International Journal of Geo-Information

MDPI

*Article*

# Measuring Villagers' Perceptions of Changes in the Landscape Values of Traditional Villages

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**Abstract:** This study aims to analyze the perceptions and driving factors behind villagers' changing perceptions of landscape values in the context of drastic landscape changes in traditional Chinese villages. Empirical evidence emphasizes the interplay between local residents' values and the local policy framework. This study establishes a method to capture the landscape values and preferences of rural community residents by combining participatory mapping with questionnaire interviews. We identified the evaluation of changing landscape values by rural residents and extracted four categories of rural development orientations, namely, economic benefits, emotional culture, public participation, and environmental protection. Furthermore, we delved into the significant heterogeneity in landscape value changes among different social groups. This study highlights the role of villagers' value judgments in guiding the scientific formulation of traditional village conservation and development policies and promoting the socially sustainable development planning of traditional villages. The research contributes to a more comprehensive understanding of the rural community's needs and preferences for the local landscape as well as the convergence and divergence between these needs and the government-led rural development trajectory.

**Keywords:** traditional villages; rural landscape values; PPGIS; villagers' perceptions



**Citation:** Li, M.; Yan, Y.; Ying, Z.; Zhou, L. Measuring Villagers' Perceptions of Changes in the Landscape Values of Traditional Villages. *ISPRS Int. J. Geo-Inf.* **2024**, *13*, 60. https://doi.org/10.3390/ijgi13020060

Academic Editors: Wolfgang Kainz and Fazlay S. Faruque

Received: 9 January 2024
Revised: 12 February 2024
Accepted: 16 February 2024
Published: 18 February 2024



## 1. Introduction

The technocratic and exclusionary model of environmental management in China has substantially constrained public participation [1,2]. Villagers' core needs and local knowledge are often overlooked [3]. This regime has contributed to China's rapid urbanization and modernization, while simultaneously inflicting severe impacts on the cultural landscapes of traditional villages, posing grave challenges to the sustainability of their cultural heritage [4–8]. Despite the national emphasis on the selection and protection of traditional villages since 2012, demonstrating a commitment to cultural heritage and legal backing, local governments, in practice, continue to promote rural tourism as a tool for development and poverty alleviation, neglecting the trends of marginalization and commercialization of villages in the wave of urbanization [9–11]. In this context, scholars have emphasized the importance of understanding and identifying landscape values [12]. The current transformation in rural areas is predominantly characterized by fundamental reorganizations of demographics, employment, economy, social strata, and landscape [13]. Rural space is becoming increasingly multifunctional, which requires a spatial approach to integrate the natural features of the landscape with the socio-economic and cultural factors that drive its changes [14]. It has become an international consensus that policies targeting rural areas must take into full account the social, economic, and cultural aspects of rural life [15]. Moreover, as an expression of culture [16], the narrative capacity of landscapes enhances local identity and cultural value [17]. Hence, local residents' understanding and valuation of local landscapes should be regarded as essential benchmarks for managing

and protecting these landscapes. This encompasses not only the recreational value of the landscape but also a comprehensive consideration of more elusive aspects such as spiritual fulfillment, educational significance, and aesthetic value [18].

In recent years, the Chinese government has persistently highlighted the necessity for provinces to enhance the legal framework protecting traditional villages. It is pivotal to secure the discourse and participation rights of native villagers to ensure the continuation of vibrant rural cultures. In 2019, propelled by the Rural Revitalization Strategy, the General Office of the State Council disseminated "Guiding Opinions on Strengthening and Improving Rural Governance". The document advocated for reinforcing cultural leadership in rural locales and tailored cultural activities extensively, necessitating that local plans align with the residents' values and demands. This signifies a growing nexus between the policy-level development of traditional villages and public awareness. However, the quest for effective public engagement in any nation or society encounters multifaceted hurdles. In China, public engagement is predominantly a localized practice, and its theoretical exploration remains profoundly scarce. The notion of public participation is somewhat nebulous and lacks scientific precision among the masses and some policymakers. This manifests in traditional village surveys that are superficial and do not inform participatory planning proposals effectively, suggesting that governmental bodies may not be adequately responsive to grassroots initiatives, leading to skepticism about the validity of local knowledge and the efficacy of public engagement techniques. Thus, a scientific approach that can authentically and profoundly apprehend residents' perspectives and thoroughly dissect the formation mechanisms of these opinions is urgently needed.

Accordingly, the primary objective of this study is to delve into the perception of landscape values by rural community members amidst the development and construction of traditional Chinese villages. Given the criticality of spatial information in identifying the priorities, conceptions, and preferences of locals [19], we employ Public Participation Geographic Information Systems (PPGIS) as a supplementary research tool. This approach is intended to transcend the constraints of traditional GIS, yielding more detailed data that correlates villagers' perceptions with the tangible space, analyzing their subjective perspectives. Furthermore, this study applies regression analysis to discern the variability in landscape value assessments among different social demographic groups, thus revealing the individual's role and impact within village development. The research aims not just to gather villagers' cognitive evaluations of landscape values but also to examine the formation mechanisms of these evaluations, providing methods and quantifiable findings that offer substantial references for the participatory planning and design of rural landscapes. It also aims to bridge the research gap concerning the convergence and divergence between the development value orientation of traditional village residents and the government-directed development trajectory under the public participation research framework [20]. The results of this study are intended to provide references for policymakers in devising strategies for protection and development, advancing traditional villages toward sustainable social development.

## 2. Literature Review

### *2.1. Evolution of the Connotation of Rural Landscape Value*

Unlike urban or suburban landscapes, rural landscapes are often perceived as spaces enveloped by nature and vernacular architecture, characterized by natural settings, agricultural activities, settlement patterns, and traditional lifestyles [21]. The study of rural landscapes originated in the West post-World War II [22], with a focus on ecologically related fields such as sustainable landscapes [23–25] and biodiversity [26–29], while also attending to cultural heritage [30], landscape assessment [31,32], and the exploration of values in landscape change [33,34]. In recent years, rural landscapes have been playing an increasingly important role in various fields such as tourism, cultural heritage, and ecology [35]. Research commonly finds that urbanization, accessibility, and other factors influence the changing values of landscapes [36], with rural landscapes being influenced

by both natural environments and human management activities [37]. The appreciation basis of rural landscapes is shifting from traditional cultivation and productivity capacities toward aesthetics, environmental, and heritage qualities [38,39]. Over time, studies on landscape value have gradually transitioned from geological and ecological aspects to generating knowledge and innovative technologies for decision-making processes [40].

In 2017, the 19th International Council on Monuments and Sites (ICOMOS) conference in New Delhi adopted the "Guidelines for Rural Landscapes as Heritage". These guidelines underscore the profound cultural significance of all rural areas as part of the landscape [41,42], marking an international consensus on the importance of rural landscape values. This has changed perceptions and values toward rural landscapes [43] and, as this reperception deepens, the integration of rural landscape values with modern societal living becomes increasingly pronounced. Landscape value constitutes a subjective interpretation of landscapes based on individuals' interactions with the environment [44], crucial for aesthetic preferences, a sense of well-being, a characteristic assessment, travel motivations, planning, and regional development [45].

In recent years, with rapid urbanization and rural revitalization strategies in China, rural landscapes have been undergoing profound transformations [6,46,47]. However, in the study of rural landscape values in China, scholars tend to focus more on built heritage while overlooking the value of everyday landscapes, especially the significance of their tangible and intangible characteristics [48].

### *2.2. The Significance of Landscape Value Perception in Rural Development*

Tuan proposed the concept of "place consciousness" to interpret the relationship between individuals and places [49]. Our emotional or aesthetic evaluation of landscapes is not an isolated psychological process; rather, it is intrinsically linked with other relevant emotional and perceptive structures associated with our relationships to the social and physical environment [50]. The World Health Organization has indicated that the quality of life is closely related to the cultural and value systems, goals, expectations, standards, and concerns of individuals [51]. Research has shown that overlooking the perception derived from residents' daily operational experiences in space can affect the deconstruction of spatial characteristics [52], and underestimating the perspectives, needs, and expectations of rural residents brings numerous challenges to the rural service process [53]. In the context of China's rural revitalization strategy, formulating spatial planning suitable for rural development should be a dynamic process integrating local knowledge, as residents familiar with a specific area can identify more landscape values and unique locations. Accordingly, incorporating the perception of local villagers in rural spatial planning is key to improving decision-making quality and enhancing public participation [54].

Many studies have identified significant individual and group differences in landscape perception [55–57], with the preferences of different groups largely endowing landscapes with meaning and value [58–60]. However, there is a paucity of research on groups' perceptions of changes in rural landscapes in China [21] and limited consideration of different stakeholders' opinions in planning processes [61], and while research on the changing values of rural landscapes often focuses on the macro level, studies at a smaller scale are relatively scarce [30,62].

### *2.3. PPGIS as a Method to Obtain Landscape Values and Preferences*

PPGIS have two important roles in analyzing perception. Firstly, as a tool for empowerment evaluation, PPGIS enable resident empowerment. Initially, Geographic Information Systems (GIS) were primarily used by elitist groups of experts for spatial analysis and decision-making related to land use and planning [52]. However, as early as 1995, Sheppard [63] proposed that "GIS should not only be a tool for analysis and problem-solving but also a social process". PPGIS aim to enhance the transparency and impact of government decision-making through public participation [64], identifying critical spatial information, especially in the fields of environmental and natural resource planning [65]. It breaks

through the expert barriers of traditional cartography, emphasizing the empowerment of communities and marginalized groups [66–73], reducing inequality in public access to information and technology [74]. Secondly, PPGIS overcome the limitations of traditional GIS by incorporating local knowledge and resident perception, offering a more inclusive and adaptable method of decision-making participation [75], providing a unique approach for civil society to participate in decision-making [76], with the flexibility to adapt to different environments and groups [77]. Additionally, by integrating local spatial knowledge, PPGIS promote reflexive practice in communities regarding the documentation, interpretation, protection, and management of cultural heritage [78], capturing the complex relationship between people and landscapes through landscape value mapping in natural resource planning and decision-making [79].

However, PPGIS research also faces several challenges in practice. Firstly, although this method allows landowners to mark and describe important locations on maps, this practice does not sufficiently consider the spatial connection between place meaning and the specific types of place attachment or values [77]. Secondly, effective spatial assessment should integrate both subjective and objective methods [80], yet most participatory mapping studies tend to adopt a singular methodological design [81] and lack an organizational framework to describe and guide their systematic application [59].

To summarize, set against the backdrop of profound changes in rural landscapes, this study aims to address gaps in research on landscape values and endeavors to construct a conceptual framework to deeply examine villagers' cognition of the connotations of rural landscape values and their evolution [82–84]. A wealth of studies has illustrated that place attachment, a theory that characterizes the emotional bonds between individuals and specific geographic settings, plays a pivotal role in research related to landscape cognition and evaluation. Furthermore, psychologist Albert Bandura's social cognitive theory suggests that individuals' understanding and perception of the social world influence their behaviors and decision-making [85]. On this basis, to gain a more precise understanding of the deep mechanisms behind villagers' assessments of rural landscape values, our study draws on place attachment and social cognitive theory. We introduce variables such as villagers' development value orientations and the social attributes of groups, exploring their interrelationships to help identify the needs and preferences of various groups. Concurrently, our study's conceptual framework aims to surpass the limitations inherent in collecting respondents' viewpoints via PPGISmethod, by combining coding and statistical methods with both qualitative and quantitative research approaches. This not only links respondents' landscape ratings with the deep value orientations expressed in their interview texts but also correlates respondents' perceptual data with geographical information, fostering an in-depth understanding of the cognitive formation mechanisms of rural landscapes. Taking the village as the research unit, this study provides a detailed analysis of the shifts in landscape values at a granular level, offering more effective decision-making support for rural planning and management.

## 3. Materials and Methods

### *3.1. Research Framework*

The methodology of this study is divided into three main stages (Figure 1):

In the first stage, subjective perceptions of the landscape by residents are collected to form specific spatial point data, supplemented with interviews to gather the following information: first, the daily life patterns of participants and their motivations for marking specific locations, thereby obtaining detailed narrative texts related to each spatial point; second, their insights into changes in the village before and after tourism development; third, their assessment of current government village planning policies. The second stage involves the categorization and processing of the data collected in the first stage. By collecting and analyzing non-digital data such as texts, videos, and audio provided by interviewees, a deeper understanding of their perspectives and experiences is gained. This allows for the classification of landscape functional types and the value preference orientations toward

village development. On one hand, it involves a comprehensive analysis of changes in the landscape values of traditional villages before and after tourism development from multiple perspectives such as spatial layout, functional type division, and villagers' perceptions. On the other hand, it helps us identify variables representing different landscape value categories and value orientations, which will subsequently be used in OLS regression models. The aim of this stage is to reveal the complexity and multidimensional characteristics of the evolution of the village environment and to identify the dependent variables representing different categories in the study of landscape preferences. In the third stage, based on the data and analysis results collected in the first two stages, regression analysis will be applied to quantitatively assess the preferences of different social groups for the development of traditional villages. The research in this stage will help understand the differences in the value perception of ancient villages among different groups, providing a scientific basis for formulating relevant policies and development strategies.

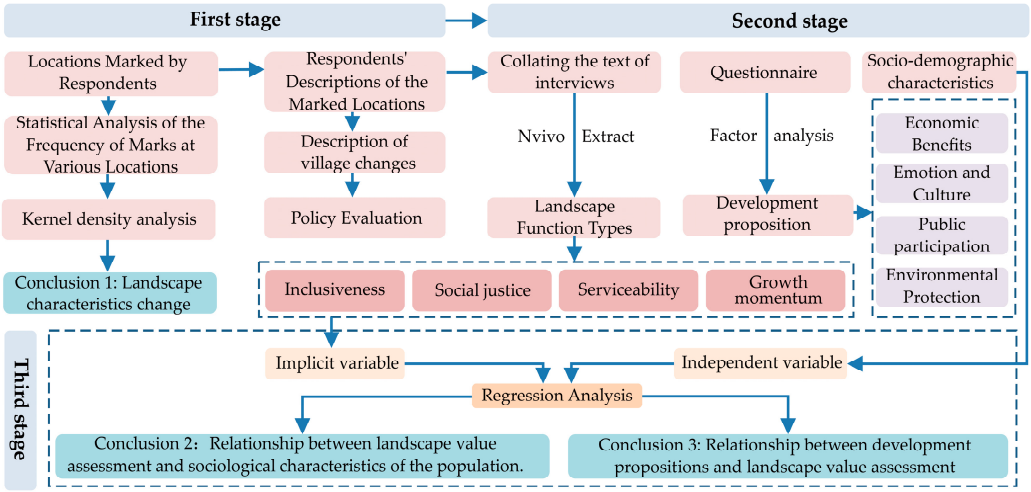


**Figure 1.** The research framework.

### *3.2. Research Area*

This study selects Xiaqiao Village of Sixi Town, Taishun County, Zhejiang Province as the research subject (Figure 2). Taishun County, located in the southwestern part of Wenzhou and the border of southern Zhejiang, adjacent to Ningde City of Fujian Province, is renowned as a "National Ecological Demonstration Zone" and "Homeland of Covered Bridges". Xiaqiao Village, as part of the eastern region of Sixi Town, is distinctive for its "pomegranate-style" architecture and is a historically profound traditional village. The selection of Xiaqiao Village as the research area is primarily for three reasons: Firstly, as a typical traditional Chinese village, Xiaqiao possesses rich historical value and has undergone significant landscape changes in recent years driven by tourism development and policy planning. Secondly, the village faces the rapid loss of traditional landscapes and culture due to tourism development, especially since 2005, the discordance between new constructions and the original landscape, and the constructive destruction reported by volunteers in 2013, highlight the challenges of cultural preservation. Lastly, since 2015, the village's tourism development strategy has been constrained by the local cultural level, lacking a deep exploration of local cultural characteristics in its branding strategy. The case of Xiaqiao Village vividly demonstrates the cultural shocks and the conflicts of interest that traditional Chinese villages face amidst modern tourism development, making it an ideal subject for understanding these challenges.

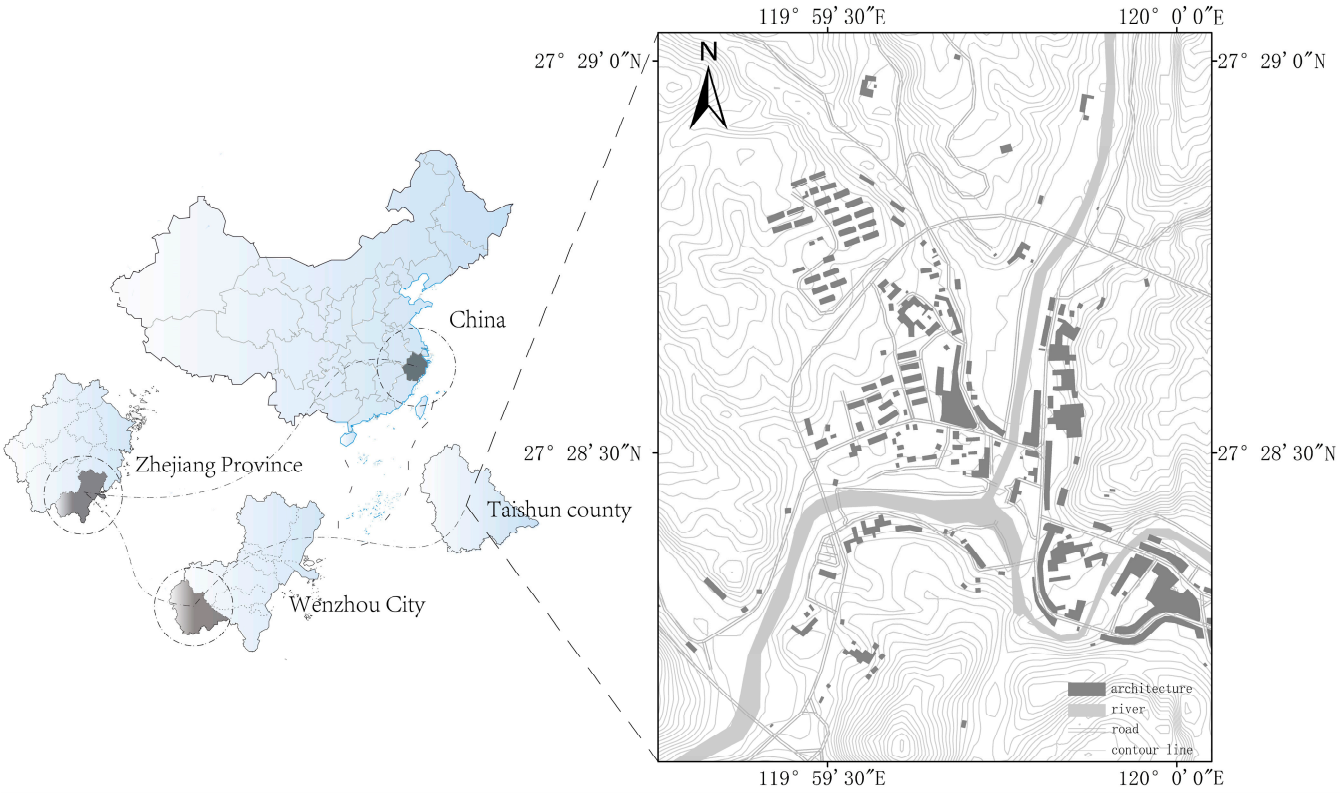


**Figure 2.** Study area profile.

### *3.3. Data Collection*

Considering the limitations of the PPGIS method described above and the specificity of the research area, we have opted for a method that combines PPGIS with questionnaire surveys and face-to-face interviews to complement online interaction. Initially, using the completion of the large project "Taishun Covered Bridge Cultural Park" in Xiaqiao Village in 2010 as a time marker, respondents were asked to mark the location of their homes using red stickers. This step ensures the accuracy and convenience of location identification, making it easier for respondents to identify other locations once their home addresses are recognized. Yellow stickers were used to mark landscapes that they felt were most important to them before 2010, and blue stickers were used for landscapes considered most important after 2010 (Figure 3). To enhance the depth and breadth of the data, in addition to identifying and marking these locations, residents were also required to record how they perceive and interpret the landscape and its values [86]. Subsequently, a questionnaire was distributed again to the mapping participants, containing 20 items testing village development and value orientation preferences and 4 items for scoring the current village status. The questionnaire uses a 7-point Likert scale; for development value orientation, the items range from "strongly disagree" to "strongly agree" to survey the villagers' value orientations. For scoring the village's current status, it includes the four landscape function types refined from the previous stage, with scores ranging from 1 to 7 representing the evaluation of each landscape function from "very poor" to "very good", respectively, indicating a range from weak to strong.

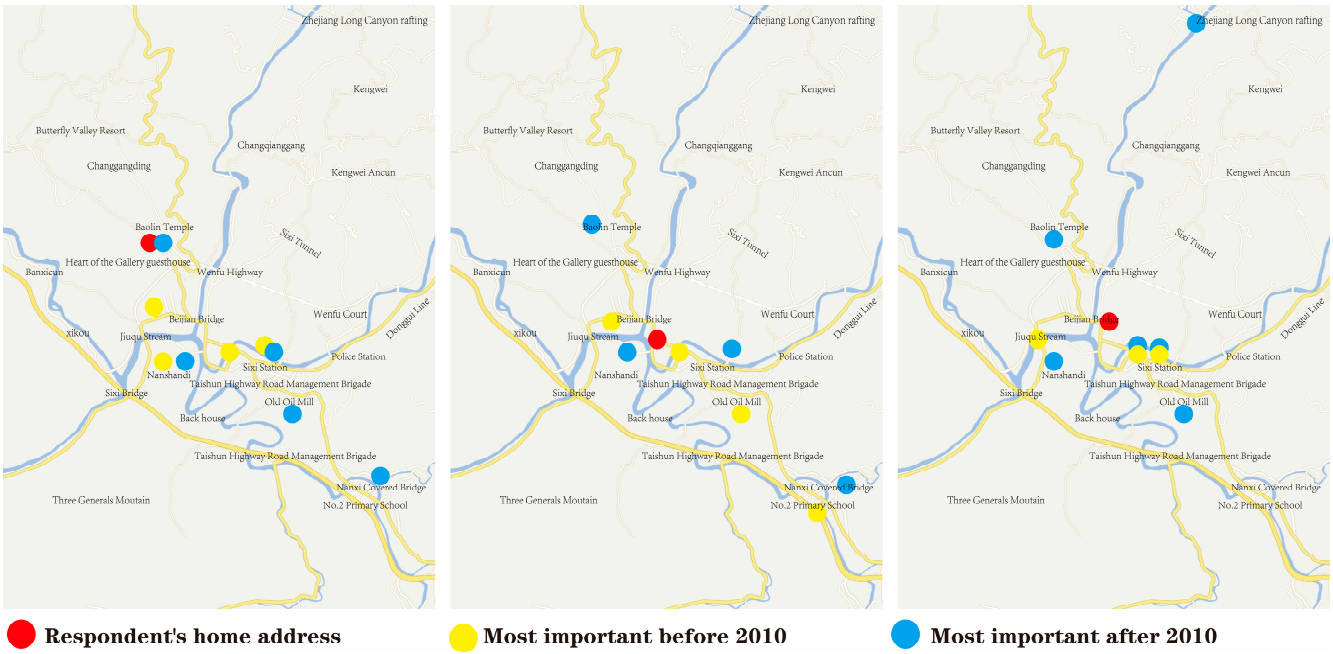


**Figure 3.** The PPGIS mapping process.

This study interviewed a total of 199 residents and recorded their demographic and sociological characteristics (Table 1). It obtained 199 sets of participatory mapping and verified the accuracy of the information marked on the PPGIS maps through fieldwork inspections.

**Table 1.** A statistical table of the sociological demographic characteristics survey.

| Trait | Options | Frequency Number of People | Percent (%) |
|---|---|---|---|
| Gender | female | 102 | 51.25 |
| | male | 97 | 48.74 |
| Age | <18 | 25 | 12.56 |
| | 18–29 | 43 | 21.60 |
| | 30–44 | 35 | 17.58 |
| | 45–59 | 67 | 33.66 |
| | ≥60 | 29 | 14.57 |
| Educational level | Primary and below | 26 | 13.06 |
| | Junior high school or technical secondary school | 79 | 39.69 |
| | High school | 35 | 17.58 |
| | College or undergraduate | 51 | 25.62 |
| | Master's degree or above | 8 | 4.02 |
| Monthly income level/RMB | <1000 | 38 | 19.09 |
| | 1000–3000 | 37 | 18.59 |
| | 3001–5000 | 58 | 29.14 |
| | 5001–7000 | 15 | 7.53 |
| | 7001–10,000 | 20 | 10.05 |
| | >10,000 | 31 | 15.57 |
| Occupation | Self-employed household | 41 | 20.60 |
| | Worker | 13 | 6.53 |
| | Civil servant | 22 | 11.05 |
| | Teacher | 26 | 13.06 |
| | Peasant | 29 | 14.57 |
| | retiree | 27 | 13.56 |
| | Petty dealer | 21 | 10.55 |
| | Pupil | 20 | 10.05 |

### 3.4. Deskwork: Coding with NVivo

The theoretical foundation of the NVivo research method is Grounded Theory (GT), which was first proposed by Glaser and Strauss from Columbia University in their 1967 publication "The Discovery of Grounded Theory: Strategies for Qualitative Research". GT utilizes a systematic set of procedures to transform observations of phenomena into inductive theories. It mainly involves the preliminary induction of raw data, gradually moving from specific observations to abstract generalizations. Through the systematic collection of data, this method emphasizes the exploration of core concepts that reflect the essence of phenomena to unveil the deeper meanings behind them.

This study will commence by organizing interview data collected from respondents' perceptions and evaluations to gain an in-depth understanding of their viewpoints and experiences. Employing GT, we systematically code the data using the Nvivo12.0 software, identifying key concepts, thus transitioning from descriptive analysis to a deeper understanding of the rural residents' perception [87,88]. The NVivo12.0 software operates on the principles of GT, utilizing a bottom-up, three-tiered coding process that encompasses three core coding functions: open coding, axial coding, and selective coding.

### 3.5. Factor Analysis

The study conducted a factor analysis (principal component analysis with maximum variance) on villagers' statements regarding their value orientations toward village development. Factor analysis primarily relates to data simplification, examining patterns of correlation (or covariance) among independent variables and employing algebraic solutions to reveal the simple underlying structure between these variables. The central goal is to identify the smallest number of dimensions that can maximize the explanation of the information contained in the data without losing key information [89]. Factor analysis effectively focuses on the main views of subjects on specific topics by reducing redundant variables to a small number of representative and mutually independent factors, thereby largely explaining the variance in data and retaining essential information [90]. Through factor analysis, we can reveal the focal points of residents' concerns and provide decision-makers with more effective bases for decision-making [91]. This analytical method not only simplifies the data processing but also uncovers the essential information hidden behind the data, thus more comprehensively understanding the real needs and expectations of rural residents.

### 3.6. Multivariate Regression Analysis

Multivariate regression analysis is used to examine which factors influence respondents' evaluations of changes in landscape values. The dependent variable is the score each individual gives to the change in four types of landscape values. Independent variables include demographic and sociological characteristics of each individual and factors of development value orientation. More specifically, the regression model is defined as follows:

$$\begin{aligned} y_i = \beta^0 + \beta^1 \text{Age} + \beta^2 \text{Female} + \beta^3 \text{Education} + \beta^4 \text{Administration} + \beta^5 \text{Town} \\ + \beta^6 \text{Economic} + \beta^7 \text{Emotion} + \beta^8 \text{Public} + \beta^9 \text{Enviroment} \end{aligned}$$

Age represents the age of the respondent, Female denotes whether the respondent is female, Administration indicates whether one has management experience, Education indicates whether an individual has received education beyond high school level (with below high school as the reference), Town indicates whether an individual has an urban background (with rural background as the reference), Economic represents the development value orientation toward economic benefits, Emotion represents the development value orientation toward emotional culture, Public represents the development value orientation toward public participation, and Environment represents the development value orientation toward environmental protection.

## 4. Results

### 4.1. Landscape Value Element Extraction

The process for extracting landscape value assessment elements is outlined as follows:

(1) Open Coding: Open coding is the initial step of the analysis, involving first-order coding of the original materials to extract primary concepts related to the research topic. This involves interpreting textual materials, refining analyses, summarizing, and conceptualizing and categorizing the raw data. This step necessitates strict adherence to the interviewees' language. All interview texts are organized and analyzed in NVivo 12.0, with unrelated content filtered out, encoding only what pertains to landscape evaluation, yielding 222 initial concepts. This paper presents only a subset of this coding due to space constraints.

(2) Axial Coding: Axial coding, the second stage of the coding process, builds on open coding. Statements from interview texts about landscape evaluation are broken down into various concepts and then categorized. The task here is to analyze and unearth deeper underlying relationships between first-order concepts, inducing and abstracting them into second-order themes from a researcher-centered perspective, forming a more profound interpretation of the initial concepts. Taking into account the concepts and their relationship with the initial categories, 12 second-order concepts are collectively identified.

(3) Selective Coding: The third stage, selective coding, clarifies the categories established by open and axial coding. It involves analyzing the inherent relations among the categories to establish a core category, linking it to other categories based on the research objectives. In this study, the logical relations between second-order themes are examined. Through coding analysis of the raw data, focusing on villagers' cognition and landscape evaluation, identifying key aggregate concepts is essential to selective coding. Refinement reveals that respondents tend to discuss the landscape's capacity for providing various services and infrastructure, the availability of resources and opportunities for everyone's benefit, fairness, profitability, and the ability to exploit rural resources and advantages to inspire endogenous vitality for sustainable development. Consequently, landscape functional types are refined into four aggregate concepts: serviceability, inclusiveness, social justice, and growth dynamics (Table 2).

**Table 2.** The extraction polymerization concept.

| Source Statements | Open Coding | Axial Coding | Selective Coding |
|---|---|---|---|
| **Topics Typically Represent Views** | **Primary Concepts** | **Second Concepts** | **Aggregate Concepts** |
| "We have recently embarked on a project to create an Intangible Cultural Heritage pedestrian street located opposite the covered bridge. The project is designed to encompass a diverse range of cultural and entertainment activities". | Preparing entertainment activities | Multiple uses of scenic area | Serviceability |
| "Previously, there were no such attractions at night, resulting in fewer people staying late. Our current goal is to gradually enhance the nighttime ambiance to encourage people to enjoy the area during the evening hours". | Creating night scene | Scenic service | |
| "We have interpreters available for hire, capable of offering historical tours and explanations at the tourist center". | Tour guides Services | Supporting facilities | |
| "The teaching resources here are not as strong as in the county. Parents who have the means generally choose not to send their children to schools in this area". | Educational backwardness | Educational resources | |

**Table 2.** *Cont.*

| Source Statements | Open Coding | Axial Coding | Selective Coding |
|---|---|---|---|
| **Topics Typically Represent Views** | **Primary Concepts** | **Second Concepts** | **Aggregate Concepts** |
| "Many of the merchants here are not actually from our village; they're outsiders pretending to be locals". | Non-local merchants | Development beneficiary group | Inclusiveness |
| "Even those in their seventies and eighties set up stalls, but they generally lack formal education". | Elderly people setting up stalls | | |
| "We've recently developed a new rafting attraction, which has brought prosperity to many villagers through shared wealth stalls". | The wealth opportunities offered by the new scenic area | | |
| "The development here hasn't been of any help to me". | Rural development is of no benefit to oneself | | |
| "I just work and farm the land, so this has no bearing on me". | Of no benefit to working | | |
| "I feel like I can't keep up with the times, and I don't really want to make any changes". | Believing that one cannot benefit | | |
| "Since the rafting attraction has just been developed and opened, there is currently no transportation service running from the Cultural Park to the rafting site". | No transportation services | Transportation popularization | |
| "People come for a day or two, and then they don't return". "There's a seasonal variation in tourism; during the summer holidays, for instance, we see more visitors, but it's unrealistic to expect such numbers throughout the year". | Short duration of tourist stays | Attract repeat customers | Growth momentum |
| "Our village has projects with both our own investments and those involving attracting investors. Currently, there are two projects open for investment. One is an Intangible Cultural Heritage pedestrian street, which is seeking investors, and the other is within Jiuqu Stream area, also open for investment". | Investment projects | Continuous income generation | |
| "Some people believe that we only focus on profit-making and neglect other aspects like cultural heritage. However, I believe that appreciation for culture is something that gradually develops, and I do think culture is quite important". | The importance of local culture | Cultural inheritance | |
| "We are aiming to develop comprehensive tourism, which means enhancing the entire town's living environment, not just focusing on the development center. We need to gradually radiate outwards". | Improvement of the quality of the living environment | Environmental sustainability | |
| "We have also organized environmental assessment competitions among different villages". | Environmental assessment competitions | | |
| "As we are older, it's difficult for us as rural folks to speak up. Generally, we tend not to say much". | Difficult to engage in discussion | Equitable participation | Social Justice |
| "Actually, being older, when we speak, people don't really take our words into consideration". | Lack of speaking rights for the Elderly | | |
| "Previously, this bridge was merely regarded as a provincial cultural relic. It's only now that it's receiving the attention it deserves". | Underappreciated the bridge | Degree of attention | |
| "Our local government only began taking action in 2008, starting with planning things like road infrastructure". | Delayed planning | | |

### *4.2. Changes in Landscape Characteristics before and after 2010*

Based on the locations marked by respondents, we calculated the frequency of each site being tagged. A further attribute assignment was conducted on these points, and based on this, we performed kernel density estimation for data before and after 2010 and created a distribution map of the overall landscape perception (Figure 4). In this map, an

increase in kernel density values indicates a higher importance of the location as perceived by villagers.

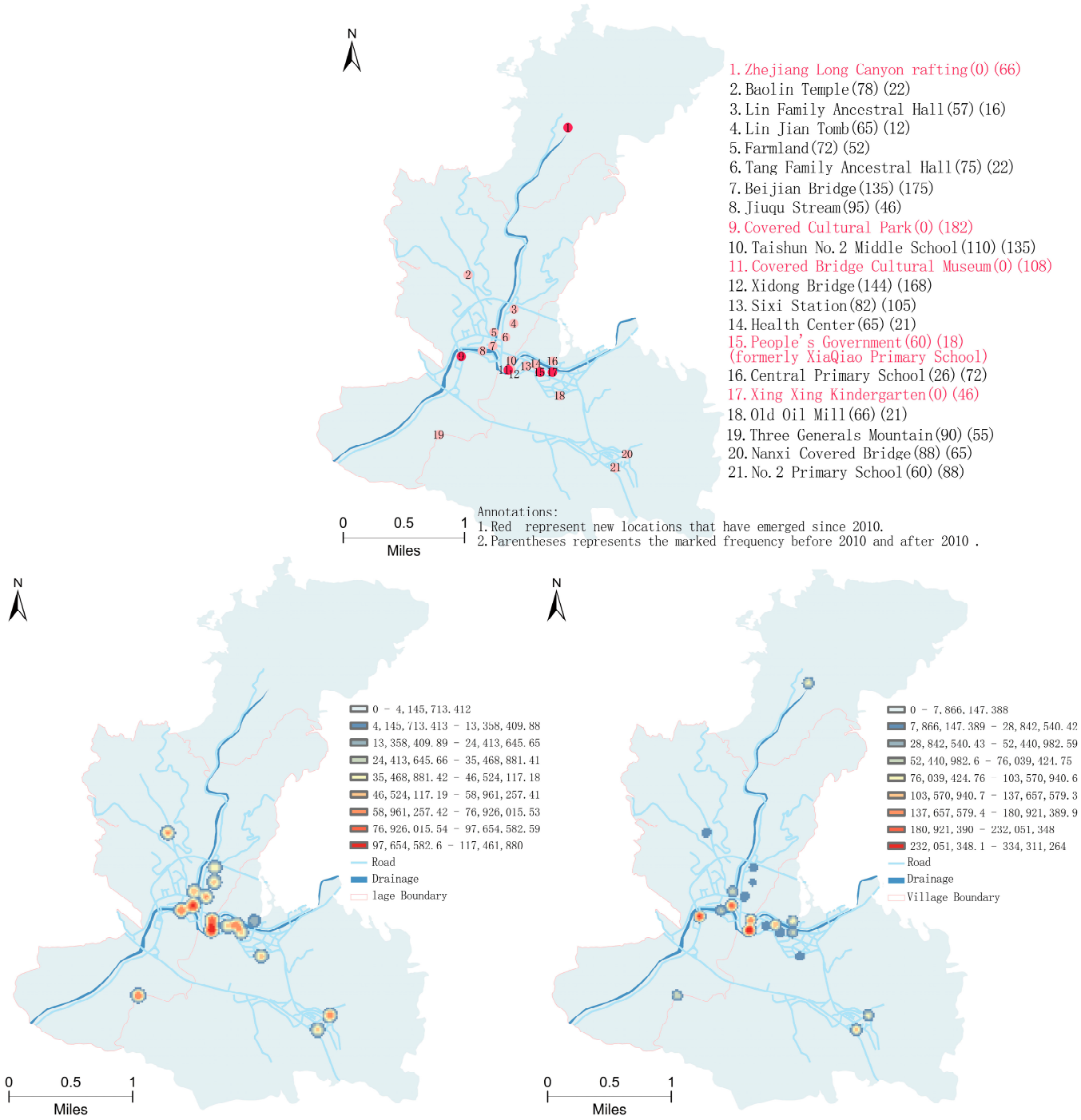


**Figure 4.** The spatial distribution of landscape perceptions before and after 2010.

Before and after 2010, areas with high landscape perception values were concentrated around Beijian Bridge, Xidong Bridge, and Jiuqu Stream. These locations are valued not only for their resources and environmental qualities but also for the recreational and emotional experiences they provide. The development of the Covered Bridge Cultural Park was a relatively sound decision, meeting the recreational and emotional needs of most villagers, while also bringing significant economic benefits to the covered bridge area. The newly developed Zhejiang Long Canyon rafting also gained popularity, attracting more

tourists to the village. However, the frequency of markings for Nanxi Covered Bridge, another site with covered bridge characteristics, significantly decreased after 2010. This is due to its relatively remote location and lack of development into a quality attraction due to insufficient surrounding facilities, leading to its relatively lower landscape value in the minds of local villagers. This coincides with the increased frequency of markings at Sixi Station, reflecting people's increased demand for travel with the development of entertainment means and living standards. At the same time, the frequency of marking landscapes for productive crops such as farmlands and mountains decreased, which is due to the gradual reduction in farming personnel as time progresses. Landscapes associated with education saw an increase in marking frequency, indicating a growing awareness among villagers about the importance of improving education levels. Cultural heritage sites such as Baolin Temple, Lin Jian Tomb, Tang Family Ancestral Hall, and Lin Family Ancestral Hall experienced a significant decrease in marking frequency, with mostly older middle-aged people or elderly people marking these sites. The lack of traditional cultural promotion has led to few villagers being aware of these locations in the village.

Overall, there has been a gradual shift in residents' perceptions of the landscape before and after 2010. People's focus on landscapes has shifted from those with traditional cultural and agricultural characteristics to more modern landscapes and educational landscapes. This shift reflects an emphasis on convenient living and education and also indicates a transformation in the modes of production.

### *4.3. Development Orientation Factor Extraction*

According to the interview results, a reliability analysis was conducted on the original 20 development orientation variables to assess the data's applicability for subsequent research. The analysis shows that the dataset's Cronbach's Alpha coefficient is 0.664 (the number of variables = 20; sample size $n$ = 199), which is within an acceptable reliability range. This indicates that the collected questionnaire data have a high degree of reliability and are suitable for further analysis. Subsequently, the information was condensed through factor analysis. In this process, the suitability of the research data for factor analysis was first assessed. The results show that the Kaiser–Meyer–Olkin (KMO) test value is 0.753 (Table 3), exceeding the baseline of 0.6 and meeting the prerequisite conditions for factor analysis. This means that the dataset is suitable for the research purposes of factor analysis. Additionally, the dataset passed Bartlett's test of sphericity ($p < 0.05$), further proving the data's suitability for factor analysis.

**Table 3.** KMO and Bartlett's tests.

| **KMO and Bartlett's Test** | | |
|---|---|---|
| Kaiser–Meyer–Olkin Measure of Sampling Adequacy. | | 0.753 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 3856.457 |
| | df | 190 |
| | Sig. | 0.000 |

Based on the scree plot (Figure 5) and the criterion of eigenvalues greater than one, it is assessed that four factors can be extracted from the twenty variables in the original data. Specifically, the variance explanation rates of these four factors are 31.300%, 19.511%, 14.371%, and 10.673%, respectively, with a cumulative variance explanation rate of 75.855% (Table 4). Moreover, the analysis shows that all study items' communalities exceed the benchmark of 0.4, indicating a significant association between each study item and its corresponding factor, ensuring that the factors effectively extract key information from the study items. After confirming that the factors have captured most of the information, we further analyzed the correspondence between factors and various study items (Table 5).

**Table 4.** Total Variance Explained.

| Total Variance Explained | | | | | | |
|---|---|---|---|---|---|---|
| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6.260 | 31.300 | 31.300 | 6.260 | 31.300 | 31.300 |
| 2 | 3.902 | 19.511 | 50.811 | 3.902 | 19.511 | 50.811 |
| 3 | 2.874 | 14.371 | 65.183 | 2.874 | 14.371 | 65.183 |
| 4 | 2.135 | 10.673 | 75.855 | 2.135 | 10.673 | 75.855 |

**Table 5.** The factor load coefficient after rotation.

| | Economic Benefits | Emotion and Culture | Public Participation | Environmental Protection |
|---|---|---|---|---|
| 1. I like to go where I can generate more economic returns. | 0.821 | −0.184 | −0.087 | 0.014 |
| 2. I hope the development can bring me more employment opportunities. | 0.777 | −0.040 | 0.155 | 0.086 |
| 3. I want these activities to be easy for everyone to participate in. | 0.161 | 0.018 | 0.771 | −0.011 |
| 4. I think traditional culture needs to be preserved no matter how the development is done. | −0.309 | 0.854 | −0.072 | −0.093 |
| 5. I want it to be easy to get anywhere. | 0.047 | −0.067 | 0.662 | 0.018 |
| 6. I think the landscape needs to retain a sense of atmosphere unique to the countryside. | −0.111 | 0.904 | 0.051 | 0.067 |
| 7. I would like to be able to participate in discussions on things here. | −0.039 | 0.073 | 0.851 | −0.071 |
| 8. I think development should bring me some compensation. | 0.844 | 0.051 | 0.030 | 0.081 |
| 9. I think development should still focus on sustainability. | 0.030 | 0.081 | −0.006 | 0.906 |
| 10. I think it should cater for our need for special cultural events. | −0.175 | 0.917 | −0.047 | −0.028 |
| 11. I think there should be places where traditional festivals can be held. | −0.080 | 0.898 | 0.024 | 0.158 |
| 12. I think we should pay attention to the protection of the ecological environment. | −0.053 | −0.041 | −0.207 | 0.892 |
| 13. I like landscapes with high visibility that can attract people from abroad. | 0.687 | −0.215 | 0.202 | −0.145 |
| 14. I think there should be some facilities to ensure the cleanliness of the environment. | −0.055 | 0.041 | −0.186 | 0.911 |
| 15. I think the scenic spots should make people feel peaceful and relaxed. | −0.210 | 0.903 | 0.024 | −0.007 |
| 16. I think development restrictions can be reduced to allow everyone to participate. | −0.099 | 0.091 | 0.878 | −0.250 |
| 17. I think the development should bring some benefits to the residents. | 0.836 | −0.144 | −0.063 | 0.013 |
| 18. I would like to attract investment. | 0.860 | −0.259 | −0.067 | −0.185 |
| 19. I would like to see recreational programs introduced so that everyone has the opportunity to participate. | 0.059 | −0.098 | 0.863 | −0.191 |
| 20. I think support for the poor should be strengthened. | 0.786 | −0.288 | 0.058 | −0.050 |

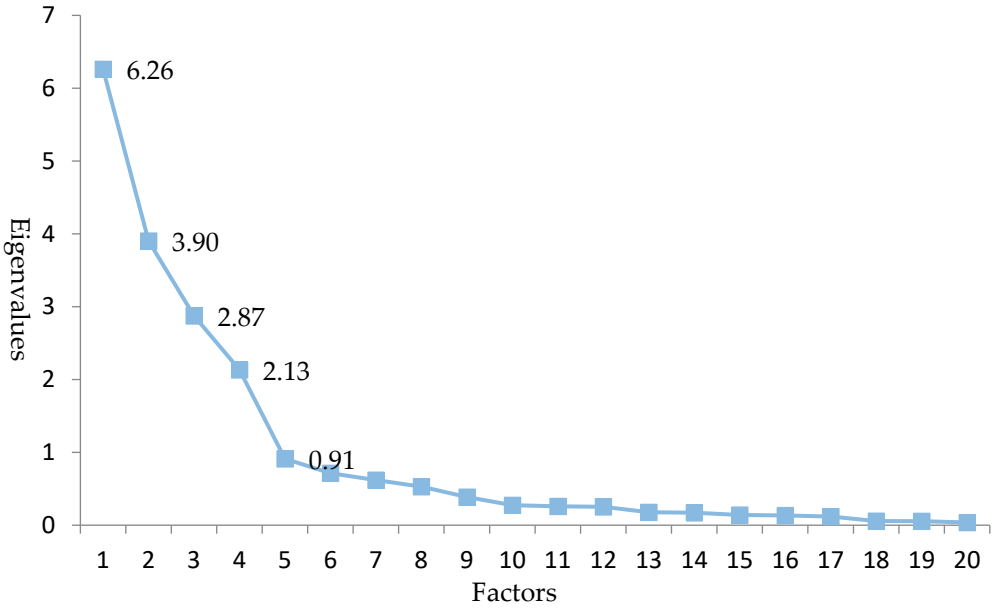


**Figure 5.** The factor analysis scree plot.

Items 1, 2, 8, 13, 17, 18, and 20 primarily focus on ensuring economic benefits and are named as the Economic Benefit factor; items 4, 6, 10, 11, and 15 highlight the concern for emotional and traditional culture and are named as the Emotion and Culture factor; items 3, 5, 7, 16, and 19 aim to improve public participation and are named as the Public Participation factor; items 9, 12, and 14 focus on improving the environmental quality of the scenic area and are named as the Environmental Protection factor.

## 5. Discussion

The regression analysis results reveal distinct individual variations in respondents' evaluations of landscape values (Table 6). An analysis of social attributes shows that management experience is a key factor influencing the evaluation of landscape values, statistically significantly impacting the perception of three types of landscape functional values. This reflects the decisive role of managerial support and advocacy in the protection and promotion of local initiatives [92]. Specifically, males, individuals with management experience, and those from urban backgrounds tend to recognize the inclusive value of rural landscapes. These social attributes also positively correlate with the perception of social justice values. This trend appears global, resonating with inclusive prosperity as a key policy issue observed in some developed countries. Certain social groups (such as white people, males, and better-educated residents) typically have advantages in the job market and enjoy higher living standards [93]. In terms of gender, societal benefits generally favor men over women, aligning with traditional views of gender roles and expectations in families and societies, revealing gender inequality as an institutional phenomenon closely tied to the distribution of social power and resources. Globally, women are often perceived as subordinate to men. Due to unequal power relations, the gender system constructs social hierarchies and inequalities, thereby affecting the formation of ideologies [94]. In rural communities, most women default to the role of family caregivers, and many express a lack of opportunities for recreational outings, which, even if available, may cause guilt due to societal expectations of their roles. Thus, they might believe that even if the village develops, it will not directly benefit their lives.

**Table 6.** Regression analysis results.

| | Inclusiveness | Social Justice | Serviceability | Growth Momentum |
|---|---|---|---|---|
| <45 (≥45 as reference) | −0.387 | −0.323 | −0.027 | 0.339 |
| Male (female as reference) | 0.650 ** | 0.263 | −0.131 | 0.171 |
| High school and above (for reference below high school) | 0.386 | 0.777 *** | 0.189 | −0.554 ** |
| Management experience (no experience as reference) | 0.821 *** | 0.768 *** | 0.612 ** | 0.174 |
| Urban (rural as reference) | 0.874 *** | 0.540 ** | 0.011 | 0.094 |
| Economic Benefit | 0.338 ** | 0.312 *** | 0.665 *** | 0.326 ** |
| Emotional and Culture | 0.018 | 0.071 | 0.273 ** | 0.076 |
| Public Participation | 0.376 *** | 0.275 *** | 0.181 | 0.298 ** |
| Environmental Protection | −0.220 * | 0.073 | 0.129 | 0.369 *** |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Individuals with education beyond high school show a negative correlation with the growth momentum value of landscapes, possibly because highly educated individuals accumulate extensive professional knowledge and critical thinking through systematic education, leading to more considerate considerations of long-term development. They recognize that while village development brings economic benefits, it may impact the potential for sustained growth due to environmental degradation and insufficient public facilities and services. Additionally, this group significantly values social justice more than others, reflecting the influence conferred by their educational level and social status. They are likely to enjoy better environmental resource allocations in their work environments. It is noteworthy that decision-makers tend to trust these highly educated individuals more while holding reservations about the insights of rural residents without equivalent education.

In terms of rural development orientation, economic growth, public participation, and environmental protection all show significant positive correlations with the perception of inclusive values. The development orientation toward emotional culture has a significant positive impact on the evaluation of service values, possibly due to the emotional projection of people toward specific places. Landscapes serve people largely because they become repositories and expressions of emotions. On one hand, villagers have a place attachment to the countryside; protecting traditional culture and designing landscapes with rural features help establish stronger emotional ties between residents and the local environment [95], fulfilling the purpose of serving spiritual needs. On the other hand, if rural communities can create traditional cultural centers in unique forms, with quality products, good displays, and creative management, they can certainly create their own revenue streams [96], thus promoting local service industry development. Economic interest orientation profoundly influences residents' perceptions of inclusivity, social justice, growth momentum, and serviceability. Economic development not only brings material wealth increase but also provides more employment opportunities and the possibility of improving residents' income levels. Quality of life is correspondingly enhanced, including improved housing conditions and convenient transportation, while the distribution of benefits brought by economic development is closely related to social justice. Respondents' development orientation toward public participation also has a significant positive impact on the value of landscape in terms of social justice and inclusivity. The substantial concept of social justice can be understood as indicating which differences and similarities between individuals are crucial for defining basic obligations and rights [97], with the perception of social fairness as a psychological perceptual factor influencing individual value judgments. The perception of social fairness is divided into perceived opportunity fairness and outcome fairness [98], with opportunity fairness manifested in delayed information access opportunities for the lower social strata. Economic disparities deprive farmers of opportunities to access information and hinder their fair participation in the democratic process [99], equally accessing employment opportunities. Outcome fairness is reflected in the differing social benefits or

compensations some villagers receive, such as two interviewees with markedly different experiences. One interviewee mentioned their house near the covered bridge was refurbished by government funds, gaining economic benefits through rent collection, while another stated their land was expropriated without corresponding compensation. Governments focus on enhancing the environment and attractions in developing scenic areas, investing significantly in surrounding houses and meticulous planning, possibly to fulfill political tasks. However, the government has evidently failed to fully safeguard residents' interests in other compensation aspects.

The relationship between environmental protection development orientation and inclusive value is significantly negatively correlated in this study, consistent with the actual situation in the village. Taking Xiaqiao Village as an example, the environmental degradation caused by development construction has raised concerns among residents. They report that, aside from the covered bridge, the village lacks the attractions and corresponding facilities to retain visitors or encourage repeat visits, leading to insufficient momentum for sustained development. This phenomenon is consistent with the conclusions of our regression model, indicating that the value orientation toward environmental protection has an undeniable impact on growth momentum.

In summary, in China's rural development, both efficiency and fairness are indispensable. The regression results of landscape functional types and developmental orientations extracted from the previous factor analysis indicate a significant discrepancy between villagers' needs and the actual environment, revealing a considerable disconnect. In the current process of rural development, the public's evaluation of landscape values displays evident class differences. This conflict is manifested not only in the fact that, although villages have started to focus on tourism resources and other industrial developments, there remains a demographic that relies on traditional agriculture for livelihood, lacks higher education, and is unable to benefit from emerging industries. It is also reflected in issues such as the unjust distribution of welfare and compensation due to unequal social power and resources, leading to the marginalization of vulnerable groups, a lack of inclusiveness in villages, and the presence of subjective group biases. Moreover, despite rural community residents' general acknowledgment of the necessity for economic development, their needs for traditional cultural maintenance and environmental protection remain unfulfilled. In the absence of a method to progress equally in environmental protection and economic development, residents are compelled to prioritize the environment as secondary, thus sacrificing some of their focus on the environment. It is these unresolved issues and contradictions that become key factors affecting the sustained development momentum of villages. Therefore, ensuring effective coordination and mutual promotion between different fields is crucial when constructing a comprehensive system for future rural development.

## 6. Conclusions

### *6.1. The Research Findings*

The data collected using the PPGIS tool in the study indicate that landscape changes brought about by the development of traditional villages have altered the villagers' assessment of landscape values and have, to some extent, led to changes in agricultural production, resident lifestyles, and their mindsets. The factor analysis of this study reveals that ensuring economic benefits, meeting the needs for emotional and cultural heritage, improving the rural environment, and strengthening public participation are important development orientations for villagers concerning the future path of the countryside. Additionally, our regression analysis results suggest that villagers' judgments on the changing landscape values of traditional villages are somewhat associated with their personal development orientations and exhibit significant differences based on their individual social attributes. Both the qualitative and quantitative analyses of this study reflect a certain alignment and divergence between the government-led development of traditional villages and the villagers' pursuit of values. This issue is not only a complex challenge in the

protection and development of traditional villages but also a comprehensive systemic issue that the government will need to address more holistically in future decision-making.

### 6.2. Academic Implications

In recent years, China has experienced rapid economic development and urbanization, especially following the implementation of rural revitalization strategies, leading to inevitable and sweeping reconstructions of China's rural landscapes [6,46,47]. How to achieve sustainable social development while protecting the cultural landscapes of traditional villages presents a significant academic question. This study provides a research method that incorporates villagers' opinions by utilizing participatory mapping as the fundamental approach. It has designed a detailed and feasible survey method for assessing villagers' value orientations and changes in rural landscape values. While the procedure is comprehensive, it is easy to implement and replicable. The study also aims to address the limitations of smaller scales in PPGIS research and to transcend administrative boundaries. Since most research is based on towns or urban districts due to the smaller scale of a village, there is a dearth of research at the village level, and most PPGIS require identifying specific information about the scope and boundaries of the village area, restricted within certain administrative boundaries [100,101]. This research, starting from the small scale of villages and taking the perspective of villagers' lives, marks points of landscape value not limited to the village landscape but also the surrounding area. It acknowledges the predicament that traditional villages in China still rely on facilities beyond their scope to meet basic living, education, and recreational needs. Qualitative methods are used to supplement the interpretation of quantitative data. In the statistical sense, a certain sample size is often needed to reflect scientific rigor, but sometimes exploring the reasons behind quantitative data requires qualitative methods. Spatial data points corresponding to interview texts can better unearth the reasons behind landscape value changes, and the varying degrees of different stakeholder demands presented in the questionnaire can be interpreted through interviews, explaining the underlying reasons.

### 6.3. Practical Implications

The importance of the emotional needs of rural residents cannot be overlooked. The cultural heritage and historical richness of the countryside often provide villagers with spiritual support and a sense of belonging. Protecting and inheriting rural traditional culture can not only satisfy residents' emotional needs but also inject unique charm and attraction into rural development [101].

Many traditional villages in China are caught in a whirlpool of government development, preservation of traditional spaces, changes in traditional landscapes, and diverse needs of villagers. This study provides insights into exploring these perceptions, offering guidance for the government to conduct more specific and detailed public opinion surveys in the future development of the countryside. It serves as a reference for understanding the welfare, demands, and value perception mechanisms of people of various social attributes. It advocates for the future introduction of democratic management mechanisms, encouraging villagers to participate in decision-making and opinion formulation, formulating reasonable policies and measures, promoting the sustainable development of the countryside and the comprehensive well-being of residents, and ultimately achieving the socially sustainable development of traditional villages.

### 6.4. Limitations and Future Research

This study represents an attempt at employing PPGIS at the rural scale in China. It combines PPGIS with questionnaire interviews to obtain perceptive data from villagers. The definition and method of participatory mapping are diverse and must be chosen according to local specifics to fit public participation best. Despite PPGIS emphasizing public participation and community empowerment, how it can be effectively integrated with other methods to achieve research objectives remains an area that needs further exploration.

Considering the vast rural territories in China and the diversity of population characteristics in different regions, more practical cases are needed to study how to implement PPGIS in various environments and communities and how to more effectively empower communities and marginalized groups in practice. Simultaneously, studying villagers' perceptions and value orientations toward landscapes is crucial for promoting the revitalization and sustainable development of traditional villages. However, future research will need to further explore the mechanisms of negotiation among different stakeholders in rural areas and undertake quantitative analysis, which will have a decisive impact on formulating and effectively implementing policies.

**Author Contributions:** Conceptualization, Mingxuan Li and Yu Yan; methodology, Mingxuan Li and Yu Yan; software, Mingxuan Li; validation, Yu Yan and Long Zhou; formal analysis, Mingxuan Li; Investigation, Mingxuan Li and Ziyi Ying; resources, Yu Yan and Ziyi Ying; data curation, Yu Yan; writing-original draft, Mingxuan Li; writing-review & editing, Yu Yan and Long Zhou; visualization, Mingxuan Li; supervision, Yu Yan; project administration, Ziyi Ying; funding acquisition, Long Zhou. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by Macao Science and Technology Development Fund [grant number 0067/2022/A].

**Data Availability Statement:** The data that support the findings of this study are available from the corresponding author, Yu Yan, upon reasonable request.

**Acknowledgments:** We extend our heartfelt gratitude to the Wenzhou University of Technology and the Taishun Research Institute for their invaluable support during the village survey process.

**Conflicts of Interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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