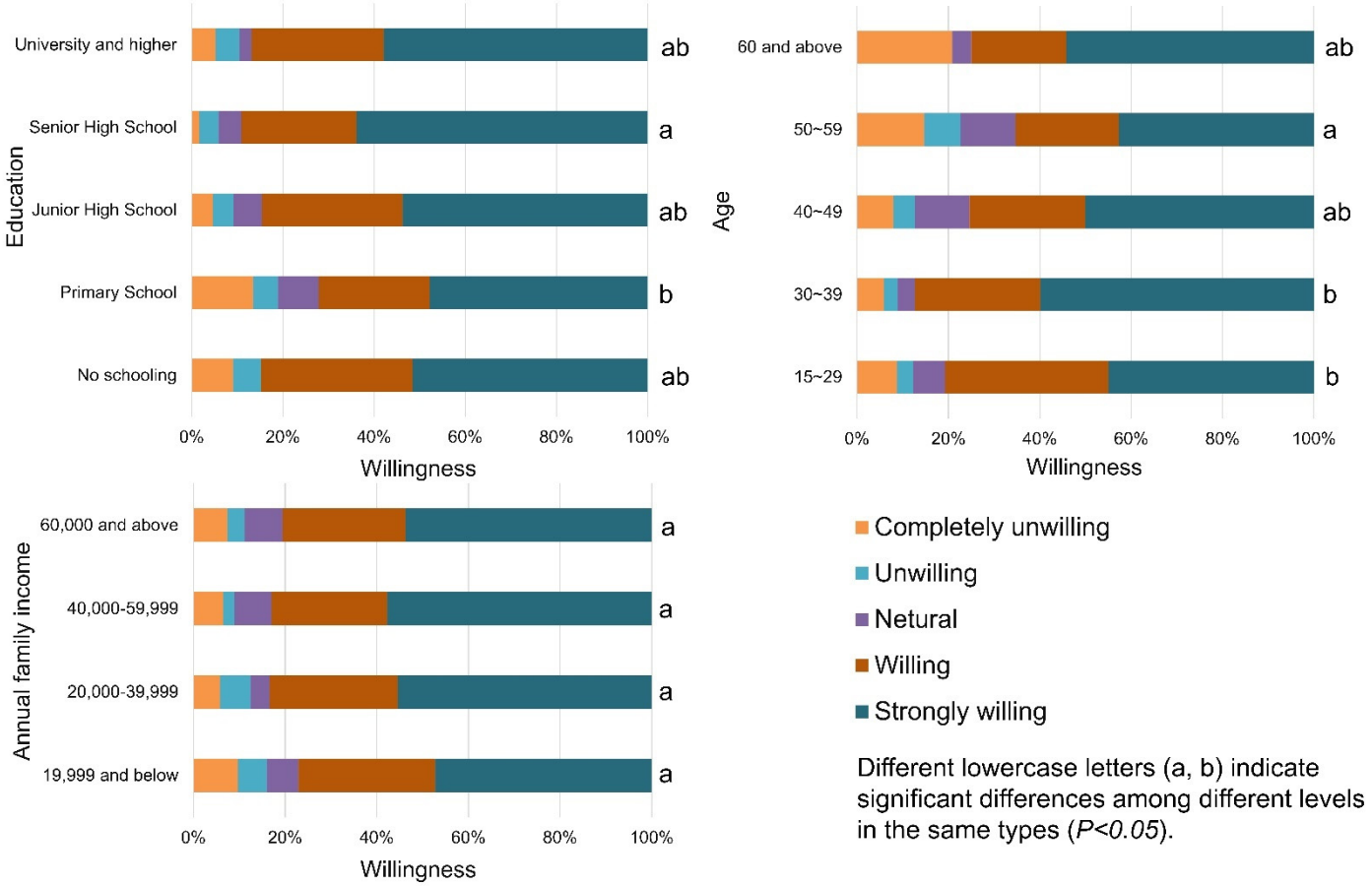

Figure 2. Distribution of willingness to conserve nature at different type levels.

Table 2. Structural model results and parameter estimates for the hypothesized model.

Model Fit Indices	χ^2	χ^2/df	GFI	IFI	CFI	AGFI	RMSEA	*p*-Value
	139.59	1.27	0.93	0.96	0.96	0.90	0.04	0.03
Standardized path estimates								
Paths				Standardized β		Standard error		*p*-value
External factors → Attitude				0.07		0.10		0.39
Personal Economics → Attitude				0.11		0.19		0.37
Awareness → Attitude				0.64		0.26		0.00 ***
Attitude → Willingness				0.37		0.04		0.00 **
External factors → Willingness				0.39		0.05		0.00 **
Personal Economics → Willingness				0.09		0.07		0.56

Note: Attitude (attitude towards ecosystem services), awareness (awareness of the two mountains theory), willingness (willingness to conserve nature); ** $p < 0.01$, *** $p < 0.001$.

Path analysis results showed that three of the six hypotheses were supported, namely, **H3**, **H4**, and **H6**. Specifically, the standard path coefficients between villagers' perceived ability and individual's attitudes, willingness and individual's attitude, and willingness and external factor were 0.64 ($p < 0.001$), 0.37 ($p < 0.01$), 0.39 ($p < 0.01$), respectively. This indicated that villagers' willingness to conserve nature was influenced by their perceived ability, while attitudes act as a mediator and play an indirect effect. Willingness to conserve nature was also positively and directly influenced by external factors, such as policy advocacy, others' opinions, or environmental education. However, villagers' economic factors did not have a direct effect on their attitudes toward ecosystem services or their

willingness to conserve nature. Individuals' attitudes were not significantly influenced by external factors.

3.3. Semi-Structured Interview in Background of Structural Model

3.3.1. Qualitative Perceptions of Acquiring Natural Resources

All interviewees (n = 7) indicated that they have obtained natural resources with economic value in public forests or rivers, particularly wild mushrooms, wild fish, ancient tree tea, and mountain spring water. Three interviewees said they had collected wild mushrooms previously, and one asserted, "I am the one who obtains the most mushrooms in the village . . . I sold them to get tens of thousands of yuan (i.e., above USD $1546) a year . . . ", and said, "mushrooms at seedling stage will not be picked, once picked next time there will be no more". However, two interviewees disagreed, and said, "I don't have such awareness [of not picking wild mushrooms at seedling stage] . . . I'm delighted to see [those wild mushrooms] and then pick them all."

In terms of catching wild fish, fishermen were informed of the government's prohibition and latest policy regarding the ban on fishing, and expressed more support but rarely achieved to meet all the fishing law's provisions. One interviewee recounted, "nearly every villager in the village has fishing nets . . . I also enjoyed net fishing." Another said, "we used to catch fish using fishing net . . . but now, we are not allowed to catch, because [river] has also made some protection, [fishing policy] is not as lenient as before . . . now [villagers] mostly shift to go bait-fishing." However, the government has not explicitly banned all net fishing, but using electric fishing machines and explosives is prohibited. A villager who lives near the river stated that he was not satisfied if there is a blanket ban [on fishing], adding "[we] rely on local natural environment for food and wealth, if government, or law does not allow us to fish we think it is a problem . . . like we fish every day to get a living . . . if you are not allowed to net fishing, and there is a big problem." However, he understands the scarcity of [wild fish] resources caused by overfishing, stating that "overfishing leads to a decrease in river fish, [such as catch fish by] net fishing, electrofishing . . . in the 80 s we also used dynamite to blow up the river fish, catch fish using electric fishing machines . . . now it's not allowed, [we use] net fishing and bait fishing."

3.3.2. Interviewees Opinions on Relationship between Conservation and Development

The conservation of ecological forests (refer to natural forests with strictly restricted use nearby villages) has special significance for local villages' well-being. When the existence of ecological forests can yield material benefits in return for villagers, there is a trade-off in interests between forest conservation and economic development.

In terms of conservation, six interviewees generally agreed that the overall conservation of ecological forest has not worsened. They also realize that ecological forest policy explicitly prohibits destructions and deforestation. As an interviewee pointed out, "no trees were cut down near our village [in ecological forest]. Large areas [of trees] have been preserved and no one has destroyed the forest." However, one interviewee thought that its conservation was worse, stating, "the conservation of ecological forest, it was worse. Because inside ecological forest, villagers planted with ancient tree tea . . . [ancient tree tea] was almost dug up by others . . . Now this [ecological forest] destruction is a bit serious . . . policy and the above [higher authorities] said those [ancient tea trees] are forbidden to be cut down or dig out [for transplanting]."

Regarding villagers' economic or direct provisioning services development, there is some favorable status quo. One interviewee stated, "there are more than 100 villagers who keep bees . . . I keep about 80 nests [per year] . . . and there exists annual [honey] income of 40,000 Yuan (about USD $6300)." He was supportive when the interviewer asked about growing the beekeeping business. Some interviewees earned several thousand per year by selling honey, but were troubled by the lack of market outlets. One interviewee asserted that, "[I] do not want to grow beekeeping business due to marketing problems particularly." In addition, mountain water potentially brings villagers increased income, which is another

direct provisioning service. Since the villagers' drinking water was sourced from a nearby ecological forest, they had great respect and beliefs in conservation. As one villager stated, "[there are] large trees aged hundreds of years, . . . we were born after [trees] existed . . . now [ecological forest] has been planned (in future it will produce mountain spring water), we can not destroy, if destroy village's tap water, it will not drip, now it's like we are protecting our water sources."

4. Discussion

4.1. Understanding the Willingness of Villagers and Its Drivers

Based on our model result, it was shown that the villagers' household income level did not contribute to their willingness to conserve nature (Figure 3 and Table S4). It implied that a higher income level did not necessarily raise the willingness to conserve nature. However, it should not be ignored that the rise in economic well-being potentially brings other factors that cause a positively common impact, thus benefiting the willingness to conserve nature [11,28]. Because the UN 2030 Agenda also emphasizes the synergies between achieving various SDGs, containing SDGs 4, 8, 14, and 15, it implies that an individual's economic development and environment are closely linked [8,9]. Willingness to conserve nature differed significantly among education and age (Figure 2). The results illustrated that younger people (under 39 years old) with higher education have a greater willingness to engage in conservation. The higher age groups, especially between 50–59-year-olds, were weaker in indicating their willingness. This group is probably more adamant when it comes to interest considerations (e.g., the cultivation of rubber plantations). Concerning education, what may be more relevant to the supplementing of culture in rural communities is environmental education intervention, science outreach guidance, and students' outdoor nature experience [26,43,52].

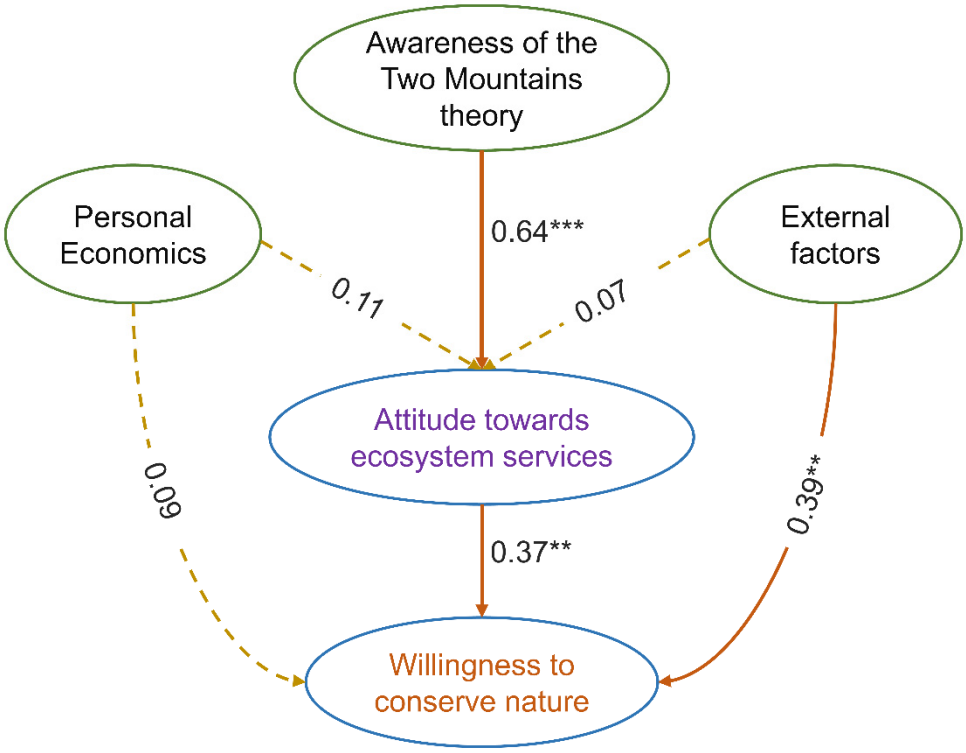

Figure 3. Structural model for complete willingness to conserve nature. The solid line indicates results that the hypotheses were verified, while the dashed line shows they were not verified. Note: ** $p < 0.01$, *** $p < 0.001$.

In addition, path analysis verified that both external factors (the government's beautiful countryside policy, communication from others, and environmental education from outside the villages) and the individual's perceived ability significantly influenced their willingness to engage in conservation behavior (Figure 3). Individual perceptions finally influence behavioral willingness with attitudes toward ecosystem services serving as an intermediary. These findings conform with the TPB framework [10]. Other studies also confirmed that local villagers are generally able to perceive most of the easily detectable ecosystem services in their lives [30]. Their perceived ability and knowledge composition can influence attitudes and willingness to engage in conservation behavior [11,17,27].

Firstly, significant impact on external factors exists from the effect of the two mountains perception advocacy and environmental education in the local rural community [26,33,52]. In the past few decades, rubber in Xishuangbanna brought high economic returns and rubber expanded wildly under the policies [38]. The large primary vegetation replacement and land use and cover conversion became the main factor of local species' habitat threats [3,53–55]. Conversely, biodiversity and habitat conservation policies and their advocacy are increasing. Over the past fifteen years, the two mountains perception, "lucid waters and lush mountains are invaluable assets" has been continuously strengthened alongside the construction of China's ecological civilization [33]. This was verified in our study: 80.10% of respondents said they had heard and had an understanding of the basic meaning of that slogan. The villagers' living experience tells us that the overexploitation of native habitats or the extensive rubber monoculture pollutes their domestic water sources and often cut off domestic water during dry periods [3]. The local botanical garden serves as a base for biodiversity conservation and science tourism, and also raises awareness of environmental issues through its attention to connecting with village communities, such as the Integrative Conservation for Zero Extinction plan, and its outreach to communities or local schools with environmental education programs [56]. The accumulation of knowledge from the botanical garden's mild outreach programs may have facilitated the development of conservation willingness.

Secondly, the significant effect on the individual's perceived ability and its attitude derives from the contribution of traditional cultural beliefs in the local rural community and change in the individual's conservation awareness [6,12]. The cultural forest near the local village is an area of villagers' traditional beliefs and also a well-preserved species habitat because of the cultural norms (e.g., elders' teaching and local religious beliefs) that promote sustainable management in Xishuangbanna [42,57]. In addition, the villagers voluntarily planted rubber in the early years, and later it became the main source of villagers' livelihood. The historical process of rubber monoculture may have increased their concern about the decline or extinction of wild edible plants in natural habitats, and thus a stronger reflection in behavioral willingness to conserve nature. For local villagers, loss in accessing wild edible plants means a reduced alternative source of their livelihood or recreation [38,58,59]. It is not negligible that there is also the phenomenon of overacquisition and illegal catching of wild animals in natural habitats [25,38]. In addition, under the expansion of the market economy, the new generation living away from home in schools or working in cities may forget their valuable traditional culture and indigenous knowledge related to natural habitat conservation inherited from the village [6]. These results call for local government and its stakeholders to adopt practical habitat conservation strategies that take greater account of the need of local villagers whose positive perceptions are reflected in the benefits of recreation and wild edible resource acquisition. It is also a process of continuous improvement of provisioning services and cultural services with the joint participation of local people.

4.2. Resolving the Relationship between Conservation and Economic Development

The natural forest habitat discussed in this study includes nationalized forests and community forests, referred to as "ecological forests". These are defined by China's ecological redline policy, with the exception of community forests, where most of the forest

rights are owned by village committees. Community forests have extremely low protected levels, and only explicitly prohibit logging, but other hidden behaviors are currently impossible to enforce [6,45,46]. Interviews revealed that ecological forests were not subject to logging by villagers, and most ecological impacts of local people involved exploitation of wild edible or ornamental plants and hunting of wild game for extra livelihoods and recreational pastimes [12,42]. However, forest wildlife resources and river fish stocks have been confirmed to be declining rapidly [58].

One reason for the decrease in fish stock may be attributed to uncontrolled fishing behavior in the past few decades, although there were laws prohibiting extreme fishing behavior. However, a blanket prohibition of fishing by administrative authorities was not well-received by the villagers, and, moreover, villagers regarded those conservation behaviors as welfare or public duty, which was considered to be the responsibility of public authorities [43]. Villagers regarded the collection of wild edible or ornamental plants as a form of recreation and incorporated fishing or netting and other mild fish-catching into their leisure time [58,59].

Revitalizing the countryside is the SDGs issue that seeks ecological development paths to improve the living standards of villagers by utilizing local natural resource endowments [33,60]. Hence, reconciling conservation and economic development is an urgent matter that needs to be addressed. Three suggestions we proposed are listed below.

First, we suggest strengthening the external influences, focusing on public environmental education and the advocacy of ecological knowledge for local people (refers to villagers, government, and stakeholders). The SEM result showed that external factors, such as policy advocacy, environmental education, and the influence of other people's perceptions had a significant impact on willingness to conserve nature, with a path coefficient of 0.39. A significant impact relationship was shown between villagers' awareness of policy knowledge and their attitudes toward ecosystem services, reaching a coefficient of 0.64. Hence, the results supported the strengthening of opportunities for villagers' engagement in nature conservation through the role of external influences, especially public environmental education. It should be a conscious effort to increase ecological knowledge about ecosystem services among local people and to increase their understanding of the local natural services [61]. There is also the need to integrate environmental education and scientific popularization into rural community [26,52].

Second, we suggest enriching and acknowledging villagers' cultural values of nature and their pleasure-seeking activities in the ecological forests or rivers, and to cultivate good traditions of sustainably acquiring resources. Acquiring forest edible resources or wild fish from rivers, besides being an extra livelihood, is an important component of the recreational culture in their lives [12,58,59]. It has been suggested that by leading government coordination and engagement, livelihood, recreation, and leisure activities such as beekeeping, wild mushroom, and edible vegetable exploitation need to be advocated and increased, in an effort to strengthen the ecosystem service provisioning and regulating processes of the habitat [33,47].

Third, we suggest strengthening the management mechanism of ecological forests and local rivers, and conducting regular monitoring and law advocacy. Villagers' material interests in the forest, such as collecting wild mushrooms, wild orchids, ancient tea, and often fishing in the rivers, cannot be completely prohibited, but rather encouraged, and need to be supervised and their ecological impacts minimized by continuously and intentionally advocating knowledge of species' conservation and laws [52,56]. As possible, ecological forests could be set up with mechanisms to detect and apprehend illegal resource extraction, as well as villager monitoring and whistle-blowing [38]. Periodic river fishing closures are needed for stock recovery and conservation, and tools that allow the capture of large numbers of fish should be strictly prohibited [62].

4.3. Strengths and Limitations

Our study identified the basic characteristics of local villagers' willingness to engage in conservation behavior and inherent impact pathways. It is valuable in terms of the policy on social perceptions or suggestions for a stronger rural community management [11,52]. In addition, its novelty is the questionnaire discussion of local villagers' willingness to engage in conservation behavior through the core components of the policy-based two mountains theory and ecosystem services. The adaptability component is reflected in the inherent linkage of ecosystem services to biodiversity and their extreme relevance to local rural villagers' lives.

However, our study had two limitations. Firstly, our results illustrated the relationship between external factors and positive results of individual perceptions on willingness. Thus, careful consideration is necessary for future conservation efforts. What is uncertain, however, is what was dominant among the external factors including influences from family, friends, and others from the villages they communicate with. Thus, we were only able to confirm that ideologies from others can influence individuals' willingness to engage in conservation behavior [11,23]. We illustrated that the communication of the two mountains theory slogan and its connotation is effective on local villagers' social perceptions, and we consider it as one of the influential components of external factors. But due to the limited study area, outreach and the exploration of those potential influence paths may require great caution. Secondly, the questionnaire and interview approaches have their limitations, and we only consider a few categories of major local influences, and model them in conjunction with the TPB. We may have overlooked other factors in our modeling and complex theoretical connections in reality [10,22,27].

5. Conclusions

By combining the policy-based two mountains theory, questionnaire contents relating to ecosystem services, and the theory of planned behavior model, we conducted an interview and survey-based assessment of the local villagers' willingness to engage in conservation behavior in rural town, in Xishuangbanna tropical area of China. The results indicated that villagers had a basic understanding of the two mountains perceptions and tended to possess their willingness, due to the slogan advocacy with nature conservation perceptions over the past fifteen years, as well as the impact of village traditional culture. Based on the analysis, demographic characteristics including education and age differed significantly in their expression of willingness to engage in conservation behaviors, respectively. The willingness was directly influenced by external factors and indirectly influenced by individuals' perceived abilities through attitudes toward ecosystem services.

The behind and influence paths of villagers' willingness should be considered as a basic reference for government policy and community management establishment on local social perceptions. Despite the fact that the driving factors impacting paths differ, we confirmed that external factors such as education and advocacy had an impact on individuals' knowledge components and further influenced their willingness to conserve nature. These factors can be taken into account in local community management and SDGs. We enhanced this understanding by complementing surveys with interviews. Hence, we emphasized the importance of environmental education and science advocacy being locally incorporated into rural communities to improve the accumulation of conservation knowledge. However, natural habitats including ecological forests and rivers also have a need for priority conservation, especially feedback on biodiversity and ecosystem service functions. The future natural habitat conservation and management should fully consider exploring the influential role of villagers' social perceptions, especially the impact of environmental education and science advocacy on humans, as well as their changes.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su14095505/s1, Table S1: Demographics of respondents (N = 211); Table S2: Reliability and validity tests of constructs; Table S3: Multiple comparisons of ANOVA on willingness to conserve across age, income, and education scales; Table S4: Semi-structured interview contents. Reference [63] is cited in the Supplementary Materials.

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References

1. Hall, L.S.; Krausman, P.R.; Morrison, M.L. The habitat concept and a plea for standard terminology. *Wildl. Soc. Bull.* **1997**, *25*, 173–182.
2. Dallimer, M.; Jacobsen, J.B.; Lundhede, T.H.; Takkis, K.; Giergiczny, M.; Thorsen, B.J. Patriotic Values for Public Goods: Transnational Trade-Offs for Biodiversity and Ecosystem Services? *BioScience* **2015**, *65*, 33–42. [CrossRef]
3. Krauss, J.; Bommarco, R.; Guardiola, M.; Heikkinen, R.K.; Helm, A.; Kuussaari, M.; Lindborg, R.; Öckinger, E.; Pärtel, M.; Pino, J.; et al. Habitat fragmentation causes immediate and time-delayed biodiversity loss at different trophic levels. *Ecol. Lett.* **2010**, *13*, 597–605. [CrossRef]
4. Haddad, N.M.; Brudvig, L.A.; Clobert, J.; Davies, K.F.; Gonzalez, A.; Holt, R.D.; Lovejoy, T.E.; Sexton, J.O.; Austin, M.P.; Collins, C.D.; et al. Habitat fragmentation and its lasting impact on Earth's ecosystems. *Sci. Adv.* **2015**, *1*, e1500052. [CrossRef]
5. Oltremari, J.V.; Jackson, R.G. Conflicts, perceptions, and expectations of indigenous communities associated with natural areas in Chile. *Nat. Areas J.* **2006**, *26*, 215–220. [CrossRef]
6. Xu, J.; Melick, D.R. Rethinking the Effectiveness of Public Protected Areas in Southwestern China. *Conserv. Biol.* **2007**, *21*, 318–328. [CrossRef]
7. Xu, W.; Xiao, Y.; Zhang, J.; Yang, W.; Zhang, L.; Hull, V.; Wang, Z.; Zheng, H.; Liu, J.; Polasky, S. Strengthening protected areas for biodiversity and ecosystem services in China. *Proc. Natl. Acad. Sci. USA* **2017**, *114*, 1601–1606. [CrossRef]
8. Zheng, X.; Wang, R.; Hoekstra, A.Y.; Krol, M.S.; Zhang, Y.; Guo, K.; Sanwal, M.; Sun, Z.; Zhu, J.; Zhang, J.; et al. Consideration of culture is vital if we are to achieve the Sustainable Development Goals. *One Earth* **2021**, *4*, 307–319. [CrossRef]
9. Bendixen, M.; Iversen, L.L.; Best, J.; Franks, D.M.; Hackney, C.R.; Latrubesse, E.M.; Tusting, L.S. Sand, gravel, and UN Sustainable Development Goals: Conflicts, synergies, and pathways forward. *One Earth* **2021**, *4*, 1095–1111. [CrossRef]
10. Lima, F.P.; Bastos, R.P. Understanding landowners' intention to restore native areas: The role of ecosystem services. *Ecosyst. Serv.* **2020**, *44*, 101121. [CrossRef]
11. Wang, Z.; Mao, X.; Zeng, W.; Xie, Y.; Ma, B. Exploring the influencing paths of natives' conservation behavior and policy incentives in protected areas: Evidence from China. *Sci. Total Environ.* **2020**, *744*, 140728. [CrossRef]
12. Chang, C.H.; Barnes, M.L.; Frye, M.; Zhang, M.; Quan, R.-C.; Reisman, L.M.G.; Levin, S.A.; Wilcove, D.S. The pleasure of pursuit: Recreational hunters in rural Southwest China exhibit low exit rates in response to declining catch. *Ecol. Soc. A J. Integr. Sci. Resil. Sustain.* **2017**, *22*, 43. [CrossRef]
13. Schermerhorn, J.R.; Hunt, J.G.; Osborn, R.N.; Uhl-Bien, M. *Organizational Behaviour*; Langara College: Vancouver, BC, USA, 2006.
14. Wauters, E.; Mathijs, E. An investigation into the socio-psychological determinants of farmers' conservation decisions: Method and implications for policy, extension and research. *J. Agric. Educ. Ext.* **2013**, *19*, 53–72. [CrossRef]
15. Ajzen, I. The theory of planned behavior. *Organ. Behav. Hum. Decis. Proc.* **1991**, *50*, 179–211. [CrossRef]
16. Fishbein, M.; Ajzen, I. *Predicting and Changing Behavior: The Reasoned Action Approach*; Taylor & Francis: Abingdon, UK, 2011.
17. Coon, J.J.; van Riper, C.J.; Morton, L.W.; Miller, J.R. What drives private landowner decisions? Exploring non-native grass management in the eastern Great Plains. *J. Environ. Manag.* **2020**, *276*, 111355. [CrossRef]

18. Meijer, S.S.; Catacutan, D.; Ajayi, O.C.; Sileshi, G.W.; Nieuwenhuis, M. The role of knowledge, attitudes and perceptions in the uptake of agricultural and agroforestry innovations among smallholder farmers in sub-Saharan Africa. *Int. J. Agric. Sustain.* **2015**, *13*, 40–54. [CrossRef]
19. Sakurai, R.; Ota, T.; Uehara, T. Sense of place and attitudes towards future generations for conservation of coastal areas in the Satoumi of Japan. *Biol. Conserv.* **2017**, *209*, 332–340. [CrossRef]
20. Boardman, J.; Poesen, J.; Evans, R. Socio-economic factors in soil erosion and conservation. *Environ. Sci. Policy* **2003**, *6*, 1–6. [CrossRef]
21. Brooks, J.S. Economic and Social Dimensions of Environmental Behavior: Balancing Conservation and Development in Bhutan. *Conserv. Biol.* **2010**, *24*, 1499–1509. [CrossRef]
22. Abdullah, S.I.N.W.; Samdin, Z.; Ho, J.A.; Ng, S.I. Sustainability of marine parks: Is knowledge–attitude–behaviour still relevant? *Environ. Dev. Sustain.* **2020**, *22*, 7357–7384. [CrossRef]
23. Gkargkavouzi, A.; Halkos, G.; Matsiori, S. How do motives and knowledge relate to intention to perform environmental behavior? Assessing the mediating role of constraints. *Ecol. Econ.* **2019**, *165*, 106394. [CrossRef]
24. Castilho, L.C.; De Vleeschouwer, K.M.; Milner-Gulland, E.J.; Schiavetti, A. Attitudes and behaviors of rural residents toward different motivations for hunting and deforestation in protected areas of the Northeastern Atlantic Forest, Brazil. *Trop. Conserv. Sci.* **2018**, *11*, 1940082917753507. [CrossRef]
25. Chang, C.H.; Williams, S.J.; Zhang, M.; Levin, S.A.; Wilcove, D.S.; Quan, R.C. Perceived entertainment and recreational value motivate illegal hunting in Southwest China. *Biol. Conserv.* **2019**, *234*, 100–106. [CrossRef]
26. Zhang, W.; Goodale, E.; Chen, J. How contact with nature affects children's biophilia, biophobia and conservation attitude in China. *Biol. Conserv.* **2014**, *177*, 109–116. [CrossRef]
27. Maleksaeidi, H.; Keshavarz, M. What influences farmers' intentions to conserve on-farm biodiversity? An application of the theory of planned behavior in fars province, Iran. *Glob. Ecol. Conserv.* **2019**, *20*, e00698. [CrossRef]
28. Gouwakinnou, G.N.; Biaou, S.; Vodouhe, F.G.; Tovihessi, M.S.; Awessou, B.K.; Biaou, H.S.S. Local perceptions and factors determining ecosystem services identification around two forest reserves in Northern Benin. *J. Ethnobiol. Ethnomed.* **2019**, *15*, 61. [CrossRef]
29. Liu, P.; Li, W.; Yu, Y.; Tang, R.; Guo, X.; Wang, B.; Yang, B.; Zhang, L. How much will cash forest encroachment in rainforests cost? A case from valuation to payment for ecosystem services in China. *Ecosyst. Serv.* **2019**, *38*, 100949. [CrossRef]
30. Caballero-Serrano, V.; Alday, J.G.; Amigo, J.; Caballero, D.; Carrasco, J.C.; McLaren, B.; Onaindia, M. Social Perceptions of Biodiversity and Ecosystem Services in the Ecuadorian Amazon. *Hum. Ecol.* **2017**, *45*, 475–486. [CrossRef]
31. Xu, J.; Chen, L.; Lu, Y.; Fu, B. Local people's perceptions as decision support for protected area management in Wolong Biosphere Reserve, China. *J. Environ. Manag.* **2006**, *78*, 362–372. [CrossRef]
32. Marzano, M.; Dandy, N. Recreationist behaviour in forests and the disturbance of wildlife. *Biodivers. Conserv.* **2012**, *21*, 2967–2986. [CrossRef]
33. Dong, Z.; Zhang, Z.; Du, Y.; He, L.; Ge, C. Practice Mode and Path of "Lucid Waters and Lush Mountains are Invaluable Assets". *Chin. J. Environ. Manag.* **2020**, *12*, 11–17.
34. Pan, X.C. The Theoretical Innovation and Practical Significance of The Theory about "Two Mountains" by Xi Jinping. *IOP Conf. Ser. Earth Environ. Sci.* **2018**, *199*, 022047.
35. Costanza, R. Valuing natural capital and ecosystem services toward the goals of efficiency, fairness, and sustainability. *Ecosyst. Serv.* **2020**, *43*, 101096. [CrossRef]
36. Lee, C.S.; Ma, L. News sharing in social media: The effect of gratifications and prior experience. *Comput. Hum. Behav.* **2012**, *28*, 331–339. [CrossRef]
37. De Bruyn, M.; Stelbrink, B.; Morley, R.J.; Hall, R.; Carvalho, G.R.; Cannon, C.H.; van den Bergh, G.; Meijaard, E.; Metcalfe, I.; Boitani, L. Borneo and Indochina are major evolutionary hotspots for Southeast Asian biodiversity. *Syst. Biol.* **2014**, *63*, 879–901. [CrossRef]
38. Huang, Z.; Bai, Y.; Alatalo, J.M.; Yang, Z. Mapping biodiversity conservation priorities for protected areas: A case study in Xishuangbanna Tropical Area, China. *Biol. Conserv.* **2020**, *249*, 108741. [CrossRef]
39. Wang, J.; Xu, J.; Pei, S. Study on indigenous knowledge system for management of ecosystem diversity in mengsong Hani Community, Xishuangbanna. *Chin. J. Ecol.* **2000**, *19*, 36–41.
40. Xu, Z. Conservation of biodiversity and cultural diversity are two sides of a coin: Xishuangbanna Dai's ecological culture as an example. *Biodivers. Sci.* **2015**, *23*, 126–130. [CrossRef]
41. Sturgeon, J.C. Governing minorities and development in Xishuangbanna, China: Akha and Dai rubber farmers as entrepreneurs. *Geoforum* **2010**, *41*, 318–328. [CrossRef]
42. Zhang, J.Q.; Mammides, C.; Corlett, R.T. Reasons for the Survival of Tropical Forest Fragments in Xishuangbanna, Southwest China. *Forests* **2020**, *11*, 159. [CrossRef]
43. Liu, G.; Chen, J. Local Dai people's attitude towards biodiversity conservation in Xishuangbanna. *J. Yunnan Univ.* **2012**, *34*, 141–148.
44. Zhu, H.; Cao, M.; Hu, H. Geological History, Flora, and Vegetation of Xishuangbanna, southern Yunnan, China. *Biotropica* **2006**, *38*, 310–317. [CrossRef]

45. Bai, Y.; Jiang, B.; Wang, M.; Li, H.; Alatalo, J.M.; Huang, S. New ecological redline policy (ERP) to secure ecosystem services in China. *Land Use Policy* **2016**, *55*, 348–351. [CrossRef]
46. Bai, Y.; Fang, Z.; Hughes, A.C. Ecological redlines provide a mechanism to maximize conservation gains in Mainland Southeast Asia. *One Earth* **2021**, *4*, 1491–1504. [CrossRef]
47. Xu, J.; Ma, E.T.; Tashi, D.; Fu, Y.; Lu, Z.; Melick, D. Integrating sacred knowledge for conservation: Cultures and landscapes in southwest China. *Ecol. Soc.* **2005**, *10*, 1–25. [CrossRef]
48. Koschke, L.; Fürst, C.; Frank, S.; Makeschin, F. A multi-criteria approach for an integrated land-cover-based assessment of ecosystem services provision to support landscape planning. *Ecol. Indic.* **2012**, *21*, 54–66. [CrossRef]
49. Bai, B.; Chen, F.; Zhou, G. Functions of village classification based on POI data and social practice in rural revitalization. *Arab. J. Geosci.* **2021**, *14*, 1690. [CrossRef]
50. Bollen, K.A. Measurement models: The relation between latent and observed variables. In *Structural Equations with Latent Variables*; John Wiley & Sons: Hoboken, NJ, USA, 1989; pp. 179–225.
51. Su, S.; Zhang, Q.; Pi, J.; Wan, C.; Weng, M. Public health in linkage to land use: Theoretical framework, empirical evidence, and critical implications for reconnecting health promotion to land use policy. *Land Use Policy* **2016**, *57*, 605–618. [CrossRef]
52. Chen, C.; Quan, R.C.; Cao, G.; Yang, H.; Burton, A.C.; Meitner, M.; Brodie, J.F. Effects of law enforcement and community outreach on mammal diversity in a biodiversity hotspot. *Conserv. Biol.* **2019**, *33*, 612–622. [CrossRef]
53. Yang, Y.; Nan, Y.; Liu, Z.; Zhang, D.; Sun, Y. Direct and indirect losses of natural habitat caused by future urban expansion in the transnational area of Changbai Mountain. *Sustain. Cities Soc.* **2020**, *63*, 102487. [CrossRef]
54. Zhang, M.; Chang, C.; Quan, R. Natural forest at landscape scale is most important for bird conservation in rubber plantation. *Biol. Conserv.* **2017**, *210*, 243–252. [CrossRef]
55. Cardinale, B.J.; Duffy, J.E.; Gonzalez, A.; Hooper, D.U.; Perrings, C.; Venail, P.; Narwani, A.; Mace, G.M.; Tilman, D.; Wardle, D.A.; et al. Biodiversity loss and its impact on humanity. *Nature* **2012**, *486*, 59–67. [CrossRef]
56. Liu, Q.; Chen, J.; Corlett, R.T.; Fan, X.; Yu, D.; Yang, H.; Gao, J. Orchid conservation in the biodiversity hotspot of southwestern China. *Conserv. Biol.* **2015**, *29*, 1563–1572. [CrossRef]
57. Gao, H.; Ouyang, Z.; Chen, S.; van Koppen, C.S.A. Role of culturally protected forests in biodiversity conservation in Southeast China. *Biodivers. Conserv.* **2013**, *22*, 531–544. [CrossRef]
58. McLellan, T.; Brown, M. Mushrooms and Cash Crops Can Coexist in Mountain Livelihoods: Wild Mushrooms as Economic and Recreational Resources in the Greater Mekong. *Mt. Res. Dev.* **2017**, *37*, 108–120. [CrossRef]
59. Ghorbani, A.; Langenberger, G.; Sauerborn, J. A comparison of the wild food plant use knowledge of ethnic minorities in Naban River Watershed National Nature Reserve, Yunnan, SW China. *J. Ethnobiol. Ethnomed.* **2012**, *8*, 17. [CrossRef]
60. Yi, Z.F.; Cannon, C.H.; Chen, J.; Ye, C.X.; Swetnam, R.D. Developing indicators of economic value and biodiversity loss for rubber plantations in Xishuangbanna, southwest China: A case study from Menglun township. *Ecol. Indic.* **2014**, *36*, 788–797. [CrossRef]
61. Torkar, G.; Krašovec, U. Students' attitudes toward forest ecosystem services, knowledge about ecology, and direct experience with forests. *Ecosyst. Serv.* **2019**, *37*, 100916. [CrossRef]
62. Koning, A.A.; Perales, K.M.; Fluet-Chouinard, E.; McIntyre, P.B. A network of grassroots reserves protects tropical river fish diversity. *Nature* **2020**, *588*, 631–635. [CrossRef]
63. Sijtsma, K. On the Use, the Misuse, and the Very Limited Usefulness of Cronbach's Alpha. *Psychometrika* **2008**, *74*, 107. [CrossRef]