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Rural Areas Facing the Challenge of Economic Diversification

Threats and Opportunities

Edited by
Francisco Javier Castellano-Álvarez, Rafael Robina-Ramírez
and Francisco José Ferreira Silva

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Editorial

Rural Areas Facing the Challenge of Economic Diversification: Threats and Opportunities

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This Special Issue delves into the challenges and threats associated with rural economic diversification. The contributions received shed light on the fact that rural areas in the most developed countries face markedly different challenges compared to those in other parts of the world. Offering such a diverse and multifaceted perspective on the various realities of the rural world from an international standpoint is a key strength of this Special Issue, which comprises total of eleven research articles; six come from Chinese authors and three from Spanish authors, and contributions from Polish and Taiwanese researchers are also included.

While all articles share a common focus on analyzing issues of significant interest within their respective rural environments, the approaches taken by Chinese researchers exhibit notable diversity. For instance, Yang et al. [1] developed an index aimed at quantifying rural revitalization in the 12 administrative regions of western China. Their methodology utilizes entropy models, the BCG matrix, and geodetection systems. This research represents a valuable addition to the existing literature on the subject [2,3], emphasizing the necessity of establishing valid indicators to accurately define rural conditions [4]. This is crucial for tailoring policy interventions to effectively address the multifaceted challenges that are inherent in rural areas.

The contributions by Zhang et al. [5] and Sun and Xu [6] delve into the impact of financial development in rural China from distinct angles. Zhang et al. [5] examine the interplay between the increasing accessibility of digital financial services for China's rural population and the demand for infrastructure, knowledge, and communication technologies in rural areas. Their study identifies a positive correlation between these factors, which stimulates rural consumption and enhances financial regulatory systems. In conclusion, the authors emphasize that modernizing China's rural regions necessitates a significant push towards digitization, including improvements to mobile connectivity infrastructure, advancements in technological development, and the promotion of digital literacy among the populace. On the other hand, Sun and Xu [6], amidst the health crisis triggered by COVID-19, utilize data from the Chinese Health and Retirement Longitudinal Survey (CHARLS) to explore the significance of financial market development in helping families cope with illness-related expenses without plunging into poverty. Their findings reveal a positive association between ownership of financial assets and health expenditure. According to the authors, this underscores the importance of fostering financial market development, including digital platforms, and enhancing financial literacy among the population. These measures aim to bolster the financial assets of rural households, thereby strengthening the national healthcare system and mitigating the risk of impoverishment among those affected by illness.

Another perspective on rural development is offered in the articles authored by Zhang and Huai [7] and Zhang et al. [8] within the realm of intangibles in rural development [9].

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Through a case study of the Shaanxi region in China, Zhang and Huai [7] employ a structural equation model to investigate the factors contributing to poverty among agricultural households. They identify educational and health conditions as barriers to employment access, thereby exacerbating poverty levels. In terms of policy recommendations, they advocate for increased public investment in infrastructure, particularly in education and healthcare facilities. Despite the challenges associated with defining the factors perpetuating poverty in rural Shaanxi, the authors assert that deficiencies in education, health, and employment are interlinked, forming a "trap" reinforced by community dynamics. To mitigate these risks, Zhang and Huai [7] endorse bottom-up development strategies that engage the local population, fostering a sense of belonging and identity, which enhances their psychological resilience. These findings align with those of Rangel-Preciado et al. [10], who, in their study on agglomeration economies, highlighted the positive impact of such strategies on social capital. Similarly, the work of Zhang et al. [8] underscores the importance of enhancing basic resources and infrastructure for the well-being of farmers. While the availability of these resources may vary depending on the country's level of development, the central conclusion of this study holds true for rural areas worldwide.

The study by Luo et al. [11] is part of a series of research endeavors that hold significance within the realm of agrotourism and rural tourism, a focal point of this Special Issue. This cluster of studies includes investigations conducted by Shen and Wang [12], Ruiz-Labrador et al. [13], and Widawski et al. [14]. Through a case study conducted in Guangxi Province (Southwest China), Luo et al. [11] reveal that the integrated development of agriculture and tourism can positively impact the income of farming families. Consequently, they present a set of policy recommendations, advocating for diversification of agricultural income through tourism activities and emphasizing the necessity to enhance the training of tourism professionals. Shen and Wang [12], in their analysis centered on organic agricultural tourism and utilizing the Reasonable Person Model (RPM), explore the influence of place attachment and environmental sensitivity, inherent in the coastal regions of Hualien and Taitung (located in eastern Taiwan), on tourist loyalty to these destinations. The study underscores the significance of place attachment in shaping tourist behavior, while the methodology employed underscores the pivotal role of two factors in destination loyalty: the territorial identity of the place and the cultivation of emotional and functional connections between tourists and the destination itself.

Meanwhile, the contribution by Ruiz-Labrador et al. [13] delves into the practice of agrotourism in peripheral European territories marked by depopulation, aging, and loss of cultural identity. Focused on the case study of Extremadura (Spain), the authors conduct a literature review centered on the analysis of the value chain associated with agrotourism in dehesa landscapes. Their research unveils the vast potential of agrotourism in such territories, underscored by the allure of these ecosystems, the production of high-quality food by livestock farms and its gastronomic derivatives, and the interaction with the local ways of life, production methods, and natural resource utilization. The study suggests various courses of action to leverage this potential, including raising awareness among farmers and ranchers about the economic benefits of agrotourism, ensuring quality standards in service provision, digitalizing tourist offerings and resources, and addressing bureaucratic and regulatory hurdles.

Finally, among the studies focusing on rural tourism in its various forms, Widawski et al. [14], drawing on the Polish context, examine how the implementation of such activities aligns with principles of sustainable development. Employing extensive documentary and web content analysis, the authors underscore the significance of preserving local culture in safeguarding natural and tourism resources. They emphasize that the conservation of local culture is a direct outcome of the community's efforts to uphold its distinctive features, traditions, and customs. The study underscores two key factors for preserving tourist resources: firstly, ensuring their sustainable utilization without compromising their essence amidst the prevalence of mass tourism and secondly, recognizing their educational value, as a deeper understanding of their uniqueness enhances their appreciation. Widawski

et al. [14] highlight the importance of "educational dwellings" in facilitating this dual aspect of Polish tourist resources. Echoing the findings of Ruiz-Labrador et al. [13] on agrotourism in the Extremadura dehesa, the authors argue that initiatives such as "educational housing" or the availability of suitable rural accommodation enable visitors to engage with the local population, their production methods, and their customs, often intertwined with the utilization of natural resources. Both research teams also emphasize the significance of effectively showcasing tourist resources online and articulating the distinctiveness of natural and cultural assets to promote tourism in a given area. These contributions are part of a broader research agenda that, from diverse perspectives, explores the potential of tourism in rural regions [15,16].

The liberalization of international agricultural trade and the adherence to the associated commitments by developed nations [17,18] pose a significant challenge to the rural landscapes of these countries, where agriculture continues to hold paramount importance. This challenge echoes the rationale behind the initiation of the Leader Community Initiative in the early 1990s [19,20]. The studies by Castellano-Álvarez and Robina-Ramírez [21] and Martínez-Carrasco and Colino Sueiras [22] delve into two intriguing aspects of these European-initiated programs, designed to diversify agricultural and rural incomes across the continent.

Castellano-Álvarez and Robina-Ramírez [21] aim to assess the feasibility of projects implemented under European rural development programs, adopting a long-term perspective and utilizing a case study methodology. In contrast to the plethora of publications in this Special Issue focused on tourism practices in less developed regions, this research sheds light on the risks associated with over-reliance on a single sector for development opportunities, particularly tourism. The examination of the case of La Vera (Extremadura, Spain) reveals a significant concentration of development program resources in initiatives promoting rural tourism, specifically in projects involving the establishment or modernization of rural accommodations. While such a focus may seem logical during the nascent stages of tourism development, sustaining this concentration of investment across successive programming periods could yield adverse outcomes. Firstly, it may disadvantage other sectors that lack equivalent opportunities and resources, despite demonstrating lower rates of investment failure. Secondly, even projects that initially benefit from this focus may face challenges, as it results in an oversupply of accommodation. In fact, over 60% of promoters involved in such projects acknowledge that the profitability of their ventures does not permit exclusive dedication to management duties.

The research conducted by Castellano-Álvarez and Robina-Ramírez [21] represents a significant contribution to the body of research that these authors have established, focusing on an issue of paramount importance within this Special Issue [23,24]. Their study delves into the county as a geographical unit of analysis, which serves as the foundation for the European Union's endogenous rural development strategies [25,26].

Lastly, the article authored by Martínez-Carrasco and Colino Sueiras [22] delves into a crucial aspect of rural development: the depopulation of rural areas. Using Spain as a case study, they employ a Delphi analysis method, consulting with 35 experts in the field. The findings of their research underscore the pressing nature of rural depopulation in Spain, positioning it as a genuine concern for the state. The expert assessments gathered by the authors unanimously emphasize the necessity for public policies geared towards fostering sustainable territorial development and stemming the migration flows from rural to urban areas. To achieve this overarching objective, the experts stress the importance of maintaining effective coordination among the various administrative bodies responsible for this domain, with the ultimate goal of enhancing the provision of basic services to rural residents and expanding their employment prospects.

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References

1. Yang, X.; Li, W.; Zhang, P.; Chen, H.; Lai, M.; Zhao, S. The Dynamics and Driving Mechanisms of Rural Revitalization in Western China. *Agriculture* **2023**, *13*, 1448. [CrossRef]
2. Abreu, I.; Mesías, F.J.; Ramajo, J. Design and validation of an index to measure development in rural areas through stakeholder participation. *J. Rural Stud.* **2022**, *95*, 232–240. [CrossRef]
3. Márquez-Fernández, D.; Foronda-Robles, C.; Galindo-Pérez, L.; García López, A. Eficacia y eficiencia de LEADER II en Andalucía. Aproximación a un índice-resultado en materia de turismo rural. *Geographicalia* **2005**, *47*, 137–152.
4. Castellano-Álvarez, F.J.; Castro-Serrano, J.; Durán-Sánchez, A. The Concept of Rural Environment: Difficulties and Perspectives. *Rev. Espac.* **2019**, *40*, 16.
5. Zhang, C.; Li, Y.; Yang, L.; Wang, Z. Does Development of Digital Inclusive Finance Promote Construction of Digital Villages? An Empirical Study Based on the Chinese Experience. *Agriculture* **2023**, *13*, 1616. [CrossRef]
6. Sun, Z.; Xu, X. Can Access to Financial Markets Be an Important Option for Rural Families to Break the Return to Poverty Due to Illness in China? *Agriculture* **2024**, *14*, 165. [CrossRef]
7. Zhang, Y.; Huai, J. A Case Study of Farmers' Behavioral Motivation Mechanisms to Crack the Fractal Multidimensional Relative Poverty Trap in Shaanxi, China. *Agriculture* **2023**, *13*, 2043. [CrossRef]
8. Zhang, R.; Zhang, J.; Zhang, K.; Xu, D.; Qi, Y.; Deng, X. Do Clean Toilets Help Improve Farmers' Mental Health? Empirical Evidence from China's Rural Toilet Revolution. *Agriculture* **2024**, *14*, 128. [CrossRef]
9. Castellano-Álvarez, F.J.; Nieto Masot, A.; Castro-Serrano, J. Intangibles of Rural Development. The Case Study of La Vera (Extremadura, Spain). *Land* **2020**, *9*, 203. [CrossRef]
10. Rangel-Preciado, J.; Parejo-Moruno, F.; Cruz, E.; Castellano-Álvarez, F.J. Rural Districts and Business Agglomerations in Low-Density Business Environments. The Case of Extremadura (Spain). *Land* **2021**, *10*, 280. [CrossRef]
11. Luo, Y.; Xiong, T.; Meng, D.; Gao, A.; Chen, Y. Does the Integrated Development of Agriculture and Tourism Promote Farmers' Income Growth? Evidence from Southwestern China. *Agriculture* **2023**, *13*, 1817. [CrossRef]
12. Shen, C.; Wang, D. Using the RPM Model to Explore the Impact of Organic Agritourism Destination Fascination on Loyalty. The Mediating Roles of Place Attachment and Pro-Environmental Behavior. *Agriculture* **2023**, *13*, 1767. [CrossRef]
13. Ruiz-Labrador, E.-E.; Sánchez-Martín, J.-M.; Gurría-Gascón, J.-L. The Agritourism Value Chain: An Application to the Dehesa Areas of Extremadura. *Agriculture* **2023**, *13*, 2078. [CrossRef]
14. Widawski, K.; Krzemińska, A.; Zaręba, A.; Dzikowska, A. A Sustainable Approach to Tourism Development in Rural Areas: The Example of Poland. *Agriculture* **2023**, *13*, 2028. [CrossRef]
15. Robina-Ramírez, R.; Ravina-Ripoll, R.; Castellano-Álvarez, F.J. The trinomial health, safety and happiness promote rural tourism. *BMC Public Health* **2023**, *23*, 1177. [CrossRef] [PubMed]
16. Robina-Ramírez, R.; Martín Lucas, M.; Dias, A.; Castellano-Álvarez, F.J. What role geoparks play improving the health and well-being of senior tourists? *Heliyon* **2023**, *9*, E22295. [CrossRef] [PubMed]
17. Castellano-Álvarez, F.J.; Parejo-Moruno, F.M.; Rangel-Preciado, J.F.; Cruz-Hidalgo, E. Regulation of Agricultural Trade and Its Implications in the Reform of the CAP. The Continental Products Case Study. *Agriculture* **2021**, *11*, 633. [CrossRef]
18. Castellano-Álvarez, F.J.; Robina Ramírez, R. Relevance of the Uruguay and Doha Rounds in the Evolution of International Agricultural Trade: The Case Study of Latin American Countries and Continental Products. *Economies* **2023**, *11*, 2. [CrossRef]
19. Castellano-Álvarez, F.J.; Durán-Sánchez, A.; del Río Rama, M.C.; Álvarez-García, J. Innovation and Entrepreneurship as Tools for Rural Development. Case Study Region of La Vera, Extremadura, Spain. In *Entrepreneurship and the Community. A Multidisciplinary Perspective on Creativity, Social Challenges, and Business*; Ratten, V., Ed.; Springer: Cham, Switzerland, 2020; pp. 125–140. [CrossRef]
20. Castellano-Álvarez, F.J.; del Río Rama, M.d.l.C.; Durán-Sánchez, A. Effectiveness of the Leader Initiative as an Instrument of Rural Development. Case Study of Extremadura (Spain). *Rev. Port. Estud. Reg.* **2020**, *55*, 61–78. [CrossRef]
21. Castellano-Álvarez, F.J.; Robina-Ramírez, R. Long-Term Survival of Investments Implemented under Endogenous Rural Development Programs: The Case Study of La Vera Region (Extremadura, Spain). *Agriculture* **2023**, *13*, 2130. [CrossRef]
22. Martínez-Carrasco Pleite, F.; Colino Sueiras, J. Rural Depopulation in Spain: A Delphi Analysis on the Need for the Reorientation of Public Policies. *Agriculture* **2024**, *14*, 295. [CrossRef]
23. Castellano-Álvarez, F.J.; del Río-Rama, M.d.l.C.; Álvarez-García, J.; Durán-Sánchez, A. Limitations of Rural Tourism as an Economic Diversification and Regional Development Instrument. The Case Study of La Vera. *Sustainability* **2019**, *11*, 3309. [CrossRef]

24. Castellano-Álvarez, F.J.; Robina Ramírez, R.; Nieto Masot, A. Tourism Development in the Framework of Endogenous Rural Development Programmes. Comparison of the Case Studies of the Regions of La Vera and Tajo-Salor (Extremadura, Spain). *Agriculture* **2023**, *13*, 726. [CrossRef]
25. Castellano-Álvarez, F.J.; Robina-Ramirez, R. Relevance of Territorial Identity in the Rural Development Programs. The Case Study of Tajo-Salor (Extremadura, Spain). *Economies* **2024**, *12*, 34. [CrossRef]
26. Castellano-Álvarez, F.J.; Robina-Ramírez, R. La comarca como ámbito de intervención en los programas de desarrollo rural. El Estudio de caso de la comarca de La Vera. In *Organización de la Producción, Instituciones y Cooperación Empresarial. Estudios Aplicados para el Desarrollo Rural*; Parejo Moruno, F., Rangel Preciado, J., Linares Luján, A., Eds.; Dykinson: Madrid, Spain, 2023; pp. 365–378.

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Article

Rural Depopulation in Spain: A Delphi Analysis on the Need for the Reorientation of Public Policies

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Abstract: In recent years, various plans have been implemented by the central government with the aim of promoting more coordinated policies to address depopulation. The severity of this challenge in Spain, which has continued to intensify, underscores the need for more decisive action. The information presented in this research is derived from a survey conducted in two rounds with 35 experts in the field, following the Delphi methodology. The general objective was to assess the opinions of an expert panel on relevant aspects concerning policies to combat depopulation in Spain. Firstly, confirming the significance of the depopulation challenge; secondly, evaluating whether the actions taken so far have been insufficient and poorly coordinated, necessitating a reconsideration; and finally, establishing a prioritization of actions that should be implemented without further delay, encompassing various areas (financing, taxation, coordination, etc.), are among the many measures advocated by the Spanish Federation of Municipalities and Provinces (FEMP) and proposed in the recent diagnoses by highly authoritative institutions such as the Bank of Spain or the Economic and Social Council of Spain (CES).

Keywords: depopulation; rural areas; development; territorial cohesion; Delphi method; Spain

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1. Introduction

1.1. Depopulation in the National Context

In recent decades, population flows from rural to urban areas have been very intense, particularly since the second half of the last century, linked to the processes of industrialization, urbanization, and development, as observed in structural changes in other European countries [1] (Michaels, et al., 2012) and, in general terms, worldwide [2] (OECD, 2020). In the case of Spain, the depopulation processes in significant rural areas have continued to worsen, with a pronounced population decline since 2011 [3] (Guitierrez, et al., 2020a). This fact is corroborated by Eurostat and, in the case of Spain, by the National Institute of Statistics [4] (INE, 2022). Their population density statistics reveal a growing concentration of the population in large cities, with increasingly depopulated rural areas. The lower population density (93 inhabitants/km^2) in Spain compared to other European countries like Germany, Italy, or France is compounded by a higher concentration of its population in urban areas, with some of the highest percentages of uninhabited land, highlighting the gravity of the rural depopulation challenge.

The study of the Spanish case is of particular interest, as it is one of the European Union (EU) countries with the highest urbanization index and a greater concentration of population in inhabited areas. This was emphasized by the Bank of Spain [5] (2021, p. 275), describing how "a large portion of the Spanish territory is uninhabited, with only 12.7% of its surface populated, compared to 67.8%, 59.9%, and 57.2% in countries such as France, Germany, and Italy, respectively". In the same sense, other studies indicate that there are extensive areas and numerous Spanish municipalities at serious risk of depopulation. For instance [6], Gutierrez, et al. (2020b) described how 42% of the territory has population

densities of less than 12 inhabitants per square kilometer, comparable only to the northern areas of the Scandinavian countries.

The intensity of extreme depopulation in large rural areas of the country was recently analyzed by the [7] BBVA-IVIE Foundation (2019). In this report, it was identified that between 2001 and 2018, 63% of municipalities in Spain experienced population decline. Specifically, municipalities with 1000 or fewer inhabitants (representing 61.5% of the total municipalities and only 3% of the population) suffered this decline most intensely, while the population loss in municipalities with over 20,000 inhabitants was not significant, as also analyzed by [8] Molina de la Torre (2018).

1.2. Theoretical Framework and Previous Research

The challenge of depopulation in Spain has been the focus of extensive analysis over the past two decades, examining the territorial evolution of depopulation in regions and municipalities linked to the ongoing urbanization processes. In Table 1, following a thorough review of prior studies, some of the key aspects identified as the characteristics of these areas are categorized, accompanied by a brief description of their implications and effects. Each of these aspects has repercussions on other elements, establishing interconnections and ultimately reinforcing the processes of population decline from various dimensions. Most studies on depopulation risk in Spain initiate their analyses with a sociodemographic contextualization. In addition to confirming the low density of these territories (1), coupled with a sustained trend of increasing depopulated areas, they analyze the demographic profile, associating it with the common outflow of the young population or the aging of residents (2), leading to negative natural population growth in these smaller municipalities [8] (Molina de la Torre, 2018), particularly those of smaller size.

Table 1. Characteristics of depopulated areas in Spain and their implications.

Characteristics	Situation Generates	Effects That Reinforce
Low population density	More challenges and insufficient service provision.	The lack of inhabitants affects the provision of public and private services, as well as their economic viability.
Demographic aging and youth migration	Lack of youth and decline in workforce.	Issues with the sustainability of basic services and the viability of activities, leading to negative population growth.
Limited access to basic services	The lack of access to essential services such as education, health, and transportation, whether public or private.	Areas become less attractive for the population, especially for families and the younger population.
Closure of public services	The closure of schools, health centers, and other public services.	An indicator of the decline of a region and can accelerate depopulation by reducing the quality of life.
Limited economic diversification	Dependency on agriculture or traditional industries.	Increased vulnerability, the lack of opportunities, and difficulties in adapting to economic changes.
Lack of job opportunities	The absence of employment, particularly for young and women.	A key factor driving migration to urban or more prosperous areas.
Decline in infrastructure	The lack of investment in infrastructure such as roads, communications, and public services.	Contributes to the decline of a region, increasing the risk of depopulation, leading to territorial competitiveness and the quality of life of its citizens being relegated to a secondary status.
Geographical isolation of remote areas	Remote areas or those with difficult access may experience higher depopulation.	The lack of connectivity and geographical isolation hinders economic and social development.
Lack of attraction for new residents	The lack of capacity or public initiatives to attract new residents.	Depopulation processes persist, accelerating despite the implementation of initiatives that prove ineffective (affordable housing programs, business opportunities, childbirth support, regionalization, and decentralization of services, etc.).

Source: self-generated.

Among the studies addressing the population challenge from a demographic and spatial perspective, notable are the studies of [3–6] Gutiérrez et al. (2020a and b). These studies provide a temporal analysis of the urbanization process and national territory depopulation, considering it within the context of growing social inequalities ([9,10] Camarero et al., 2009, 2020). Authors such as [11] Recaño (2017) underscore that this continuous population loss may be irreversible, propelled by the feedback generated among all the elements being described.

In the realm of analyzing inequalities in access to basic public or private services for rural versus urban populations (3), an increasing number of investigations employ spatial network analysis and geographic information systems. Studies such as those by [12] Alloza et al. (2021) and [6] Gutiérrez et al. (2020b) quantify accessibility deficits between rural and urban populations or the loss of services (4), highlighting the existing inequalities and inequities among citizens in the provision of basic services, describing it as an essential factor in the depopulation processes. An important extension of these analyses of citizens' unequal access to basic services is concerning financial exclusion, lower digitalization, or the closure of banking entities in the depopulated rural areas by [13] Jiménez and Tejero (2018) or [14] Martín-Oliver (2019).

More recent are the analyses of the economic context in areas affected by depopulation, which are scantily diversified and based on traditional activities (5), or especially those with fewer job opportunities (6), considered an essential cause in the outflow of young population, particularly women. A pivotal study in the analysis of the economic challenges of depopulation-prone areas is recently conducted by the [5] Bank of Spain (2021). This study presents a detailed analysis of economic effects and causes of depopulation, providing valuable insights into the other differentiating elements of these municipalities compared to more urban ones, such as income and salary inequalities, the concentration of higher-skilled workers in cities, lower contributions to economic activity, value-added generation, or lower productivity in depopulated rural areas. Furthermore, the study offers an analysis of historical trends in investment concentration promoted in recent decades with the development of Spain and how economic activity and capital have tended to concentrate in urban areas.

The diagnosis from the Bank of Spain and other studies such as [12] Alloza et al. (2021) incorporates an analysis of inequalities in fiscal or public investment terms, identifying deficiencies in improving investments in communications or road networks in these more isolated territories. These studies establish a connection between the higher vulnerability of rural territories at risk of depopulation and their greater distance from major urban centers, as also emphasized by [5] Bank of Spain (2021). Undoubtedly, this vulnerability is associated with particular topographic or geographical isolation characteristics (7). More recently, studies have highlighted deficits in access to digital services and the existence of a digital divide [12] (Alloza et al., 2021). This latest study, like several previously described ones, questions the effectiveness of the implemented public policies (8), as described in this study.

1.3. Government Initiatives for Achieving More Cohesive Territories

In 2017, the Committee of the Regions [15] (European Union, 2017) stated that demographic challenges (in particular aging, a decrease in the number of young people, and low birth rates) are among the most significant challenges facing EU. It identified a higher growth in urban areas than in rural ones in most European countries, with remote rural areas across the continent experiencing intense demographic challenges. Urgent measures were suggested, recognizing that responses to this major challenge are still underdeveloped. In the same year, the Spanish government established the Commissioner for the National Strategy Facing the Demographic Challenge [16] (MPTFP, 2019), approved in the Council of Ministers in March 2019. It is worth noting that two years earlier (2015), a study proposal for the adoption of measures related to rural depopulation in Spain was approved in the Spanish Senate.

A year later, the Ministry for Ecological Transition and the Demographic Challenge initiated a public participation process that led to the approval of the "Recovery Plan: 130 Measures Facing the Demographic Challenge" [17] (MITECO, 2021). This political impulse to face the challenge of depopulation in Spain, proposing coordinated initiatives and special consideration for the depopulation challenge, reflects the growing concern of the national administration in addressing this problem.

These advances, driven by increasing public and media attention during those years, were reinforced by the rigorous studies of several organizations, highlighting the importance of the depopulation challenge and the need to implement measures in multiple areas: [9] Camarero et al. (2009); [10] Camaro et al. (2020); [18] CES, 2018; and [19] CES, (2021). Specifically, there was a consensus among the affected rural municipalities on the specific actions and measures that should be adopted, as outlined in the proposal report by the Spanish Federation of Municipalities [20] (FEMP, 2017).

The following section presents the origin of the information generated in this research through an expert consultation using a two-round Delphi-method survey. Its objective was to gather expert assessments on the relevant aspects of depopulation analysis in Spain, providing their critical and collective insights on policies and initiatives aimed at mitigating or reversing the challenge of depopulation, offering their evaluation of the utility of proposed initiatives in previous diagnoses. In all cases, the statements evaluated by the consulted panel of experts correspond to proposals outlined in recent research. The objective of this investigation is to verify the relevance and importance of their urgent implementation without further delay.

2. Research Methodology

2.1. Delphi Method

This research presents data collected through a survey conducted with experts in the field of rural development and depopulation issues. The Delphi methodology, initially applied in the study of national security by Dalkey and Helmer (1963) [21], has been employed, with numerous applications in various scientific fields for prediction and forecasting over the past 60 years, as extensively reviewed by Khodyakov et al. (2023) [22]. This review builds upon the research of Gupta and Clarke (1996) [23] conducted two decades earlier, and the Delphi method has increasingly found applications in studying the expected effects of agricultural and rural development policies in Spain: [24] Diez (1979); [25] Fearne (1989); [26] Martínez-Carrasco et al. (2014); and [27] Abreu and Mesias (2020).

The Delphi technique aims to obtain the reliable opinions of a group of experts through an interactive process with a small panel of experts. As noted by Lamdeta (2006) [28] in their literature review that included an analysis of the limitations of this method, it remains a valid instrument for prediction and decision support in the social domain.

In this study, two rounds were conducted, with 35 experts completing the process in two iterations out of the initial 50 participants in the first round. According to Landeta (2002) [29], this methodology allows for expert anonymity, as participants are unaware of each other's identities; and more importantly, it facilitates feedback through successive rounds, enabling group discussion on complex issues.

The research commenced with the design of an initial questionnaire, informed by an extensive literature review and in-depth interviews with 13 experts and stakeholders associated with the rural development in Spain. The questions were asked to the experts to assess their level of agreement with statements presented to them on aspects highlighted by the recent literature, using a Likert scale from 1 to 5 (1 = Totally Disagree; 5 = Totally Agree). They were required to assess areas with varying levels of need for improvement (1 = Very Low Need for Improvement; 5 = Very High Need for Improvement) or prioritize actions presented to them (first, second, or third) based on their importance. All these questions ultimately aimed to contrast the relevance of hypotheses put forward by previous studies, with four main questions intended to be validated by the expert panel:

(1st) How important is the challenge of depopulation in Spain, and to what extent is it complex to reverse or alleviate the processes affecting the large areas of the national territory?

(2nd) Is it necessary to introduce changes in policies to combat depopulation in rural areas, such as reorienting existing policies, making regulatory changes, or allocating more funding for this purpose?

(3rd) Do experts positively evaluate strategies implemented in recent years at the national level, specifically targeting the fight against depopulation in rural areas, and that need to be implemented in the coming years?

(4th) What specific measures and actions in various areas, among those demanded by rural areas affected by depopulation in Spain, should be implemented without further delay, among those proposed and agreed upon within the federation of provinces and municipalities?

Undoubtedly, the statements in the proposed questions are indebted to the findings of previous research, especially those put forth by the Economic and Social Council [7] (CES, 2021) and the [5] Bank of Spain (2021), or more specifically, concrete proposals advocated by the Depopulation Commission created in the Spanish Federation of Municipalities and Provinces [20] (FEMP, 2017).

The final questionnaire was sent via email, which was complemented by the distribution of the questionnaire through *Google Forms*, to a hundred experts on rural areas from various public and private institutions between September and December 2021, eliciting responses from a total of 50 experts (First Round). Following the analysis of responses to this initial survey, the questionnaire underwent revision, providing an opportunity for deferred group discussion.

It is worth noting that the configuration of this initial contact list was complex, involving a significant effort to compile emails through various means. This ranged from the simpler method of identifying researchers with relevant publications for the study to official lists of people responsible for various administrative tasks and institutions (at local, regional, national, and community levels) involved in depopulation issues. Additionally, contacts from rural development actors, primarily those directly involved in various Local Action Groups (LAG), were included in the list.

The second questionnaire (Second Round) was sent between January and March 2022. In addition to incorporating new aspects or nuances raised in the first round, it facilitated controlled feedback. This was made possible by including the aggregated results (from all questions) obtained in the First Round. Each technician could assess, maintain, or alter their responses. Additionally, a new final question was introduced, requiring the evaluation of the importance of various actions in the realm of policies combating depopulation.

2.2. Expert Panel Profile and Study Objectives

The data presented in this research correspond to the responses provided by a panel of 35 experts with whom interaction took place over a period of six months. They responded to the two questionnaires sent (First and Second Rounds), and the results are presented in the following section. As noted by Landeta (2002) [29], the Delphi technique allowed us to obtain the descriptive statistics of the responses, such as the Mean (Me), Median (Md), or relative frequencies (%) of the responses. Despite the small number of experts considered, given the qualitative nature of the instrument, it remains valid for the analysis and understanding of complex social realities, with the presented results having no inferential claims.

As shown in Table 2, the expert panel was heterogeneous, encompassing responses from local development agents, private entities active in the local sphere, researchers (mostly from universities), and members of regional or national public administrations (AAPP), along with responses from experts of European Union (EU) institutions. All of these experts work in the field of rural development and possess a high level of knowledge regarding the depopulation challenge in Spain. The experience and diversity of profiles

among the respondents undoubtedly contributed richness and nuances to the analysis of the complex reality under study, identifying areas where their perspectives differ and others where a high level of consensus exists.

Table 2. Professional profile of the Delphi Panel in the First Round (N = 50) and the Second Round (N = 35).

	Local Development Agents	Private Sector	AAPP	Researchers	European Union Institutions	N°
1st Round	14	10	8	14	4	50
2nd Round	10	4	6	11	4	35

Source: self-generated.

The expert panel had extensive professional experience on the topic of rural areas, with an average of 20 years in this field; all had university education, with 62.9% having completed postgraduate studies. Their level of knowledge about the depopulation challenge was high, with a self-assessed knowledge level of 4 (on a scale of 1 to 5) being the mode for the topics addressed in this study.

It is important to mention that responses were obtained from experts who work in different Spanish Autonomous Communities (Andalusia, Aragon, Castilla-La Mancha, Madrid, Region of Murcia, and Valencia), as indicated, in institutions operating at the local, regional, national, or European levels. This diversity enriched the assessment of the questions posed to them regarding the debate and situation in Spain concerning the challenge of rural areas experiencing significant depopulation.

The obtained information, valuable for its specialized and exploratory nature, provides insights into the perspectives that professionals from different sectors (Table 2) hold regarding the key aspects in the design and implementation of public policies to support rural areas undergoing depopulation processes. It is noteworthy that, although the study focuses on policies to combat rural depopulation in Spain, it offers valuable reflections that could be considered in guiding future rural development and territorial cohesion policies implemented in other EU countries. These insights may prove useful in shaping or reorienting national-level territorial policies.

3. Results

3.1. Importance of the Depopulation Challenge in Spain

As shown in Table 3, all 35 experts in the panel perceive the depopulation challenge in Spain as either "serious" or "very serious". This issue, affecting extensive rural areas due to the continuous processes of urbanization and population loss in vast rural regions, was specifically rated as "very serious" by 62.9% (22 out of 35) participants in the Second Round.

Table 3. Assessment of considerations regarding the depopulation challenge in Spain (N = 35).

Rating from 1 to 5	Relative Frequency (%)					Me	Md
(Ratings from 1 = Completely Disagree to 5 = Completely Agree)	**1**	**2**	**3**	**4**	**5**		
1. The depopulation challenge is a very serious issue in Spain	0.0	0.0	0.0	37.1	62.9	4.6	5
2. Combating depopulation in rural areas should be one of the major national challenges	0.0	0.0	5.7	28.6	65.7	4.6	5
3. Depopulation in rural areas and small municipalities is a complex and challenging issue to reverse.	0.0	8.6	5.7	48.6	37.1	4.1	4
4. Citizens are aware of the depopulation problem and its connection to the multifunctionality of rural areas.	17.1	45.7	22.9	14.3	0.0	2.3	2

Source: Results from the Second Round of the Delphi Panel.

The level of consensus regarding the consideration of depopulation as one of the "major national challenges" was also very high. A total of 94.3% agreed or strongly agreed with the statement, with an average rating of 4.6. This aligns with the importance attributed to this issue in terms of territorial and social cohesion by the [5] Bank of Spain (2021) and [8] Molina de la Torre (2018).

Slightly lower percentage (85.7%) of experts indicated agreement or strong agreement with the fact that depopulation is a complex problem to solve or reverse, echoing various diagnostics and emphasizing the importance of addressing it from multiple perspectives [18] (CES, 2018). The magnitude and difficulty of the depopulation challenge should make us aware of the need to formulate creative and holistic rural development policies and initiatives that could shape rural territories as spaces for experimentation and new opportunities [30] (Pinilla and Sáez, 2017), tailored to the needs or challenges of each territory.

Contrastingly, 22 out of 35 respondents disagreed or strongly disagreed with the statement that the Spanish population, in general, has a high level of awareness about the importance of the depopulation problem and the multiple functions that "vibrant" rural areas have for society as a whole. The average value (Me) for this statement was 2.3, with a median (Md) of 2. This result contrasts with the findings of the [31] CIS Barometer (2019) five years ago. According to this study, the Spanish population was becoming increasingly aware about depopulation, with 82.4% stating they had heard about the depopulation challenge, of which 90% considered it to be a "very or quite serious" problem, reflecting a growing public concern.

In another question included in the First Round, which saw minimal changes in the responses provided in the Second Round (indicating the stability of responses achieved in the second survey), the panel of experts was asked to indicate, in their opinion, the importance (on a scale of 1 to 5, with 5 = very important) of different areas for improvement in rural areas that determine the need for greater support to these regions.

As shown in Table 4, more than three-quarters of the panel of expert considered it "important" or "very important" to improve the situation of the population of rural municipalities affected by depopulation in comparison with the situation of the urban population. These areas include the following: (1) improving access to jobs and employment opportunities; (2) the equalization of high-quality public health services for the elderly or children with those available in urban areas; (3) enhancing infrastructure and transportation connections, such as improving road networks or public transportation with larger neighboring municipalities; and (4) the need to improve digital infrastructure and internet access, as frequently mentioned in the literature. Following these four needs of the rural population, there is also a high consensus regarding the compelling need of improving access to other local private services (such as pharmacies, post offices, and shops), as well as improving access to basic education services. In general, these results suggest the need for improvement in terms of quality and coverage for the entire population of fundamental basic services [15] (European Union, 2017), mitigating the processes of the so-called "rural exodus" in Spain [6] (Gutierrez, et al., 2020b).

These described deficiencies, in addition to reinforcing the consideration that the challenge of depopulation in rural areas must be understood as a problem lacking socio-territorial cohesion, suggest that we should not only analyze the problem as a demographic issue but also as an economic and social one. Therefore, it is necessary to counteract the gradual loss of territorial competitiveness that has occurred in Spanish rural areas, with the aim of generating employment and economic activity to increase the attraction of an active population, opportunities, and spaces for medium-term development. This involves actions aimed at maintaining a minimum level of services that ensure the well-being of inhabitants of rural areas.

Table 4. Evaluation of the improvement needs of the population in depopulating rural areas compared to the situation in urban areas (N = 35).

Rating from 1 to 5	Relative Frequency (%)					Me	Md
(1 = Very Low Need for Improvement and 5 = Very High Need for Improvement)	1	2	3	4	5		
1st. Availability of job/employment/business opportunities.	0.0	0.0	8.6	22.9	68.6	4.6	5
2nd. Access to healthcare or childcare for children and the elderly.	0.0	0.0	8.6	40.0	51.4	4.4	5
3rd. Infrastructure and transportation connections (e.g., with urban areas and other towns).	2.9	2.9	31.4	11.4	51.4	4.1	5
4th. Digital infrastructure (broadband and internet access).	0.0	5.7	17.1	37.1	40.0	4.1	5
5th. Access to local services, such as shops, post offices, pharmacies, etc.	0.0	0.0	22.9	42.9	34.3	4.1	4
6th. Access to education and training services.	0.0	0.0	14.3	60.0	25.7	4.1	4
7th. Access to cultural and recreational activities.	0.0	5.7	37.1	31.4	25.7	3.8	4
8th. Threats to the natural environment and its protection.	2.9	11.4	34.3	28.6	22.9	3.6	4
9th. Availability of housing.	0.0	25.7	37.1	14.3	22.9	3.3	3
10th. Access and affordability of various energy options (gas, electricity, etc.).	2.9	14.3	37.1	37.1	8.6	3.3	3

Source: results from the Second Round of the Delphi Panel.

Other aspects, described in the last four rows of Table 4, obtained mean scores closer to a mean value of three, showing a higher level of disagreement among respondents regarding their severity. This was the case for equalizing the opportunities for the population of small rural municipalities affected by depopulation in terms of their access to cultural and leisure activities; the protection and maintenance of the values of their natural and environmental surroundings; or the availability of access to housing or different energy options. These responses result from both a neutral assessment by a significant number of experts and the presence of different considerations regarding their relevance. In these cases, the results could be justified by the fact that, while in some rural areas in Spain these needs are adequately addressed, in others they remain significant obstacles to their development, which motivates the migration of their population to more urban municipalities.

3.2. Need to Promote Development Policies Targeted at Depopulated Areas

In a second major block of the present study, the aim was to identify the changes that, in the opinion of the experts, should be introduced in public policies implemented in Spain to combat depopulation, both at national and regional levels. Thus, as shown in Table 5, there was virtually unanimous agreement (97.1%) in the belief that it is necessary to consider, in public policies (Mean = 4.6 and Median = 5), in various areas of economic and social development, a greater focus on territorial cohesion, introducing positive discrimination criteria for rural areas at risk of depopulation. This is in line with the procedures applied in cohesion and investment policies of the European Union, taking into account the level of development of the member countries. This result coincides with the statements of several authors, among them [32] is Bello Parades (2023), who indicated "*the need to rethink public policies to lead to greater territorial cohesion and, ultimately, to offer solutions to these territories*".

There was also very high consensus on the need for regulatory changes, particularly a higher level of coordination between public administrations (with shared or exclusive competencies in different areas) in public policies aimed at supporting rural areas. In this sense, a total of 91.4% of the Delphi panel agreed or strongly agreed with the need for more efforts in horizontal and vertical coordination between administrations, as well as the reformulation of regulatory frameworks in various areas, described in great detail by [19] CES (2021).

Table 5. Evaluation of the need for changes in policies to combat depopulation in rural areas (N = 35).

Ratings from 1 to 5	Relative Frequency (%)					Me	Md
(1 = Completely Disagree to 5 = Completely Agree)	1	2	3	4	5		
It is necessary to introduce the territorial cohesion approach in national and regional policies, paying particular attention to the challenges of depopulated rural areas.	0.0	0.0	2.9	34.3	62.9	4.6	5
There is a need for further normative development and coordination among public administrations in the fight against depopulation.	0.0	0.0	8.6	34.3	57.1	4.5	5
It is necessary to allocate a larger portion of national and regional policy funding to areas affected by depopulation, even at the expense of other policies.	2.9	0.0	28.6	34.3	34.3	4.0	4

Source: results from the Second Round of the Delphi Panel.

Finally, there was also a high consensus in the belief that more financial resources should be allocated to support national and regional policies for depopulated rural areas (Mean = 4 and Median = 4), even if this came at the expense of resources allocated to other purposes or public policies. The lack of financial support for plans or programs was pointed out by [18] CES (2018) as one of the reasons that had largely prevented the development of agreements and commitments for initiatives co-financed by the national administration and the Spanish autonomous communities under the Sustainable Rural Development Program, as well as Law 45/2007 on Sustainable Rural Development, which was never implemented. In this context of increased funding and coordination of funds, the experience of the Agenzia per la Coesione Territoriale Italiana [33] (ENRD, 2020) is of interest, as an example of designing a comprehensive rural development strategy, coordinating projects financed with European structural and investment funds.

In another question, the Delphi panel was asked to assess actions and policies recently undertaken that, in several areas, could be an essential support for a more sustainable development of the territory, particularly addressing the needs of rural areas at risk of depopulation. One such example is the Cross-Cutting Objective proposed by the Common Agricultural Policy (CAP) for the current budgetary period, 2021–2027, regarding the support for the digitization of the agri-food sector and rural areas, aiming to bridge the digital divide in rural areas. In this statement, there was unanimous consensus among the respondents (Table 6), with 100% agreeing or strongly agreeing with the importance of digitization support included in the national plans of the CAP in its first pillar (Mean = 4.6). This result aligns with the essential role that the provision of digital and financial services, along with the development of training programs in digital skills for businesses and the population in rural areas in Spain, plays in revitalizing rural areas [12] (Allonza, et al., 2021).

Table 6. Evaluation of strategies implemented at the national level in the fight against depopulation in Spanish rural areas (N = 35).

Ratings from 1 to 5	Relative Frequency (%)					Me	Md
(1 = Completely Disagree to 5 = Completely Agree)	1	2	3	4	5		
Strategies aimed at digitization should pay special attention to supporting rural areas and the agri-food sector, bridging gaps with urban areas and other sectors.	0.0	0.0	0.0	40.0	60.0	4.6	5
The Next-Generation Recovery Funds should prioritize financing investments in rural areas and municipalities affected by depopulation.	0.0	2.9	8.6	42.9	45.7	4.3	5
Environmental strategies aimed at combating climate change, decarbonization, renewable energies, etc., should give special attention to supporting rural areas.	0.0	0.0	17.1	51.4	31.4	4.1	4
The "Plan of Measures for the Demographic Challenge" is an excellent starting point for the formulation of coordinated policies against depopulation.	0.0	0.0	28.6	48.6	22.9	3.9	4

Source: results from the Second Round of the Delphi Panel.

The relevance given to the Next Generation EU funds (NGEU) is also very important, with a substantial majority of the panel (88.7%) agreeing that it is essential for NGEU priorities to include financing investments in areas affected by depopulation. Similarly, a significant portion of the panel of experts (82.8%) considered that substantial funds directed toward environmental measures aimed at combating climate change in rural areas in the coming years are a new opportunity for the revitalization and development of depopulated areas in Spain, according to [19] CES (2021).

Finally, a significant majority of the experts considers that the "Plan of Measures for the Demographic Challenge" [17] (MITECO, 2021), described in the introduction of this study, is an excellent starting point for the formulation of coordinated policies against depopulation, with no expert expressing disagreement, corresponding to scores of 1 or 2.

3.3. Expectations Regarding the New CAP Post-2023

It is essential at this point to mention that, at the time of conducting this Delphi survey, the negotiation process for the Common Agricultural Policy (CAP) Post-2020 was still ongoing, a sectoral policy of significant importance for the entire rural environment. The intricate negotiation process led to an extension of the deadline for submitting the Strategic Plans for the Common Agricultural Policy (PEPAC) of the member states, including Spain, to 31 December 2021 [34] (MAPA, 2021). This necessitated a postponement of the implementation of the new CAP to 1 January 2023. It is relevant to provide a brief description of aspects available at the time of this research and on which several statements were presented to the experts.

As shown in Table 7, 60.0% of the experts indicated their agreement or strong agreement that the diagnosis presented by this national strategy regarding the needs of the agricultural sector is appropriate (Mean = 3.6; Median = 4). It is noteworthy that the percentage of responses giving equal consideration (42.9%) to the diagnosis of the needs of the rural environment is slightly lower (Mean = 3.5; Median = 3).

Table 7. Assessment of the Common Agricultural Policy Post-2020 and its National Strategic Plan (N = 35).

Ratings from 1 to 5	**Relative Frequency (%)**					**Me**	**Md**
(1 = Completely Disagree to 5 = Completely Agree)	**1**	**2**	**3**	**4**	**5**		
1. The Spanish Strategic Plan for the Post-CAP accurately diagnoses the needs of the agricultural sector.	2.9	5.7	31.4	45.7	14.3	3.6	4
2. The Spanish Strategic Plan for the Post-CAP accurately diagnoses the needs of the rural environment.	2.9	2.9	51.4	31.4	11.4	3.5	3
3. In its design and implementation, as in other policies, the participation of key stakeholders is insufficient.	8.6	14.3	8.6	40.0	25.7	3.6	4
4. The growth of resources allocated to the environment and climate action, in line with the European Green Deal, is positive for society as a whole.	0.0	0.0	2.9	45.7	51.4	4.5	5
5. The increase in resources allocated to the environment and climate action, in line with the European Green Deal, is positive for the agricultural sector.	0.0	2.9	2.9	54.3	40.0	4.3	4
6. The funds for Rural Development managed by Local Action Groups should be greater.	0.0	8.6	25.7	28.6	37.1	3.9	4
7. The increase in bureaucracy and administrative burden associated with monitoring CAP aid is excessive.	2.9	5.7	17.1	31.4	42.9	4.1	4
8. The increase in bureaucracy for Local Action Groups hampers their ability to revitalize territories.	0.0	2.9	11.4	51.4	34.3	4.2	4

Source: results from the Second Round of the Delphi Panel.

Regarding the ongoing participation process in the design and implementation of this national strategy, a high percentage of experts (60.0%) also indicated their agreement or

strong agreement that the involvement of key stakeholders was insufficient, as is the case in the design of other policies.

Given that one of the main changes in the new Common Agricultural Policy (CAP) is related to the reinforcement of measures against climate change and environmental protection, two final statements were proposed on this matter. In line with the "European Green Deal", particularly the "Farm to Fork" strategy, the new CAP will allocate 40% of its funds to this purpose. The proportion of panel members expressing agreement or full agreement with the positive effects of this environmental orientation on society as a whole was maximum (97.1%), with a median response of five. Its positive consideration was slightly lower in the agricultural sector (84%). It is worth noting that in the previous CAP, eco-conditionality measures had already gained significant prominence, with eco-schemes and other environmental requirements becoming an unstoppable trend. Despite the undeniable fact that these measures will impose new demands on the agricultural sector, the responses obtained, considering comments from interviews, suggest that a significant part of the primary sector seems to have embraced the increasing connection that public support will have, beyond its goals of income maintenance or ensuring food security, to agriculture that provides environmental services to society as a whole.

The last two statements referred to the significant role that Local Action Groups (LAGs) play in Rural Development, within the second pillar of the CAP. The level of consensus is high, with a median of four, regarding the need for LAGs, heirs to the Leader initiative, to have a greater volume of resources, and how the administrative burden associated with the management of CAP aid and bureaucratic obstacles hinders the operational capacity of these revitalizers of rural areas.

In line with the aspects described regarding the CAP and its relevance in rural development, the European Economic and Social Committee emphasized in several opinions the importance of achieving better governance and participation in the design and implementation of policies impacting the development of rural areas. Historically fragmented, disjointed, and burdened with bureaucracy [35] (Unión Europea, 2022), there is a need to continue promoting greater alignment of the CAP with other cohesion policies (Cohesion Funds, the European Regional Development Fund, or the European Social Fund). These objectives are among those proposed to advance in the coming years within the EU Rural Action Plan, with the Commission planning to publish impact reports on policies and improvement needs throughout 2024.

3.4. Prioritization of Coordinated Measures to Support Depopulated Rural Areas

Finally, Table 8 presents the assessment provided by the panel of 35 experts to 15 selected measures, many of which were advocated by [20] FEMP (2017) and grouped into seven major areas: institutional measures and financing; economy and employment; infrastructure; social services; housing; demographic incentives; and culture, identity, and communication.

The questionnaire asked them to identify the three most important measures that should be implemented with greater urgency, and these were ordered based on the most frequently mentioned as top priorities (Table 8). The generated ranking identifies 6 actions out of the 15 concrete measures in which at least a quarter of the panel of experts considered them to be among the top three priorities. The first one stands out, with 62.7% of the Delphi panel considering it urgent, and is to establish (first) plans for basic public services in the health, education, or social protection sectors, equalizing the level of access and coverage between rural and urban populations.

Table 8. Ranking of specific measures to be urgently implemented in Spain (Top 15) in the fight against depopulation of rural areas (N = 35).

Measures and Actions to Support Rural Areas Affected by Depopulation (1st = First or Most Important; 2nd = Second; 3rd = Third)	Relative Frequency (%)			
	1st	2nd	3rd	Total
1. Establish plans for the coverage of guaranteed basic public services in rural areas, including healthcare, education, and social services, comparable to those in urban areas.	20.0	31.4	11.4	62.9
2. Implement incentives and support for the location and creation of businesses and employment in rural areas.	17.1	14.3	5.7	37.1
3. Review the funding of local entities with criteria ensuring their subsistence and covering extra costs associated with providing basic services in small communities, reinforcing criteria for accessing lines and plans for smaller municipalities.	14.3	8.6	14.3	37.1
4. Establish special support plans for self-employed individuals and entrepreneurs in rural areas, promoting training and employment, with special attention to young people and women.	8.6	8.6	14.3	31.4
5. Explicitly include in the budgets of all Public Administrations (AAPP), a demographic strategy with annual objectives, means to achieve them, and an evaluation of achievements.	17.1	2.9	5.7	25.7
6. Provide tax credits and deductions for professional and business activities carried out in rural areas or in personal income tax for residents.	5.7	11.4	8.6	25.7
7. Provide support for childbirth, bonuses for families with children, or encourage the proximity of daycare services.	2.9	2.9	5.7	11.4
8. Promote urban regeneration, rehabilitation plans, and access to housing for the population of small municipalities, creating housing opportunities, etc.	0.0	8.6	2.9	11.4
9. Facilitate the decentralization of public care resources in the Autonomous Community (residences, youth centers, day centers, home assistance, etc.), supporting the creation of intermunicipal associations.	0.0	5.7	5.7	11.4
10. Improve communication infrastructure based on a distance map to basic services and enhance public transportation services for the population of rural municipalities.	0.0	0.0	11.4	11.4
11. Reinstate the 2007 Sustainable Rural Development Law, envisioned as a national framework with common and harmonized guidelines in the fight against depopulation in Spain, obliging the development of area plans as an intervention scale.	5.7	0.0	2.9	8.6
12. Promote and support intermunicipal associations for social and public services.	5.7	0.0	2.9	8.6
13. When implementing depopulation countermeasures at the national, regional, or autonomous community levels, clearly define the competence, whether unique or shared.	2.9	2.9	2.9	8.6
14. Improve digital infrastructure and implement ICT training plans in rural areas.	0.0	2.9	2.9	5.7
15. Develop communication strategies to promote the advantages of rural areas, fostering identity.	0.0	0.0	2.9	2.9

Source: results from the Second Round of the Delphi Panel.

This reinforces the line of work proposed by various studies that verify and quantify how rural areas in Spain have poorer accessibility to services than their European counterparts ([36] Kompil, et al., 2019), revealing significant deficits in the accessibility to basic services in rural municipalities compared to urban ones ([12] Allonza, et al., 2021; [37] Goerlich et al., 2021). As previous reports, such as the one conducted by the [7] BBVA Foundation (2019), suggest, making these areas economically and socially "attractive" is key to their repopulation. It should be added that, as this is not an exclusive challenge for Spain but is also identifiable in Eastern and Baltic EU countries, as well as other countries like Greece, Portugal, or regions in southern Italy, it presents an opportunity for the adoption of these measures as an essential part of community policies.

In the field of employment and economic opportunities, two priority actions were mentioned: establishing incentives for location and business creation (second), as well as supporting the installation of self-employed individuals and entrepreneurs in rural areas (fourth), with special attention to young people and women, developing tax deductions and incentives for this purpose (sixth). Regarding institutional measures, the panel of experts

considered it a priority to increase the budgets of local administrations in rural areas and their possibilities of accessing other lines of funding (third), with the explicit inclusion in the budgets of all administrations (fifth) of actions aimed at fighting depopulation.

In this area of promoting economic activity through fiscal policies, the proposal for differentiated taxation for depopulated rural areas, described under the concept of "demographic ultra-periphery", is relevant, as outlined by [38] Herce et al. (2019); these authors propose the possibility of a "differentiated tax system for repopulation", with deductions and bonuses at the national and regional levels in the Personal Income Tax (IRPF), Wealth Tax (IP), Transfer Tax and Documented Legal Acts (ITP and AJD), Inheritance and Gift Tax (IS and D), or Corporate Taxes (IS).

Table 8 presents ten other actions, to a lesser extent than those identified as more urgent, but all of them would undoubtedly be essential for the fight against depopulation. Among the most valued are the further development of support for childbirth and the permanence of families in rural areas (seventh); plans for the regeneration of housing and urban centers (eighth); promoting the creation of inter-municipal public service associations (ninth); or improving road communication infrastructures and public transportation (tenth), with six additional actions described.

It is worth recalling that many of the proposed measures and tax incentives have been employed in other countries such as Ireland, France, England, or Sweden [16] (MPTFP, 2019). Notably, studies like the one conducted by the [5] Bank of Spain (2021) and the [39] SSPA (2017) highlight the case and efforts of the Highlands and Islands Enterprise (HIE) in Ireland, which has successfully reversed the population decline in the Highlands and Islands of Scotland. Undoubtedly, in the European context, numerous experiences in rural development have, in a more localized manner, significantly contributed to retaining people in the territory in many European countries. It is interesting to read the review by [40] Latocha-Wites et al. (2024), examining the exogenous and endogenous factors that justify their success. The study concludes the relevance of the latter, particularly the presence of territorial and social capital.

In many instances, demographic recovery processes in depopulated areas have been accompanied by the return of urban populations to rural areas due to shifts in social preferences, such as residential choices or the pursuit of an enhanced quality of life. Additionally, advancements of transportation and communication networks have significantly contributed to making former remote locations appealing to citizens. These processes enable the identification of social trends favoring rural repopulation or counter-urbanization, phenomena that have been occurring for decades in many developed countries [41] (Woods, 2011). Spain has not been immune to these social processes, with a particularly intense flow of population directed towards dynamic rural areas, especially those in proximity to large cities or population centers [42] (Molinero, 2017). Noteworthy are specific cases, albeit more isolated, where there has been migration to more remote and isolated areas by new urban settlers, often highly qualified individuals. These individuals integrate into the established labor markets or establish innovative businesses in the territory with a global orientation [43] (Baylina et al., 2019).

4. Discussion

The described Delphi analysis, starting from a questionnaire that collected proposals outlined in previous studies on the issue of depopulation in Spain, has allowed contrasting the existence of significant consensus on various aspects, facilitated by the deferred discussion provided by the two rounds of submissions. Among the main findings of this research, outlined in the previous section, it is noteworthy to highlight the significant consensus on important issues already addressed by other investigations.

Firstly, regarding the severity of the depopulation problem, all 35 experts consider depopulation to be a "serious" or "very serious" issue in Spain, emphasizing the greater vulnerability of rural areas at risk of depopulation ([44] Reig, et al., 2016). This result aligns with previous studies, emphasizing the need to address this problem adequately, providing

evidence on this territorial and social issue. Noteworthy are studies conducted by reputable bodies such as [19] CES (2021) and [5] Bank of Spain (2021), which express the need for it to be considered and addressed as a "state matter" ([45] Paniagua, 2019; [46] Moyano, 2020).

Secondly, regarding the evidence of the need for improvement in opportunities and services accessed by the population in many rural areas, ensuring that they are comparable to those enjoyed by urban citizens. Key areas requiring urgent improvements in rural areas are identified, as described by [12] Allonza et al. (2021) or [37] Goerlich et al. (2021), emphasizing the necessary equality in access to employment opportunities, healthcare, infrastructure, digital services, and education. Therefore, greater effort is needed to ensure a basic set of services for citizens and, as noted by [5] Banco de España (2021), to generate the necessary conditions for their medium- and long-term development, enhancing the competitiveness of their territories.

Thirdly, the need for public policies to establish explicit objectives and actions aimed at making progress in the depopulation challenge (at the normative, budgetary, financial levels, etc.) and greater coordination. The expert panel reaches a high level of consensus advocating for public policies addressing depopulation with a territorial cohesion approach proposed by [8] Molina de la Torre (2018), involving regulatory changes, greater coordination between administrations, and the allocation of specific financial resources for this purpose. All these aspects, as described in the [5] Bank of Spain (2021) report, will be necessary but not sufficient conditions to mitigate or reduce the depopulation problem in Spain.

Fourthly, the need for taking urgent action. Among the measures considered by the expert panel are establishing plans for basic public services, incentives for business location, reviewing the financing of local entities, and supporting self-employed individuals and entrepreneurs. In this regard, it is necessary to give due attention to the specific actions proposed years ago by the Spanish Federation of Municipalities [20] (FEMP, 2017), as well as other voices advocating for development policies to introduce elements of positive discrimination in favor of areas affected by depopulation, of a budgetary, fiscal, administrative, or other nature.

Fifthly, implementing the "Plan of Measures for the Demographic Challenge" is of relevance. This plan [11] (MITECO, 2021) is perceived by the consulted experts as an excellent starting point for addressing depopulation, as it designs mechanisms for coordinating policies, vertically and horizontally, demonstrating the existence of a will for a more comprehensive and coordinated action of existing resources and policies.

Lastly, the substantial funds directed from the European Union towards digitalization, among others, the Next Generation funds, represent an opportunity that can be decisive in revitalizing rural areas, with significant digital divides. Such efforts need to be made in the current budgetary period, integrating the dimension of depopulation into other European programs with a significant impact on rural areas, undoubtedly including the Common Agricultural Policy's (CAP) Strategic Plan within the current Multiannual Financial Framework (MFF) for the seven-year period 2021–2027 [34] (MAPA, 2021). The importance and impact of agricultural funds EAGGF (European Agricultural Guidance and Guarantee Fund) and rural development (European Agricultural Fund for Rural Development (EAFRD)) on the development of rural areas are significant. Additionally, other funds such as the European Regional Development Fund (ERDF) or the European Social Fund (ESF) should address depopulation as a criterion for project selection. Similarly, the experts on the panel see that the EU's Next Generation funds could be essential for financing significant investments in areas affected by depopulation in the coming years, supporting innovation and modernization processes. This presents an unmissable opportunity to boost competitiveness or the number of future innovative projects [47] (Fernández de Cayuela and Santos Álvarez, 2022).

In conclusion, it is important to highlight the complexity of the challenge and how it is essential to emphasize that, while all outlined actions are relevant and should be integrated and considered, they need to be tailored to each territory [11] (Recaño, 2021),

given their particularities and needs [48] (Bandrés and Azón, 2023), based on a previous appropriate diagnosis [49] (Colino et al., 2022), with a willingness for experimentation and analysis of the best practices in other countries or regions ([39] SSPA, 2017; [50] SSPA, 2021). As pointed out by [51] Velasco Caballero (2022), the goal should be to generate a more integrated and balanced (cohesive) territorial model, seizing opportunities such as digitalization, ecological transition, or lifestyle changes. Undoubtedly, resources from restructuring funds or other European policies [52] (Moyano Estrada and Gómez Benito, 2022) could contribute to ensuring that residents in depopulated areas enjoy better services and infrastructure than currently exist in Spain, but above all, promote more innovative actions of endogenous development.

5. Conclusions

The Delphi analysis conducted has confirmed the severity of the depopulation problem in extensive rural areas of Spain, which, according to the consulted experts, should be considered one of the main national challenges. The level of consensus achieved in various statements allows the identification of areas where it is urgent to proceed with the development and implementation of new and more effective public policies, acknowledging their complexity. One of the most significant aspects is to increase coordination among different administrations for actions carried out jointly or within their respective areas of competence, redirecting them towards strategies for more sustainable territorial and social development. These strategies should explicitly define the goal of reversing population flows from rural to urban areas. This achievement requires coordinated and comprehensive action, undoubtedly involving the combination of efforts from multiple areas. The improvements in basic public services accessed by the population of rural municipalities, addressing deficits in terms of accessibility and quality, are described as the more urgent measures. Simultaneously, equal emphasis should be placed on the specific actions that enhance employment opportunities in rural areas. This undoubtedly involves positive differentiation in favor of productive projects in rural areas, as well as the improvement in transportation and communication infrastructure to restore the competitiveness levels of rural areas against urban ones, generating new development opportunities in the medium term.

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References

1. Michaels, G.; Rauch, F.; Redding, S. Urbanization and Structural Transformation. *Q. J. Econ.* **2012**, *127*, 535–586. [CrossRef]
2. OCDE. Cities in the world: A new perspective on urbanisations. In *OCDE Urban Studies*; Organisation for Economic Cooperation and Development and Comisión Europea: Paris, France, 2020; 171p.
3. Gutiérrez, E.; Moral-Benito, E.; Ramos, R. Tendencias recientes de la población en las áreas rurales y urbanas de España. In *Documentos Ocasionales*; Banco de España: Sevilla, Spain, 2020; Volume 2027, 42p.
4. INE. *Padrón Municipal de Habitantes*; Instituto Nacional de Estadística: Madrid, Spain, 2022.
5. Banco de España. La Distribución Espacial de la Población en España y sus Implicaciones Económicas. 2021, pp. 271–318. Available online: https://repositorio.bde.es/handle/123456789/16628 (accessed on 20 September 2022).

6. Gutiérrez, E.; Moral-Benito, E.; Ramos, R.; Oto-Peralías, D. The spatial distribution of population in Spain: An anomaly in european perspective. In *Documentos de Trabajo*; Banco de España: Sevilla, Spain, 2020; Volume 2028, 322p.
7. Fundación BBVA-IVIE. Despoblación de las provincias españolas. *Esenciales* **2019**, *37*, 2.
8. Molina de la Torre, I. La despoblación en España: Un análisis de la situación. *Inf. Comunidades Autónomas* **2018**, *2018*, 66–87.
9. Camarero, L.; Cruz, F.; González, M.; El Pino, J.A. La población rural en España. De los desequilibrios a la sostenibilidad social. In *Colección Estudios Sociales*; Fundación La Caixa: Barcelona, Spain, 2009; Volume 27, 199p.
10. Camarero, L. Despoblamiento, baja densidad y brecha rural: Un recorrido por una España desigual. In *Panorama Social*; FUNCAS: Madrid, Spain, 2020; pp. 47–74.
11. Recaño, J. La sostenibilidad demográfica de la España vacía. *Perspect. Demogràfiques* **2017**, *7*, 1–4.
12. Alloza, M.; González-Díez, V.; Moral-Benito, E.; Tello-Casas, P. El acceso a servicios en la España rural. In *Documentos Ocasionales*; Banco de España: Sevilla, Spain, 2021; Volume 2122, 44p, Available online: https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/PublicacionesSeriadas/DocumentosOcasionales/21/Fich/do2122.pdf (accessed on 20 September 2022).
13. Jiménez, C.; Tejero, H. Cierre de oficinas bancarias y acceso al efectivo en España. *Rev. Estab. Financ. Banco España* **2018**, *34*, 35–57.
14. Martín-Oliver, M. Financial exclusion and branch closures in Spain after the Great Recession. *Reg. Stud.* **2019**, *53*, 562–573. [CrossRef]
15. Unión Europea. La respuesta de la UE al reto demográfico. In *Dictamen del Comité Europeo de las Regiones*; Diario Oficial de la Unión Europea DOUE: Luxembourg, 2017; Volume C 017/08, 6p.
16. MPTFP. *Estrategia Nacional Frente al Reto Demográfico: Directrices Generales*; Ministerio de Política Territorial y Función Pública: Madrid, Spain, 2019; 17p, Available online: https://www.miteco.gob.es/content/dam/miteco/es/reto-demografico/temas/directricesgeneralesenfrd_tcm30-517765.pdf (accessed on 20 September 2022).
17. MITECO. *Plan de Recuperación. 130 Medidas Frente al Reto Demográfico*; Ministerio de Transición Ecológica y el Reto Demográfico: Madrid, Spain, 2021; 129p, Available online: https://www.miteco.gob.es/es/reto-demografico/temas/medidas-reto-demografico.html (accessed on 20 September 2022).
18. CES. *El Medio Rural y Su Vertebración Social y Territorial*; Informe 01, Sesión Ordinaria del Pleno de 24 de Enero; Consejo Económico y Social de España: Madrid, Spain, 2018; 172p.
19. CES. *Un Medio Rural Vivo y Sostenible*; Informe 02, Sesión Extraordinaria del Pleno de 7 de Julio; Consejo Económico y Social de España: Madrid, Spain, 2021; 234p, Available online: https://www.ces.es/documentos (accessed on 20 September 2022).
20. FEMP. *Listado de Medidas Para Luchar Contra la Despoblación en España. Documento de Acción. Comisión de Despoblación*; Federación Española de Municipios y Provincias: Madrid, Spain, 2017; 26p, Available online: https://www.femp.es/sites/default/files/doc_despob_definitivo_0_0.pdf (accessed on 20 September 2022).
21. Dalkey, N.C.; Helmer, O. An Experimental Application of Th e Delphi. Method to the Use of Experts. *Manag. Sci.* **1963**, *9*, 458–465. [CrossRef]
22. Khodyakov, D.; Grant, S.; Kroger, J.; Gadwah-Meaden, C.; Motala, A.; Larkin, J. Disciplinary trends in the use of the Delphi method: Abibliometric analysis. *PLoS ONE* **2023**, *18*, e0289009. [CrossRef] [PubMed]
23. Gupta, U.G.; Clarke, R.E. Theory and applications of the Delphi technique: A bibliography (1975–1994). *Technol. Forecast. Soc. Chang.* **1996**, *53*, 185–211. [CrossRef]
24. Diez, E. *Galicia Rural y el año 2000: Un Análisis Tipo Delphi*; Comunicaciones INIA: Serie Economía y Sociología Agrarias; Instituto Nacional de Investigaciones Agrarias: Madrid, Spain, 1979; Volume 6, 52p.
25. Fearne, A. The CAP in 1995-A Qualitative Approach to Policy Forecasting. *Eur. Rev. Agric. Econ.* **1989**, *16*, 113–127. [CrossRef]
26. Martínez-Carrasco Pleite, F.; Colino Sueiras, B.; Gómez Cruz, J.A. Rural poverty and development policies in Mexico. In *Estudios Sociales: Revista de Alimentación Contemporánea y Desarrollo Regional*; Centro de Investigación en Alimentación y Desarrollo, A. C. en Hermosillo: Sonora, México, 2014; Volume 22, pp. 11–35.
27. Abreu, I.; Mesias, F.J. The assessment of rural development: Identification of an applicable set of indicators through a Delphi approach. *J. Rural Stud.* **2020**, *80*, 578–585. [CrossRef]
28. Lamdeta, J. Current validity of the Delphi method in social sciences. *Technol. Forecast. Soc. Chang.* **2006**, *73*, 467–482. [CrossRef]
29. Landeta, J. *El Método Delphi. Una Técnica de Previsión del Futuro*; Ariel Social: Barcelona, Spain, 2002; 223p.
30. Pinilla, V.; Sáez, L.A. *La Despoblación Rural en España: Génesis de un Problema y Políticas Innovadoras*; Centro de Estudios de Despoblación y Desarrollo de Áreas Rurales (CEDDAR) y red de Áreas Escasamente Pobladas del Sur de Europa (SSPA): Zaragoza, Spain, 2017; 24p.
31. CIS. *Barómetro de Febrero*; Centro de Investigaciones Sociológicas (CIS): Madrid, Spain, 2019; Volume 3240, 42p.
32. Bello Paredes, S.A. La despoblación en España: Balance de las políticas públicas implantadas y propuestas de future. In *Revista de Estudios de la Administración Local y Autonómica*; Nueva Época: Vila Seca, Spain, 2023; Volume 19, pp. 125–147.
33. ENRD. *Strategy for Inner Areas in Italy*; Working Document; European Network for Rural Development: Bruxelles, Belgium, 2020; 4p.
34. MAPA. *Plan Estratégico de España Para la PAC Post 2020*; Ministerio de Agricultura, Pesca y Alimentación: Madrid, Spain, 2021; 3721p. Available online: https://www.mapa.gob.es/es/pac/pac-2023-2027/plan-estrategico-pac.aspx (accessed on 20 September 2022).

35. Unión Europea. *Una Visión a Largo Plazo Para las Zonas Rurales de la UE: Hacia Unas Zonas Rurales más Fuertes, Conectadas, Resilientes y Prósperas Antes de 2040. Dictamen de la Sección de Agricultura, Desarrollo Rural y Medio Ambiente. Comunicación de la Comisión al Parlamento Europeo, al Consejo*; Unión Europea: Brussels, Belgium, 2022; Volume NAT/839, 12p. Available online: https://ec.europa.eu/regional_policy/es/newsroom/news/2021/06/30-06-2021-long-term-vision-for-rural-areas-for-stronger-connected-resilient-prosperous-eu-rural-areas (accessed on 20 September 2022).
36. Kompil, M.; Jacobs-Crisioni, C.; Dijkstra, L.; Lavalle, C. Mapping accessibility to generic services in Europe: A market-potential based approach. *Sustain. Cities Soc.* **2019**, *47*, 101372. [CrossRef]
37. Goerlich, F.J.; Maudos, J.; Mollá, S. *Distribución de la Población y Accesibilidad a Los Servicios en España*; Monografías, Fundación Ramón Areces e Instituto Valenciano de Investigaciones Económicas (IVIE): Madrid, Spain, 2021; 160p, Available online: https://www.ivie.es/es_ES/ptproyecto/distribucion-la-poblacion-acceso-los-servicios-publicos/ (accessed on 20 September 2022).
38. Herce, J.A.; Esteban, S.; De Frutos, P.; García, B. Una fiscalidad diferenciada para el progreso de los territorios despoblados en España. Justificación, valoración e impacto socioeconómico. In *Proyecto de Cooperación Medida LEADER. Desafío SSPA 2021*; Southern Sparsely Populated Areas (SSPA): Teruel, España, 2019; 69p.
39. SSPA. *Documento de Posición*; Southern Sparsely Populated Areas (SSPA): Teruel, España, 2017; 28p.
40. Latocha-Wites, A.; Kajdanek, K.; Sikorski, D.; TomczaK, P.; Szmytkie, R.; Miodonska, P. Global forces and local responses—A "hot-spots" model of rural revival in a peripheral region in the Central-Eastern European context. *J. Rural Stud.* **2024**, *106*, 103212. [CrossRef]
41. Woods, M. Engaging the global countryside: Globalization, hybridity and the reconstitution of rural place. *Prog. Hum. Geogr.* **2007**, *34*, 4. [CrossRef]
42. Molinero, F. De la plétora demográfica al vaciamiento general: La difícil situación del campo en el interior de España. *Rev. Desarro. Rural Sosten.* **2017**, *33*, 10–11.
43. Baylina, M.; Montserrat Villarino, M.; Garcia Ramon, M.D.; Mosteiro, M.J.; Porto, A.M.; Salamaña, I. Género e innovación en los nuevos procesos de re-ruralización en España. *Finisterra* **2019**, *54*, 75–91.
44. Reig, E.; Goerlich, F.J.; Catarino, I. *Delimitación de Áreas Rurales y Urbanas a Nivel Local. Demografía, Coberturas del Suelo y Accesibilidad*; Informe BBVA: Bilbao, Spain, 2016; Informes Economía y Sociedad; 138p, Available online: https://dialnet.unirioja.es/servlet/libro?codigo=910254 (accessed on 20 September 2022).
45. Paniagua, A. La despoblación, una cuestión de Estado al margen de los cambios políticos. *Diario ABC*, 25 September 2018.
46. Moyano Estrada, E. Discursos, certezas y algunos mitos sobre la despoblación rural en España. *Panor. Soc.* **2020**, *31*, 31–45.
47. Fernández de Cayela, J.; Santos Álvarez, R. Territorios rurales inteligentes como modelo de desarrollo". La España rural: Retos y oportunidades de futuro. Fundación Cajamar. *Mediterráneo Económico* **2022**, *35*, 417–439.
48. Bandrés Moliné, E.; Azón Puértolas, V. La España despoblada: Tendencias recientes. *Economistas* **2023**, *181*, 266–273.
49. Colino Sueiras, J.; Martínez-Carrasco Pleite, F.; Losa Carmona, A.; Martínez Paz, J.M.; Pérez Morales, A.; Albadalejo García, J.A. Las zonas rurales en la Región de Murcia. Consejo Económico y Social de la Región de Murcia (CESRM). *Estudios* **2022**, *44*, 398. Available online: https://dialnet.unirioja.es/servlet/libro?codigo=942561 (accessed on 20 May 2023).
50. SSPA. Combatir Con Éxito la Despoblación Mediante un Modelo de Desarrollo Territorial. La Experiencia de Highlands and Islands Enterprise. Southern Sparsely Populated Areas (SSPA): Teruel, España, 2021; 86p.
51. Velasco Caballero, F. Despoblación y nivelación financiera municipal en el marco de la Carta Europea de Autonomía Local. *Rev. Estud. Adm. Local Autonómica* **2022**, *18*, 6–31. [CrossRef]
52. Moyano Estrada, E.; Gómez Benito, C. La Estrategia Nacional Frente al Reto Demográfico. Una política de Estado para un Problema Transversal de los Territorios. Mediterráneo Económico. Fundación Cajamar. En "La España Rural: Retos y Oportunidades de Futuro". 2022, Volume 35, pp. 443–462. Available online: https://dialnet.unirioja.es/servlet/libro?codigo=858317 (accessed on 20 September 2022).

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Can Access to Financial Markets Be an Important Option for Rural Families to Break the Return to Poverty Due to Illness in China?

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Abstract: Background: In China's post-epidemic era, the income of rural households has decreased, and the function of property preservation and appreciation is expected to weaken, which gives the financial market an increasingly prominent role in blocking the barrier of poverty caused by disease. Method: Based on CHARLS data, this paper empirically explores the relationship between financial assets and health expenditure and catastrophic health expenditure (representing the incidence of return to poverty due to illness) to provide evidence for the development of financial markets to help stop the return to poverty due to illness and consolidate the achievements of poverty alleviation. Results: The results show that the influence of financial assets on the incidence of catastrophic health expenditures is significant and has a threshold effect. At the same time, financial assets have a greater impact than housing on preventing the return to poverty due to illness. Therefore, moving to the financial market can be a viable option for rural households to stop the return to poverty due to illness in the future. Policy suggestion: The government should standardize the development of the financial market and scientifically allocate financial resources to ensure the stable preservation and appreciation of household financial investment. Rural family members should actively improve personal financial literacy and reasonable planning of family assets to achieve stable preservation and appreciation of family financial investment.

Keywords: rural families; poverty; catastrophic health expenditures; financial assets; financial literacy

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1. Introduction

Health expenditures due to physical health problems place a heavy economic burden on households, leading to poverty due to illness. In Kenya, about 1.48 million residents were pushed below the national poverty line due to health care payments in 2007 [1], and Albania and Kosovo are severely suffering from the catastrophic and impoverishing effects of health expenditures as well [2], which all suggests that at a time of illness, a household may divert expenditures to health care to an extent that its spending on basic necessities falls below the poverty line [3]. China's health expenditure has been on the rise in recent years. The total government health expenditure increased from 4.6 trillion yuan to 6.5 trillion yuan between 2016 and 2019, with an average annual growth rate of 12.2% (National Bureau of Statistics, 2020), accounting for 6.16% GDP in 2016 and 6.59% GDP in 2019. In contrast, as early as 2005, only 15 of the 46 African WHO member states spent less than 4.5% of their GDP on health [4]. Li (2012) pointed out that the rate of catastrophic health expenditure in China reached 13.0% [5], which was similar to the most of the areas mentioned above. Unfortunately, three years of the continuous impact of the novel coronavirus epidemic has worsened the condition of rural families who have just emerged from absolute poverty in 2020, and the risk of falling back into poverty due to illness has increased sharply. In this context, the 20th National Congress of the

Communist Party of China (2022) emphasized that "ensuring people's health should be placed in a strategic position of priority development", "consolidating and expanding the achievements of poverty alleviation, and enhancing the endogenous development momentum of poverty-stricken areas and people".

Income, housing, and financial assets are the last barriers that prevent families from falling back into poverty due to illness. (Health insurance, for example, is limited.) However, under the reality and expectation that income increase is difficult under the impact of the epidemic, the real estate market is depressed, and good investment attributes have been lost (supported by the central "housing does not speculation" positioning), can financial assets become the preferred wealth appreciation and maintenance channel to block the return to poverty due to illness? The effective integration of the financial market and the real economy is the basis for the orderly and sustainable development of a country's economy, and the development potential is huge. However, the average financial assets of rural households in China accounted for only 20.4% of total household assets, which is far less than the nearly 70% of real estate (Urban Household Assets and Liabilities Survey Group of the Survey and Statistics Department of the People's Bank of China, 2019). Thus, with the expected strong government support, moving into financial markets may be a promising and viable option. In March 2023, the Central Committee of the Communist Party of China and The State Council decided to establish the State Financial Supervision and Administration based on the China Banking and Insurance Regulatory Commission.

The burden of health expenditure is an important factor affecting the vulnerability of multidimensional poverty regression [6,7], which has attracted the attention of many scholars and influenced the concept of catastrophic health expenditure (CHE) to measure it [8–12]. However, there are few studies on the role of financial development in poverty reduction due to illness or health. Gao P. (2009) studied financial poverty reduction earlier [13]. After the 18th National Congress of the Communist Party of China in 2012, many relevant studies emerged and reached a peak in the past three years. Relevant studies have found that poor rural areas can achieve a poverty reduction effect by reducing the incidence of poverty by considering the level of financial development [14–17]. However, the poverty reduction effect of finance has a certain income threshold effect in different regions due to the differences in economic and income development levels [18–21]. When per capita income jumps out of the "poverty trap", financial development has a clear accelerating effect on poverty alleviation [22,23]. Moreover, digital financial inclusion can contribute to the poverty reduction effect by increasing the availability of financial resources for poor farmers [24–28]. Finally, the level of financial literacy of family members, such as personal financial knowledge and social network relationships, plays a very important role in the poverty vulnerability of rural families [29–33]. All the above research has demonstrated the poverty reduction effect of financial development, but there is scant research related to health poverty. Only Liu H and Wang H et al. (2018) found that the promoting effect of rural financial development on the alleviation of medical poverty has gradually increased [34].

Meanwhile, the impact of health shocks on household financial investment has been confirmed by some scholars [35–37]. Surveys in eighty-nine countries covering 89 percent of the world's population suggest that 150 million people globally suffer financial catastrophe annually because they pay for health services. However, there is a certain two-way effect between health expenditure and household financial asset allocation, and household financial asset allocation has a certain impact on health expenditure and then on poverty or return to poverty due to illness. However, there are few pieces of relevant literature, and health factors are mostly discussed as one of the dimensions of the multidimensional poverty vulnerability index. For example, Zhou D. and Wang M. (2019) [38] incorporated health factors into their vulnerability poverty alleviation theory and used the data of three rounds of micro-surveys in the China Household Tracking Survey (CFPS) from 2010 to 2014 and built a conditional Markov model to discuss the blocking effect of household asset endowment, including financial assets, on the return to poverty.

Moreover, from the perspective of China's current economic situation, the main investment channels for households are the real estate market and the financial market. However, due to the changes in the economic situation and policy orientation, the value-added function of the real estate market is expected to weaken, while through the continuous improvement and development of the financial market and the continuous improvement of people's financial literacy, the author believes that moving towards the financial market will also become an important choice for rural families in China who have just stepped into a well-off life to prevent them from returning to poverty in the future due to illness. Therefore, based on the data of the China Health and Retirement Longitudinal Survey (CHARLS), this paper analyzes the relationship between rural households' financial assets, health expenditure, and catastrophic health expenditure to provide evidence for the development of financial markets to help stop the return to poverty due to illness. Looking at the previous research literature, it seems that there is no relevant research literature that has carried out a clear in-depth analysis of this. This constitutes the marginal innovation of this paper.

2. Materials and Methods

2.1. Theoretical Analysis

Grossman's (1972) health demand model included human health as a special capital in the asset accumulation process, and health was regarded as a depreciable capital good, whose stock was dynamically changing; for example, occurrence of diseases and the growth of age would reduce the stock of health. Individuals need health care (for example, investing time and consuming medical products and services) to reap the consumption benefits that health provides (health as a commodity provides utility to the individual) as well as the productive benefits (healthy individuals have greater income). The asset accumulation formula can be expressed as Formula (1):

$$\dot{A}_t = rA_t + Y[t^s(H_t)] - \pi_t^H I_t - \pi_t^Z Z_t \quad (1)$$

A refers to the stock of financial assets, r is the interest rate (rate of return), Y refers to labor income, t^s is a function of "sick time", H_t is the stock of individual healthy capital, Z is consumer goods, and I is healthy capital investment. π^H and π^Z are the marginal (or average) costs of investing in health and consumption.

That is, individual or household asset accumulation is positively correlated with income and financial assets and negatively correlated with healthy capital investment and commodity consumption. When discussing household assets or poverty research, predecessors have rarely taken into consideration the stability of financial assets and their return rate as an important factor. This also provides research space for the possible innovation of this paper.

2.2. Research Hypothesis

Firstly, investing in real estate is no longer a good way to preserve and increase the wealth of ordinary Chinese households. Household assets refer to the property, claims, and other rights owned by the family that can be measured in money and can be divided into financial assets, physical assets, intangible assets, etc. From the perspective of multidimensional poverty, household assets are the collection of money, population, and material and social resources, including financial assets, human assets, material assets, society and nature, etc. [39]. Household assets are mainly divided into financial assets and non-financial assets; financial assets include bank deposits, bonds, stocks, investment funds, retirement funds, life insurance, and so on. Non-financial assets include owner-occupied homes, non-owner-occupied homes, commercial assets, automobiles, consumer durables, gold, silver, jewelry, antiques, and art, among others. Zhou and Wang (2019) [38] divided assets into five categories when discussing household asset endowment to prevent the return to poverty, namely production assets represented by machinery and equipment, self-use

assets represented by household durable consumer goods, security assets represented by medical insurance, human assets represented by education level, and financial assets represented by stocks or funds. It is worth noting that unlike Haveman and Wolff (2000) [40], they considered the limited number of real estate owned by poor families and the small possibility of selling them, so they regarded real estate as a component of self-use assets; that is, real estate in relatively low-income groups basically does not have investment attributes, which is also consistent with the empirical results of this paper. It is one of the focus points of this paper's viewpoint analysis. Coupled with the blessing of the central government's future positioning of "housing without speculation", this paper believes that investment real estate will no longer be the best choice for rural families to block return to poverty in the future.

Secondly, China's health insurance market is inadequate, increasing the risk that rural families will fall back into poverty due to illness. To reduce the incidence of catastrophic health expenditure and avoid the return to poverty due to illness, production assets and self-use assets do not constitute the necessary conditions to prevent catastrophic health expenditure. The security assets represented by medical insurance have certain protection functions, but the health insurance market in China is not perfect. Basic medical insurance is not enough to cope with high health costs; the commercial medical insurance market is still quite immature and not practical for rural low-income families; and long-term care insurance, which has been piloted in 49 cities across the country twice, namely in 2016 and 2020, is only in the exploratory stage. Thus, the role of asset protection in interrupting the return to poverty due to illness is not enough, at least at this stage. The human assets represented by the level of education are of great significance in consolidating the achievements of poverty alleviation in China in the future, achieving and sustaining a well-off society and moving towards common prosperity. However, for the current rural low-income families who have just left poverty, the level of education is relatively low and cannot change in a short period of time, and the only hope is placed on the generational replacement of the family. For example, the younger generation of rural families is more educated and can utilize more financial knowledge and concepts, and the improvement of financial literacy will help them choose and invest in investment channels (such as various financial products) other than real estate, which is difficult to achieve with their native family or personal efforts, in order to thwart the possibility of returning to poverty.

Finally, financial assets represented by stocks or funds have significant advantages in preventing rural families from returning to poverty due to illness for four reasons: First, the current investment channels for maintaining and increasing the value of household assets in our country are very limited, and the investment function of the most valuable real estate in the past is not an optimistic option for the future. Therefore, financial investment is a good choice when other good alternative channels cannot not found. Second, the financial market of our country is constantly improving and maturing, and the vigorous government support, combined with the development of the mature financial market in the United States and other countries, has given financial investment a good, stable value preservation and appreciation function in the long term. Third, there are various financial products, including structural collocation choices of long-term and short-term products, as well as high-risk and high-yield futures options and low-risk and low-yield funds, which largely avoid the risk bias caused by the lack of financial literacy of relatively low-income families. Moreover, with the generational change of relatively low-income families, the education level is rising higher and higher, and the improvement of financial literacy will gradually correct this risk bias. Fourth, benefiting from the continuous development of China's medical insurance and long-term care insurance and other security asset markets, rural low-income families will be likely to attain some additional assets from the basic living expenses that may "drip into more" into the financial market. Compared with the huge amount of capital required for real estate investment, the diversity of financial products and the low threshold of the number of funds will constitute a strong temptation for rural low-income families to enter the financial market. Of course, the risks associated with this

temptation will also be reduced with the improvement of financial literacy caused by the increase of education level in the process of family generational change, the development of the digital economy, and the wide spread of the Internet.

Therefore, in view of the above analysis, household income and assets such as real estate and financial assets constitute the last barrier to preventing rural Chinese households from falling back into poverty due to illness. However, the more than three-year continuous epidemic has dealt a heavy blow to rural household income; at the same time, due to the current real estate market downturn, houses have lost the reality and expectation of good investment value, while the financial market is constantly improving and developing. Therefore, this paper proposes the following hypothesis:

Hypothesis 1. *Financial assets are an important factor affecting household health expenditures, including the likelihood of visiting a doctor (a proxy for how concerned people are about their health).*

Hypothesis 2. *Financial assets significantly influence the incidence of catastrophic health expenditures (representing the return to poverty due to illness) of rural households.*

Hypothesis 3. *Financial assets have a greater impact on rural households' catastrophic health expenditures than housing. Entering the financial market, compared to entering the real estate market, is more likely to become a viable option for rural families to block their return to poverty due to illness in the future.*

2.3. Data Source

The data for this study come from the China Health and Retirement Longitudinal Survey (CHARLS), which aimed to collect a set of high-quality micro-data representing households and individuals aged 45 and above in China. The CHARLS National Baseline Survey was conducted in 2011, covering 150 county units and 450 village units. The samples were then tracked every two to three years, with the most recent data available in 2018. For this study, the latest 2018CHARLS data were selected, and 6103 rural samples were obtained by screening the samples of middle-aged and elderly people over 45 years old and removing missing values. At the same time, in the last part, to compare rural households with urban households, we also included the urban sample (1009). The statistical software analysis process was completed by STATA 17.0 (64bit).

2.4. Variable Selection

Anderson's Behavioral Model of Health Services Use (BMHSU), a mainstream theoretical model in Western countries for explaining individual medical behaviors, was used to select the variables in this paper.

2.4.1. Dependent Variable

(1) Health expenditure (HE): Health expenditure (HE) refers to the costs incurred by an individual to treat a physical illness and maintain a current state of health, including outpatient and inpatient medical expenses. As rural families gradually improve their health awareness, the purchase of health products has gradually become a trend, resulting in preventive spending. Therefore, this paper also includes the consumption expenditure generated by the purchase of health care products; that is, the study considers the consumption expenditure of outpatient service, hospitalization, purchase of drugs, and purchase of health care products. Among them, the number of outpatient visits (the probability of seeing a doctor) also reflects the extent of rural families' attention to their own health. To avoid heteroscedasticity or skewness, we added 1 to the horizontal value and then took the logarithm;

(2) Catastrophic health expenditure (CHE): Excessive medical and health expenditure will undoubtedly affect the expenditure of individuals or families in other aspects, have a negative impact on their lives, and may also occur due to illness or poverty,

and CHE indicators can well reflect the family's "illness or poverty" status. There are many definitions of CHE, but the one widely used by scholars is the one proposed by WHO in 2000: When an individual's medical expenditure exceeds 40% of his or her affordability, it means that a current individual has incurred catastrophic medical expenditure [41], and affordability is usually measured by the difference between total consumer expenditure and food expenditure.

When catastrophic health expenditure occurs, we can consider that a return to poverty due to illness (impoverishment) has occurred in rural households, so the incidence of catastrophic health expenditure can also be regarded as the incidence of return to poverty due to illness.

2.4.2. Independent Variable

Household income, as well as assets such as real estate and financial assets, constitute the last barrier against rural households returning to poverty due to illness. Therefore, income and total assets were selected as the core independent variables, and herein, total assets are composed of real estate and financial assets: (1) income (inc): average household income, mainly including wage income, transfer income, agricultural income, and inheritance of each member of the family; (2) total assets (ass): sum of financial assets and real estate; (3) financial assets (fin_ass): including cash, electronic money, bank deposits, bond funds purchased, etc.; and (4) real estate (hs_ass): refers to the value of the house owned by the family (including the rural family in the countryside and the purchase of investment property in the town). Similarly, to avoid outliers or extreme observations, we added 1 to each of the above four core independent variables. The reason why these four variables are discussed separately is that income and total assets are different concepts concerning the flow and stock of household wealth, respectively, and their impact on and expectations for health expenditure are different. Financial assets and real estate were taken for comparative analysis.

2.4.3. Control Variable

The control variables are mainly demographic characteristic variables, socio-economic characteristic variables, and some health characteristic variables: (1) demographic characteristics variables: gender, age, and marital status; (2) socio-economic characteristic variables: education level, possession or not of medical insurance, and possession or not of pension insurance, for example, possession or not of medical insurance is specifically reflected in the 2018 questionnaire of the China Health and Pension Tracking Survey: "Do you currently participate in the following medical insurance?"; (3) health characteristic variables: self-rated health status and suffering or not from chronic diseases.

2.5. Empirical Method

Firstly, non-parametric kernel density regression was used to measure HE level and CHE incidence under different income and asset levels. Nonparametric estimation is a method in contrast to parametric estimation, which generally does not emphasize the specific distribution of the model and does not make any assumptions about it. The parameter estimation method assumes that the population follows some specific distribution with unknown parameters, focuses on estimating the parameters of the assumed model, and has strong dependence on the assumptions made by the model. When comparing the two, the non-parametric estimation method is more robust. Its core idea is that the average value of each estimate is first obtained to yield an estimate of the regression function. However, the observed values of real data are limited, and taking the average value as the estimator will easily lead to excessive variance. In order to avoid the problem of data scarcity, the "locally weighted average estimator" is considered [42]. Specifically, in this study, four core independent variables of inc, ass, fin_ass, and hs_ass were substituted, and Gaussian kernel was selected to perform kernel density regression for HE and CHE, respectively.

Secondly, the two-part model was used to estimate the parameters of the influencing factors of HE and CHE. Although the non-parametric estimation method has some advantages in practical application, it may face the "curse of dimension" because it has high requirements on sample size and is not suitable for the case of too many explanatory variables. To explore the statistical relationship between variables, this study employed another method, the two-part model, to estimate the parameters of the influencing factors of HE and CHE. In the sample size, nearly 40% of HE is 0, showing a skewed distribution, and a biased estimate may be generated if the conventional OLS estimation is applied. To avoid possible sample selection problems, the "two-part model" was chosen in this study. That is, individual behavior was divided into two stages (participatory decision making and quantitative decision making).

Finally, in the discussion of catastrophic health expenditure, this paper adopts the empirical method of logit regression.

3. Results

3.1. Descriptive Statistics

Specific variable descriptions and descriptive statistics are shown in Table 1.

Table 1. Introduction of variables and descriptive statistics.

Variable Name		Variable Description	Mean Value	Standard Deviation	Minimum Value	Maximum Value
Dependent variable	Health expenditure (HE)	Logarithm	2.960	2.640	0	10.60
	Catastrophic health expenditure (CHE)	Yes = 1	0.283	0.450	1	1
		No = 0	0.717	0.450	0	0
Independent variable	Income	Logarithm	6.546	3.832	0	14.92
	Total assets	Logarithm	9.821	2.668	0	24.12
	Financial assets	Logarithm	8.717	2.042	0	18.52
	House property	Logarithm	4.856	5.726	0	24.12
	Age	Continuous variable	61.67	9.509	45	108
	Education	Complete Secondary education and above = 1	0.291	0.454	1	1
		Failure to complete compulsory education = 0	0.291	0.454	0	0
Control variable	Gender	Male = 1	0.450	0.498	1	1
		Female = 0	0.550	0.498	0	0
	Marital status	Having a spouse = 1	0.861	0.346	1	1
		Divorced, widowed, unmarried = 0;	0.139	0.346	0	0
	Self-assessment of health status	"Bad", "very bad" = 1;	0.284	0.451	1	1
		"Very good", "good", "average" = 0	0.716	0.451	0	0
	Chronic diseases	Chronic disease = 1	0.285	0.451	1	1
		No chronic disease = 0	0.715	0.451	0	0
	Medical insurance	Have either one Health insurance = 1	0.811	0.391	1	1
		None = 0	0.189	0.391	0	0
	Endowment insurance	Have either one Basic endowment insurance = 1	0.944	0.231	1	1
		None = 0	0.056	0.231	0	0

First of all, as shown in Table 1, in this sample, the average logarithmic value of HE is 2.960, and the incidence of CHE is 28.3% (which can also be used to represent the incidence of rural families in the sample returning to poverty due to illness or being in poverty already). It can be seen that the incidence of CHE outstripped 13.0% (of 2008) by a large margin. Only 29.1% of middle-aged and elderly people completed compulsory education, indicating that the current sample is slightly less educated. The proportion of people with poor self-rated health and chronic diseases was similar in the total sample, accounting for about three-tenths of the sample population. In addition, 86.1% of the people in the sample

have a spouse, the average age is 62 years old, the sample is more female, and most of the people have health insurance and pension insurance.

Secondly, combined with Table 1 and Figure 1, the distribution of income and assets of the sample population has the following characteristics: (1) From the peak value, both income and real estate have a peak value near 0, which suggests a significant proportion of rural residents are unemployed or production-self-sufficient. In addition, the income is a double peak, and the proportion of people with lower income is higher in the double peak, indicating that there is a certain income structure in the sample. The asset class variables all have single peaks, which generally conform to normal distribution. (2) From the perspective of span, the span of real estate is the largest (max = 24.12), which also leads to a large span of personal assets, which indicates that individual differences are large, and the realization of common prosperity in the future is not realistic. The span of income is the smallest, followed by financial assets, indicating that the distribution is more concentrated.

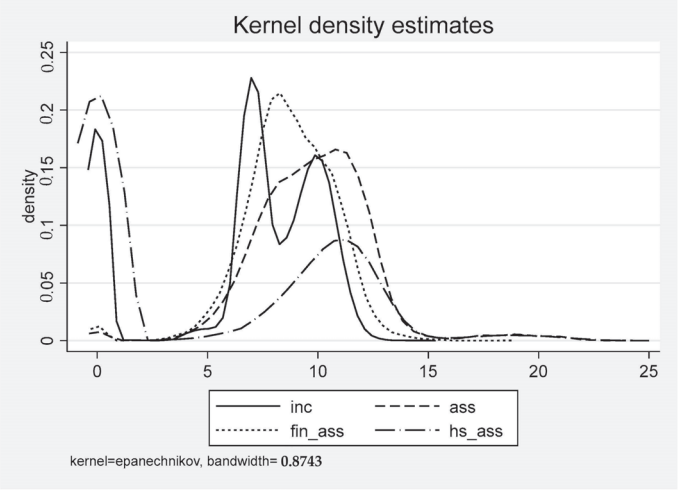


Figure 1. Kernel density of income and assets.

3.2. Non-Parametric Kernel Density Regression Results

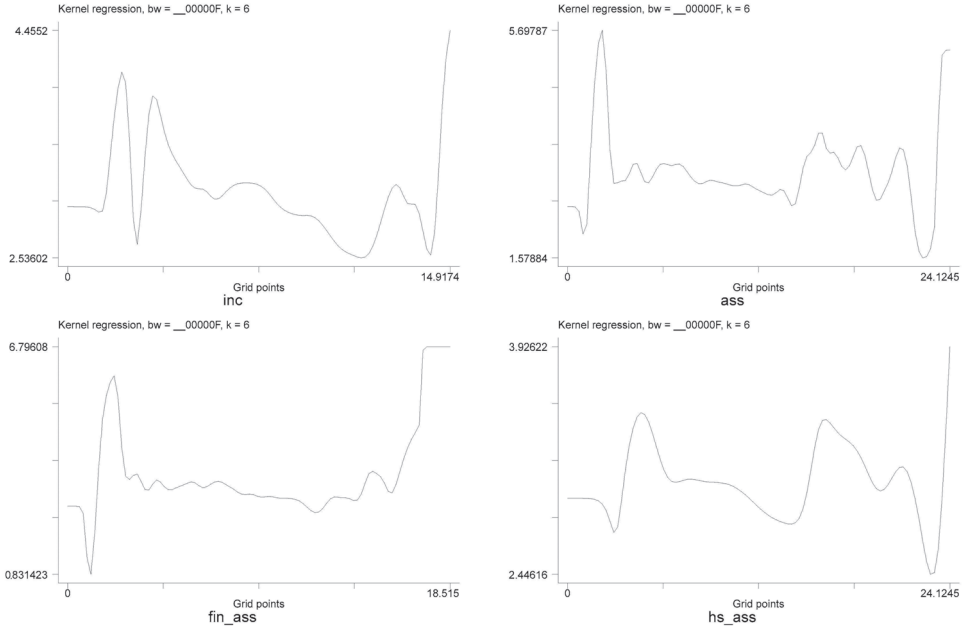
First, the kernel density regression of income, assets, and HE has the following characteristics (as shown in Figure 2a): (1) Income: HE gradually declines with the increase in income and rises abruptly when it exceeds a certain threshold. Locally, HE appears at a double peak before the quarter of the income quantile and suddenly rises and falls. On the one hand, it shows that people's concern about their health has a certain correlation with their income. The extremely low-income groups do not care enough about their health problems because their health problems are in a secondary position compared with economic poverty, which is especially obvious in the vast rural areas in the formerly deeply poor areas. On the other hand, it also shows that rural households just out of poverty are very sensitive to health expenditure; one reason is because they are more concerned about their health problems after poverty alleviation, and the other is that a small change in health expenditure may affect their other normal consumption expenditure, increasing the risk of falling back into poverty. (2) Assets: With the increase of financial assets, although there are certain fluctuations, the overall curve is relatively smooth only after a certain critical value is exceeded. It shows a positive correlation with HE in a small range, which indicates that only the development of financial assets can promote people's demand for health quality. However, the linear relationship between real estate and HE is not clear, which is mainly manifested in the curve peaks at the lower and higher asset levels, respectively, showing different monotonicity in different asset ranges as well as a nonlinear relationship. This

shows that financial assets are more sensitive to health quality demand than real estate, and the future prospects are more promising.

Secondly, the kernel density regression of income and assets and CHE has the following characteristics (as shown in Figure 2b): (1) Real estate and total assets: With the increase in the amount of assets, CHE will increase to a certain extent, but then, it shows a downward trend. However, as the amount of assets increases further, the CHE will increase and then decrease. CHE increases approaching the asset maximum. The influence of real estate and total assets on CHE does not show obvious characteristics. This may be because in the current Chinese household, real estate accounts for an absolute majority of the total assets, so the performance characteristics are the same. At the same time, they do not show a clear signature of catastrophic health expenditures, suggesting that rural households cannot effectively prevent return to poverty due to illness through housing investment. (2) Income and financial assets: In addition to the extreme value of financial assets at a lower level, CHE decreases significantly with the increase in income and financial assets as a whole. This suggests that the impact of financial assets on catastrophic health expenditures has a threshold effect that proves Huang and Shi's view [22,23] from the perspective of returning to poverty due to illness. The explanation is that if financial assets are too small, they have little significance in preventing the return to poverty due to illness. Therefore, it is necessary to find ways to increase the financial assets of rural households as soon as possible until the threshold is reached.

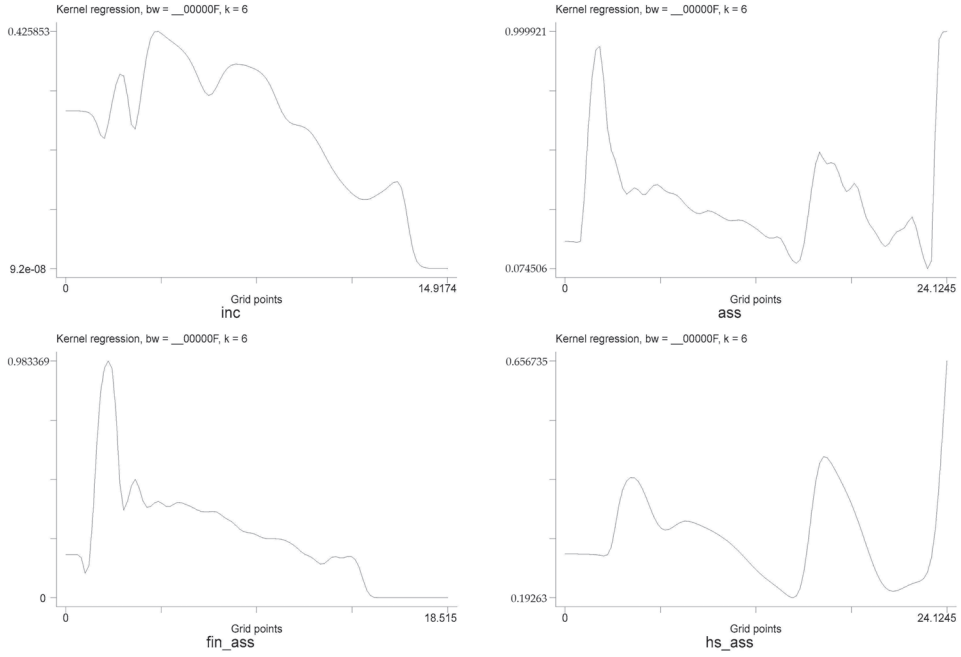
3.3. Financial Assets and Health Expenditures

In Figure 2a, income, assets, and HE show a U-shaped relationship. To test whether this relationship is valid in statistical regression, the influence of the quadratic term was also considered when studying the influencing factors of health expenditure (HE). The regression results are shown in Tables 2 and 3. In the tables, (2–1)–(2–4) show univariate regression, (2–5)–(2–8) introduce quadratic regression, and the same is true below (Tables 3–6).



(**a**)

Figure 2. *Cont*.



(**b**)

Figure 2. Kernel density regression of income, assets, and HE and CHE. (**a**) Kernel density regression of income, assets, and HE. (**b**) Kernel density regression of income, assets, and CHE.

Table 2. Influencing factors for seeking or not seeking medical treatment.

	Margins (Average Marginal Effect)							
	(2–1)	**(2–2)**	**(2–3)**	**(2–4)**	**(2–5)**	**(2–6)**	**(2–7)**	**(2–8)**
inc	0.001				0.007			
	(0.002)				(0.006)			
ass		0.005 **				0.015 *		
		(0.003)				(0.008)		
fin_ass			0.015 *				0.018	
			(0.009)				(0.011)	
hs_ass				0.002				0.002
				(0.001)				(0.003)
inc2					−0.001			
					(0.001)			
ass2						−0.000		
						(0.000)		
fin_ass2							−0.001	
							(0.001)	
hs_ass2								−0.000
								(0.000)
Age	0.001 *	0.001 *	0.001 *	0.001	0.001	0.001 *	0.001 *	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education	0.024 *	0.022 *	0.022	0.023 *	0.025 *	0.022	0.023 *	0.023 *
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.013)
Gender	−0.062 ***	−0.063 ***	−0.063 ***	−0.061 ***	−0.062 ***	−0.063 ***	−0.063 ***	−0.061 ***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)
Marital status	0.006	0.003	0.003	0.003	0.003	0.001	0.001	0.003
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Health status	0.197 ***	0.199 ***	0.199 ***	0.197 ***	0.196 ***	0.199 ***	0.199 ***	0.197 ***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Suffering from chronic disease	0.116 ***	0.116 ***	0.116 ***	0.116 ***	0.116 ***	0.116 ***	0.116 ***	0.116 ***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Medical insurance	0.002	0.003	0.002	0.002	0.001	0.003	0.001	0.002
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Endowment insurance	−0.001	−0.002	−0.003	−0.001	−0.000	−0.003	−0.002	−0.001
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)

Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 3. Influencing factors of health expenditure.

	(3–1)	(3–2)	(3–3)	(3–4)	(3–5)	(3–6)	(3–7)	(3–8)
inc	−0.017 ***				−0.040 *			
	(0.006)				(0.023)			
ass		−0.001				0.012		
		(0.008)				(0.030)		
fin_ass			−0.007				0.061	
			(0.013)				(0.050)	
hs_ass				0.002				0.010
				(0.004)				(0.011)
inc2					0.002			
					(0.002)			
ass2						−0.001		
						(0.001)		
fin_ass2							−0.004	
							(0.003)	
hs_ass2								−0.001
								(0.001)
Age	0.007 **	0.005 **	0.005 *	0.005 **	0.008 ***	0.005 **	0.005 *	0.005 **
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Education	0.037	0.031	0.034	0.029	0.032	0.030	0.040	0.029
	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.053)	(0.052)
Gender	−0.242 ***	−0.225 ***	−0.229 ***	−0.225 ***	−0.231 ***	−0.226 ***	−0.239 ***	−0.229 ***
	(0.063)	(0.063)	(0.063)	(0.063)	(0.064)	(0.063)	(0.063)	(0.063)
Marital status	−0.179 ***	−0.193 ***	−0.191 ***	−0.193 ***	−0.182 ***	−0.194 ***	−0.189 ***	−0.193 ***
	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
Health status	0.062 ***	0.071 ***	0.074 ***	0.068 ***	0.070 ***	0.068 ***	0.064 ***	0.065 ***
	(0.066)	(0.066)	(0.066)	(0.066)	(0.066)	(0.066)	(0.067)	(0.066)
Suffering from chronic disease	0.872 ***	0.882 ***	0.880 ***	0.883 ***	0.876 ***	0.884 ***	0.879 ***	0.883 ***
	(0.047)	(0.047)	(0.047)	(0.046)	(0.047)	(0.047)	(0.047)	(0.046)
Medical insurance	0.066	0.075	0.074	0.077	0.069	0.076	0.072	0.076
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)
Endowment insurance	0.279 ***	0.271 ***	0.273 ***	0.270 ***	0.278 ***	0.271 ***	0.277 ***	0.270 ***
	(0.095)	(0.095)	(0.095)	(0.095)	(0.095)	(0.095)	(0.095)	(0.095)
Constant term	4.014 ***	3.976 ***	4.051 ***	3.960 ***	3.947 ***	3.905 ***	3.818 ***	3.967 ***
	(0.215)	(0.242)	(0.269)	(0.215)	(0.225)	(0.293)	(0.319)	(0.215)

Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

As shown in Table 2, among the core independent variables, only total assets and financial assets passed the significance test. The marginal effect of total assets is 0.005 ($p < 0.05$), indicating that every unit increase in total assets increases the probability of seeking medical treatment by 0.5%. When the secondary term of total assets is introduced, although the effect is ignored, the probability of seeking medical treatment is significantly increased to 1.5% ($p < 0.1$). At the same time, for every unit increase in financial assets, the likelihood of an individual seeking medical treatment increased by 1.5%. This suggests not only that there is a relationship between financial assets and how concerned people are about their health but also, indirectly, that housing plays a small role. Among the control variables, the individual's health status has a significant impact on the probability of seeking medical treatment, and the results passed the test at the significance level of 1%. Among them, compared with those with good health and those without chronic disease, the probability of seeking medical treatment increased by nearly 20% and 12%, respectively, with poor health and chronic disease. In addition, women with compulsory education and older age proved more likely to seek medical treatment.

As shown in Table 3, in terms of influencing factors of health expenditure, among the core independent variables, asset variables did not pass the significance test, while the increase of income level significantly reduced HE by 1.7%, and the conclusion was

very significant ($p < 0.01$). After the quadratic term was introduced, HE decreased by 4% for every 1% increase in income over a 10% confidence interval. Among the control variables, at the significance level of 1%, the variables that are more prominent in increasing the level of HE are, in turn, having chronic diseases, having pension insurance, being female, being single, and having poor health, indicating that these variables have a very significant impact on HE. Among them, the level of HE in people with chronic diseases is nearly 90% higher than that in healthy people, explaining the primary motivation for rural residents' medical expenditure. Interestingly, the application effect of endowment insurance is far from that of medical insurance, which may indicate that the current Chinese medical insurance system is more skewed towed the elderly.

Table 4. Factors influencing catastrophic health expenditures.

	Odds Ratio							
	(4–1)	**(4–2)**	**(4–3)**	**(4–4)**	**(4–5)**	**(4–6)**	**(4–7)**	**(4–8)**
inc	0.966 ***				1.139 ***			
	(0.007)				(0.033)			
ass		0.985				1.020		
		(0.011)				(0.039)		
fin_ass			0.956 ***				1.255 ***	
			(0.015)				(0.074)	
hs_ass				1.005				1.026
				(0.005)				(0.016)
inc2					0.983 ***			
					(0.003)			
ass2						0.998		
						(0.002)		
fin_ass2							0.982 ***	
							(0.004)	
hs_ass2								0.998
								(0.001)
Age	1.028 ***	1.024 ***	1.022 ***	1.025 ***	1.020 ***	1.024 ***	1.021 ***	1.024 ***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)
Education	0.940	0.936	0.952	0.927	0.973	0.935	0.976	0.925
	(0.065)	(0.064)	(0.066)	(0.064)	(0.067)	(0.064)	(0.068)	(0.063)
Gender	1.037	1.060	1.039	1.068	0.965	1.059	1.008	1.059
	(0.088)	(0.089)	(0.088)	(0.090)	(0.083)	(0.089)	(0.086)	(0.089)
Marital status	0.818 ***	0.798 ***	0.807 ***	0.795 ***	0.834 ***	0.796 ***	0.814 ***	0.795 ***
	(0.048)	(0.047)	(0.047)	(0.046)	(0.049)	(0.047)	(0.048)	(0.046)
Health status	1.642 ***	1.677 ***	1.698 ***	1.652 ***	1.544 ***	1.663 ***	1.634 ***	1.638 ***
	(0.143)	(0.147)	(0.149)	(0.144)	(0.135)	(0.146)	(0.143)	(0.143)
Suffering from chronic disease	3.048 ***	3.080 ***	3.041 ***	3.103 ***	2.964 ***	3.087 ***	3.016 ***	3.104 ***
	(0.180)	(0.182)	(0.180)	(0.183)	(0.176)	(0.183)	(0.179)	(0.183)
Medical insurance	1.048	1.065	1.060	1.074	1.018	1.065	1.039	1.073
	(0.077)	(0.078)	(0.077)	(0.078)	(0.075)	(0.078)	(0.076)	(0.078)
Endowment insurance	0.997	0.993	1.003	0.984	1.013	0.991	1.011	0.985
	(0.118)	(0.117)	(0.118)	(0.116)	(0.120)	(0.117)	(0.119)	(0.116)

Exponentiated coefficients. Standard errors in parentheses. *** $p < 0.01$.

Table 5. Robustness test.

	45–60								60+							
	(A-1)		(A-2)		(A-3)		(A-4)		(B-1)		(B-2)		(B-3)		(B-4)	
	Probit	OLS	Probit	OLS	Probit	OLS	Probit	OLS	Probit	OLS	Probit	OLS	Probit	OLS	Probit	OLS
inc	0.002	−0.015 **							0	−0.017						
	−0.002	−0.007							−0.003	−0.011						
ass			0.010 ***	−0.007							0.002	0.001				
			−0.004	−0.014							−0.003	−0.011				
fin_ass					0.009 *	0.006							0.003	−0.011		
					−0.005	−0.021							−0.004	−0.016		
hs_ass							0.002	−0.004							0.001	0.004
							−0.001	−0.006							−0.001	−0.005
Medical insurance	0	−0.021	0.002	−0.008	0	−0.006	−0.001	−0.008	0.002	0.138 *	0.003	0.144 **	0.003	0.141 **	0.003	0.146 **
	−0.023	−0.091	−0.023	−0.091	−0.023	−0.091	−0.023	−0.091	−0.019	−0.071	−0.019	−0.071	−0.019	−0.071	−0.019	−0.071
Endowment insurance	0.0207	0.188	0.02	0.174	0.02	0.169	0.023	0.173	−0.013	0.350 ***	−0.014	0.347 ***	−0.015	0.351 ***	−0.014	0.344 ***
	−0.0407	−0.161	−0.041	−0.161	−0.041	−0.162	−0.041	−0.161	−0.031	−0.118	−0.031	−0.118	−0.031	−0.118	−0.031	−0.118

Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 6. Comparison of urban and rural differences.

	Urban (1009)				Rural (6103)			
	(6–1)	(6–2)	(6–3)	(6–4)	(6–5)	(6–6)	(6–7)	(6–8)
inc	0.982				0.964 ***			
	(0.019)				(0.008)			
ass		0.966				0.989		
		(0.030)				(0.012)		
fin_ass			0.901 **				0.966 **	
			(0.039)				(0.016)	
hs_ass				1.006				1.005
				(0.013)				(0.005)
N	1009	1009	1009	1009	6103	6103	6103	6103

Standard errors in parentheses. ** $p < 0.05$; *** $p < 0.01$.

3.4. Financial Assets and Catastrophic Health Expenses

When studying the influencing factors of catastrophic health expenditure (CHE), the quadratic term was also introduced into the model, and a significant change of the introduced quadratic term was observed.

(1) Core independent variable: In models (4–1) and (4–3), both income and financial assets passed the test at the significant level of 1%; that is, with each unit increase of income and financial assets, CHE incidence is 0.966 times and 0.985 times of the original, and when the corresponding quadratic term was introduced into the model, the conclusion still proved valid (models (4–5) and (4–7)). Currently, the regression probability ratio of the primary term is greater than 1, and the regression probability ratio of the secondary term is less than 1. The curve presents an inverted "U" shape, first increasing and then decreasing, and the income and financial assets at the maximum value are 3.824 and 6.306, respectively, both of which are less than the 1/4 quantile at their respective levels, namely 5.994 and 7.550, indicating that the incidence of CHE will decrease when the individual's income and financial assets exceed a certain amount. The above regression results are consistent with the previous non-parametric kernel density regression. Total assets and housing did not pass the significance test. This suggests that housing plays a small role in preventing rural low-income households from falling into or returning to poverty due to illness, while financial assets and income play an equal or even greater role in this process. The possible explanation is that China's economy mainly concentrates on urban areas rather than rural areas, leading to the restricted exchange value but rigid self-use demand for rural families. In this context, it is nearly impossible to sell real estate to fund the seeking of medical treatment;

(2) Control variables: At the 1% significance level, the model (4–1)–(4–8) had a consistent conclusion: CHE risk increased by 1.02 times (OR = 1.02) with each increase in age of 1 year; the incidence of CHE in married people is 0.8 times that of single people (OR = 0.8). In people with poor health and chronic diseases, the incidence of CHE is about 1.65 times and 3 times higher than that of healthy people. However, it is worth noting that the impact of education and health insurance on catastrophic health expenditures is not significant, which may reflect that compared with low-income households; the overall level of education is not high, both have only the most basic health insurance, and the difference is not large.

3.5. Robustness Test

To test the above regression results, the samples were grouped for regression. Since the quadratic term plays a testing role in the benchmark regression test and does not affect the actual regression result, only the significance of the primary term was analyzed in the robustness test.

At present, the retirement age in China is generally 60 years old, and when they enter the year "sixty and sixty", their income and asset structure will change to a certain extent and gradually change into non-earned income such as pensions. In the previous statistical analysis of the samples, different characteristics were shown before and after the age of 60. Therefore, 60 years old was taken as the cut-off point, 45–60 years old was judged as middle-aged, 60 years old and above was considered as elderly, and the HE model was grouped by age for regression.

The regression results in Table 5 show that the probability of seeing a doctor and the level of HE between the middle-aged group and the elderly group show great differences. For the middle-aged group, the probability of seeing a doctor was still affected by financial assets and total assets and was positively correlated. HE, on the other hand, is a function of income. When income increases by 1%, HE decreases by 1.5%, which is significant at the probability of $p < 0.05$. For the elderly group, it is not the income and asset level that affect the probability of seeing a doctor and the level of HE but the medical insurance and pension insurance. Medical insurance and pension insurance provide residents with certain medical

protection, which will significantly increase the level of HE. All in all, the main determinant of HE was income, but there was an age difference. The middle-aged people are mainly supported by income, and the elderly are mainly supported by medical insurance and pension insurance. Financial assets in asset class variables are the main determinant of the probability of middle-aged and elderly patients seeking medical treatment.

3.6. Urban-Rural Difference Analysis

Due to China's urban–rural dual structure, in addition to the differences in objective living environments, there are also the resulting differences in income, expenditure, assets, insurance, and other social and economic variables; if urban and rural residents are treated equally, it can easily lead to bias in regression. Therefore, it is necessary to group the CHE model according to urban and rural regression.

The regression results in Table 6 show that the decreasing effects of income and assets on CHE are significantly different in urban and rural samples. The accumulation of financial assets significantly reduced the incidence of CHE in both urban and rural subsamples ($p < 0.05$). The difference from the original conclusion is that, compared with the urban group, the CHE of rural residents is also related to income, and CHE decreases by 96.4% when income increases by 1 unit, which passed the test at a significant level of 1%. That is, the main determinants of CHE are income and financial assets, but there are urban–rural differences. Urban groups are mainly supported by financial assets (indicating that urban groups value financial assets more than income due to relatively high education and knowledge quality), while rural groups are mainly supported by income and financial assets. This all indicates that one of the key points for preventing return to poverty in the future should be to improve people's financial assets by improving the financial market and developing the financial market.

4. Discussion

4.1. Main Conclusions

The COVID-19 epidemic that has lasted for more than three years has not only greatly increased the burden of health expenditure on rural families but also increased the risk for rural families who have just stepped out of absolute poverty to return to poverty due to reduced economic income as a result of illness. The difficulty of liquidity also highlights the importance of household assets, including housing and financial assets, as another important barrier against the return to poverty due to illness. However, the decadence of the real estate market and the central "housing does not speculation" positioning have undercut its preservation and appreciation function and financial assets. Due to its prominent position in the national economy, the strong support of policies, and the general improvement of people's financial literacy, the asset threshold is far lower than real estate investment and other multiple factors superimposed, and the status of the barrier against returning to poverty due to illness is increasingly significant. The empirical results of this paper also support this conclusion. Based on the CHARLS database, this paper discusses the impact of financial assets on the health expenditure and catastrophic health expenditure of Chinese rural households by using non-parametric kernel density regression and two-part model to argue that "moving to the financial market can be a feasible option to prevent Chinese rural households from returning to poverty due to illness in the future". The main conclusions include the following:

First, although it is mobile income that has the greatest impact on rural households' health expenditure, financial assets have a significant impact on the probability of visiting a doctor, which represents people's concern about their health. This can be seen in Tables 2 and 3. This shows that to build a "healthy China" in the future, it is necessary to develop the financial market to enhance the financial assets of the people.

Second, the impact of financial assets on the incidence of catastrophic health expenditures when representatives of rural households return to poverty due to illness is significant. From the results in Table 4, it can be seen that financial assets passed the test at the sig-

nificant level of 1%; that is, with each unit increase in financial assets, the incidence of catastrophic health expenditure is 0.985 times the original. This is basically in line with the view of Zhou D. et al. (2019) [38] that household asset endowment prevents return to poverty, which made a breakthrough in focusing on healthy return to poverty. However, the non-parametric kernel density regression results in Figure 2 also show that the impact of financial assets on catastrophic health expenditure has a threshold effect, and if the financial assets are too few, it has little significance in preventing the return to poverty due to illness [28]. Therefore, it is necessary to find ways to increase the financial assets of rural households as soon as possible until the threshold is reached.

Third, financial assets play a greater role than housing in preventing rural households from falling back into poverty due to illness. The non-parametric kernel density regression results in Figure 2 not only show that rural households cannot effectively block the return to poverty due to illness through real estate investment but also that financial assets are more sensitive to health quality demand than real estate. Table 4 also proves that real estate plays a small role in preventing rural low-income families from falling into or returning to poverty due to illness. This rejects the conclusion of Che [43]. While financial assets and income play an equal or even greater role in this process, this shows that one of the key points of preventing poverty in the future should be to increase the financial assets of rural households by improving and developing financial markets. At present, the only way for people to invest is financial assets such as houses and stocks. In the current situation where the development of the real estate market is not optimistic, the financial market is particularly important and has more advantages than housing investments, such as the original capital threshold requirements, but it puts forward higher requirements for professionalism and people's knowledge quality.

4.2. Policy Suggestion

Therefore, this paper argues that "moving towards the financial market can be a viable option for rural households to prevent the return to poverty due to illness in the future" and puts forward the following policy recommendations:

First of all, the development of financial markets, scientific allocation of financial resources, and expansion of financial channels should be standardized. According to the stage of economic development and regional characteristics, we must scientifically allocate different financial channels and financial resources in rural areas, especially in the formerly deeply impoverished areas that have just achieved poverty alleviation, such as the three districts and three states [14]. Wang H. and Wen T. et al. (2018) claimed that rural finance in China's deeply poor areas shows more obvious features of "benefiting wealth"; that is, the income increase effect of "elite farmers" is much higher than that of "poor farmers" [16]. Therefore, it is necessary to improve the accuracy of financial resource investment in the original deep poverty areas, improve the rural financial system in the original deep poverty areas, and consolidate the basic conditions for rural financial poverty reduction and income increase in the deep poverty areas. Finally, the deep combination of financial resources and production factors can be realized from different dimensions of financial development scale, efficiency, and service degree. In addition, we should strictly regulate the development of the financial market so that ordinary people's financial investment can steadily increase in value.

Secondly, by promoting the development of Internet credit and Internet insurance through digital financial inclusion (i.e., financial availability), rural poverty can be alleviated directly, while rural poverty can be alleviated indirectly by increasing the employment of individuals and private enterprises (i.e., economic opportunities). At present, China's rural digital inclusive finance should still be aimed at directly increasing the financial availability of poor farmers [26]. The realization of financial availability can enable young family members to obtain their benefits through their efforts without requiring too many complicated interpersonal relationships and while avoiding the current powerless mentality of many young people due to high housing prices and other reasons.

Thirdly, the level of education must be improved to promote the improvement of financial literacy. The level of financial literacy of family members, such as personal financial knowledge and social network relationships, plays a very important role in the poverty vulnerability of rural families. Financial knowledge level and social network significantly reduce the possibility of household poverty, and the increase in the breadth and depth of the use of Internet finance can alleviate the multidimensional poverty of farmers by improving non-agricultural employment opportunities, expanding e-commerce business, and improving financial literacy.

Finally, the members of rural families should strengthen the integration and reasonable planning of the family's available resources to maintain and increase the value of financial assets and play the threshold line of blocking the effect of returning to poverty due to illness. One is the accumulation of existing assets, and the second is the combination of high and low risk and utilizing income of different financial varieties.

5. Conclusions

The difficulty of income growth of rural households and the expected reduction of the function of property preservation and appreciation have suddenly shown the increasingly prominent role of financial markets. Based on CHARLS data, this paper empirically explores the relationship between financial assets and health expenditure and catastrophic health expenditure (representing the incidence of return to poverty due to illness) to explore whether access to financial markets can be a viable option to prevent rural households from returning to poverty due to illness in the future. Although our study is promising, there are some limitations. For example, in the context of the current downturn in China's financial markets, this study seems inappropriate. In addition, due to the availability of data, this paper adopts 2018 data. Nevertheless, these factors should not constitute a fundamental obstacle to the study in this paper. In future studies, we hope to obtain more updated data for more in-depth research. Moreover, with reference to the economic development trend and financial market trend of countries with perfect market economy systems, such as the United States, we believe that access to the financial market is important for all Chinese people, including rural families, in protecting their wealth in the future, as preliminarily discussed in this paper. It may be difficult in the short term, but in the future, with the improvement of the quality of people's knowledge and the improvement of the economic system, we firmly believe in this view.

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References

1. Chuma, J.; Maina, T. Catastrophic health care spending and impoverishment in Kenya. *BMC Health Serv. Res.* **2012**, *12*, 413. [CrossRef] [PubMed]
2. Bredenkamp, C.; Mendola, M. Catastrophic and impoverishing effects of health expenditure: New evidence from the western Balkans. *Health Policy Plan.* **2011**, *26*, 349. [CrossRef] [PubMed]
3. Yang, W. Catastrophic health expenditure. *Lancet* **2014**, *362*, 996.
4. Kirigia, J.; Preker, A.; Carrin, G.; Mwikisa, C.; Diarra-Nama, A. An overview of health financing patterns and the way forward in the who african region. *East Afr. Med. J.* **2006**, *83*, S1–S28. [CrossRef] [PubMed]
5. Li, Y.; Wu, Q.; Xu, L.; Legge, D.; Hao, Y.; Gao, L.; Ning, N.; Wan, G. Factors affecting catastrophic health expenditure and impoverishment from medical expenses in China: Policy implications of universal health insurance. *Bull. World Health Organ.* **2012**, *90*, 664–671. [CrossRef] [PubMed]
6. Sen, A. Capability and Wellbeing. In *The Quality of Life*; Nussbaum, M., Sen, A., Eds.; Clarendon Press: Oxford, UK, 1993; pp. 30–53.
7. Zhu, M.; Yu, X.; Wang, M.; Xiong, X. Evaluation of household catastrophic medical expenditure and serious illness insurance compensation model in China. *Econ. Res. J.* **2017**, *52*, 133–149. (In Chinese)
8. Cylus, J.; Thomson, S.; Evetovits, T. Catastrophic health spending in Europe: Equity and policy implications of different calculation methods. *Bull. World Health Organ.* **2018**, *96*, 599. [CrossRef] [PubMed]
9. Tirgil, A.; Dickens, W.T.; Atun, R. Effects of expanding a non-contributory health insurance scheme on out-of-pocket healthcare spending by the poor in Turkey. *BMJ Glob. Health* **2019**, *4*, e001540. [CrossRef]
10. Aryeetey, G.C.; Westeneng, J.; Spaan, E.; Jehu-Appiah, C.; Agyepong, I.A.; Baltussen, R. Can health insurance protect against out-of-pocket and catastrophic expenditures and also support poverty reduction? Evidence from Ghana's National Health Insurance Scheme. *Int. J. Equity Health* **2016**, *15*, 116. [CrossRef]
11. Karan, A.; Yip, W.; Mahal, A. Extending health insurance to the poor in India: An impact evaluation of Rashtriya Swasthya Bima Yojana on out of pocket spending for healthcare. *Soc. Sci. Med.* **2017**, *181*, 83–92. [CrossRef]
12. Xu, X.; Yang, H. Elderly chronic diseases and catastrophic health expenditure: An important cause of Borderline Poor Families' return to poverty in rural China. *Humanit. Soc. Sci. Commun.* **2022**, *9*, 291. [CrossRef]
13. Gao, P. Fiscal Poverty Alleviation: The Practical Guarantee of Rural People's Livelihood in the Financial Storm—Commenting on Yan Kun et al. Research on Fiscal and Tax Policies for Poverty Reduction in Rural China. *Fisc. Res.* **2009**, *5*, 80–81. (In Chinese)
14. Fu, Z.; Zhang, Q. Analysis of poverty reduction effect of rural financial channels based on PSTR model. *J. Zhongnan Univ. Econ. Law* **2016**, *3*, 78–86. (In Chinese)
15. Liu, F.; Liu, M. Research on the Dynamic Poverty Reduction Effect of Rural Financial Development in Concentrated Contiguous Poverty-stricken Areas: Based on the Empirical Analysis of 435 Poverty-stricken Counties. *J. Minzu Univ. China (Philos. Soc. Sci. Ed.)* **2017**, *44*, 71–79. (In Chinese)
16. Wang, H.; Wen, T.; Han, J. Rural Finance and Rural Household Income Growth in Deeply Impoverished Areas: Poverty or Prosperity? *Contemp. Financ. Econ.* **2018**, *11*, 44–55. (In Chinese)
17. Zhang, B.; Weng, C. Poverty reduction effect of rural financial development: Spatial spillover and threshold characteristics. *Agrotech. Econ.* **2015**, *9*, 37–47. (In Chinese)
18. Kuang, X. The mechanism and effect of China's financial poverty reduction under the guidance of monetary policy. *J. Financ. Econ.* **2019**, *34*, 72–83. (In Chinese)
19. Su, J.; Hu, Z.; Tang, L.; Xiao, P. Threshold characteristics and regional differences of poverty reduction effect of rural informal finance development: An analysis based on panel smooth transformation model. *China Rural Econ.* **2013**, *7*, 58–71. (In Chinese)
20. Su, J.; Hu, Z. Direct Effects and Mediation Effects of Rural Financial Poverty Alleviation—Dynamic Analysis Based on State-Space Model and Mediation Effect Test. *Financ. Econ.* **2015**, *36*, 33–38. (In Chinese)
21. Fu, P.; Zhang, P. The threshold effect and regional differences of rural financial development and poverty reduction—Empirical data from China. *Contemp. Financ. Econ.* **2016**, *6*, 55–64. (In Chinese)
22. Shi, R.; Xu, Z.; Zhao, Y. The threshold effect of financial poverty reduction and its empirical test: Based on the interprovincial panel data in western China. *China Soft Sci.* **2013**, *3*, 32–41. (In Chinese)
23. Huang, D.; Xu, X.; Fang, J. Research on the poverty reduction effect of financial inclusion in China on rural poor population. *J. Demogr.* **2019**, *41*, 52–62. (In Chinese)
24. Huang, Q.; Li, Z.; Xiong, D. The poverty reduction effect and transmission mechanism of digital inclusive finance. *Reform* **2019**, *11*, 90–101. (In Chinese)
25. He, Y.; Li, J. The poverty reduction effect and employment mechanism of digital inclusive finance. *Consum. Econ.* **2021**, *37*, 69–79. (In Chinese)
26. Liu, J.; Liu, C. The effect of digital financial inclusion on rural poverty reduction: Effects and mechanisms. *J. Financ. Econ.* **2020**, *1*, 43–53. (In Chinese)
27. Zhang, D.; Yin, Z.; Sui, Y. Can financial inclusion improve the quality of poverty reduction?—Based on the analysis of multidimensional poverty. *South. Econ.* **2020**, *10*, 56–75. (In Chinese)
28. Shi, R. The multi-dimensional poverty reduction effect of financial development in western China: An empirical analysis based on spatial panel quantile model. *Fujian Forum (Humanit. Soc. Sci. Ed.)* **2020**, *2*, 91–99. (In Chinese)

29. Zhang, M.; Li, G.; Hou, Y. From poverty alleviation to rural revitalization: How to prevent financial literacy from falling back into poverty. *Stat. Inf. Forum* **2022**, *37*, 117–128. (In Chinese)
30. Pan, X.; Zhang, W. Is financial literacy good for rural poverty reduction? *Rural Econ.* **2020**, *9*, 99–109. (In Chinese)
31. Wang, Y.; San, D.; Zhuang, T. Research on the impact of financial knowledge and social network on poverty reduction in ethnic areas. *J. Ethnol.* **2020**, *11*, 32–43+127–129. (In Chinese)
32. Li, J.; Shen, Y.; Yang, J.; Chen, Q. Research on the impact of Internet finance use on multi-dimensional poverty reduction of rural households. *Stat. Inf. Forum* **2021**, *36*, 104–118. (In Chinese)
33. Ding, J.; Yuan, Y.; Liang, S. Financial Poverty Alleviation: Analysis of the Interaction between Digital Finance and Traditional Finance and Its Relative Importance. *J. Int. Financ. Res.* **2022**, *9*, 14–24. (In Chinese)
34. Liu, H.; Wang, H.; Xie, Z. Analysis of Rural Financial Development, Financial Support for Agriculture and Poverty Reduction in Western Region: Based on Panel Threshold Model. *Stat. Inf. Forum* **2018**, *33*, 51–57. (In Chinese)
35. Wang, W.; Sun, X. Research on medical insurance, health capital and household financial asset allocation. *Insur. Res.* **2020**, *1*, 87–101. (In Chinese)
36. Fu, X.; Qu, S.; Tian, B.; Li, Y. Research on financial asset decision-making of elderly households in China from the perspective of health shock. *Forecast* **2020**, *39*, 83–89. (In Chinese)
37. Zhang, J.; Shi, X.; Cao, Y. Financial risk assessment of middle-aged and elderly households under dynamic health shock. *J. Financ. Econ.* **2022**, *48*, 153–168. (In Chinese)
38. Zhou, D.; Wang, M. The internal logic of the phenomenon of falling back into poverty: Theory and verification of vulnerability poverty alleviation. *J. Financ. Econ.* **2019**, *45*, 126–139. (In Chinese)
39. Moser, C. *Reducing Global Poverty: The Case for Asset Accumulation*; Brookings Institution Press: Washington, DC, USA, 2008.
40. Haveman, R.; Wolff, E.N. *Who Are the Asset Poor? Levels, Trends and Composition, 1983–1998*; Working Paper No. 00–12; Washington University Center for Social Development: St. Louis, MO, USA, 2000.
41. World Health Organization. *The World Health Report 2000: Health Systems: Improving Performance*; World Health Organization: Geneva, Switzerland, 2000.
42. Nadaraya, E.A. On Estimating Regression. *Theory Probab Its Appl.* **1964**, *9*, 141–142. [CrossRef]
43. Che, X.; Li, J.; Fu, W.; Fang, F. Association between livelihood capital and catastrophic health expenditure among patients with critical illness: A cross-sectional study in rural Shandong, China. *BMJ Open* **2021**, *11*, e051234. [CrossRef]

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Do Clean Toilets Help Improve Farmers' Mental Health? Empirical Evidence from China's Rural Toilet Revolution

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Abstract: The mental health crisis poses a major challenge to global sustainable development. In response, the United Nations has launched an ambitious plan to "reshape the environment that affects mental health". Clean toilets are an important measure of civilization, yet it is unclear whether they are helping to alleviate the global mental health crisis. Therefore, using data from a large sample of rural Chinese households and introducing an instrumental variables approach based on the IV-Tobit model to address endogeneity, this study quantitatively discusses that clean latrines have a positive effect on the mental health of farm households. The results showed the following: (1) 89.8% of Chinese rural households had clean toilets, while the average farm household depression index was 12.568; and (2) clean toilets helped to improve the mental health of farmers, which means that the depression index of farmers with clean toilets decreased by 66.9% compared to farmers without clean toilets. The findings of this study can inform the development of policies to mitigate the global mental health crisis and contribute to the resilience of global development.

Keywords: clean toilets; mental health; toilet revolution; IV-Tobit model; China rural

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1. Introduction

Mental disorders are a major public health problem affecting patients, society, and the entire nation [1]. The World Health Organization has announced that nearly 1 billion people worldwide suffered from mental disorders in 2019, which means that 1 in 8 people suffered from a mental disorder. For individuals, mental disorders have a significant negative impact on a patient's labor force participation, with people with mental disorders losing an average of 10.52 additional years of work [2]. Mental illness can also lead to a greater likelihood of leaving school early, a lower likelihood of obtaining full-time employment, and a reduced quality of life. In addition, all people with mental disorders have an increased risk of premature death [3]. For the whole of society and the economy, mental disorders can cause an increase in total economic costs. A Canadian study suggests that the total economic costs associated with mental illness will increase six-fold over the next 30 years, and could exceed $2.8 trillion based on 2015 Australian dollars [4]. As a result, how to effectively curb the spread of the global mental illness crisis has become a research priority for the academic community.

The lifetime prevalence of mental disorders in China is 16.6%, meaning that 230 million people will suffer from mental disorders in their lifetime. The insidious nature of mental illnesses has led to the frequent problem of Chinese patients suffering from mental illnesses and failing to recognize their illnesses or seek timely medical attention. This will lead to tragic consequences, such as a rural suicide rate of 7.04 per 100,000 in 2019, a suicide rate among China's elderly that is 2.75 to 7.08 times higher than that of the general population, and a continued rise in psychological problems among left-behind children [5]. Rutter [6]; Clark et al. [7]; Evans [8] showed that the environment can effectively improve

mental health. Therefore, this paper starts from the perspective of the toilet revolution in China's habitat improvement, quantitatively investigates whether this environmental reform can improve the level of human mental health, and proposes Hypothesis H1: The toilet revolution has a positive effect on the mental health of farmers.

Firstly, the definition of mental disorders. Current research findings have classified mental disorders into 11 conditions: panic disorder, social phobia, simple phobia, major depressive disorder, obsessive-compulsive disorder, substance abuse/dependence, alcoholism/dependence, personality disorder, schizophrenia, bipolar disorder, and dementia in those older than 65 years of age [9]. This shows that depression is an important part of mental disorders. According to a WHO analysis, a quarter of the world's population suffers from a mixture of the more common mental disorders, usually anxiety and depression [10]. Thus, the key to effectively addressing mental disorders, an important issue in global sustainable development, is how to effectively address depression, which in turn comes to significantly alleviate the global problem of mental illness. Studies by Slyepchenko et al. [11] and Yang et al. [12] have shown that the disruption of the gut microbiome is associated with Major Depressive Disorder (MDD) and that disruption of the gut microbiome will lead to MDD through some mechanism. Phillips et al. [13] believe that the living environment has a positive impact on mental health, and Li and Zhou [14] believe that living environment interventions, such as environmental improvements to indoor home facilities, are an effective way to reduce the risk of depressive symptoms in middle-aged and older Chinese people. This study hypothesizes that improving physical health and living environments can be effective in improving depression and alleviating mental disorders, ultimately contributing to sustainable global development at both individual and socio-economic levels.

The state of physical health and living conditions in rural areas are not encouraging. It is estimated that as of 2017, 880 million people were living in slum-like conditions, with approximately 50% living in rural areas where conditions still needed to continue to improve [15]. The UN Millennium Development Goals (MDGs) report suggests that global basic sanitation coverage was only 67% as of 2015, well below the 75% coverage needed to achieve the MDGs. Poor sanitation around the world has led to increased disease prevalence and environmental pollution (MFA and UN, 2015, UNICEF and WHO, 2015); 1.5 million children die from diarrhea each year [16]. This shows that the toilet revolution, which is an important measure to improve health and living conditions, cannot be delayed.

The toilet revolution refers to the renovation of toilets in developing countries, and discussions about a revolution in public toilets were raised in public media in China as early as the early 1990s. The Five-Year Action Proposal for the Improvement and Upgrading of the Rural Habitat Environment (2021–2025) proposes that during the implementation of the proposal, the rural toilet revolution should be promoted solidly, including important initiatives such as gradually popularizing rural sanitary toilets, effectively improving the quality of toilet conversion, and strengthening the harmless treatment and resourceful use of toilet waste. The implementation of these elements will effectively improve the living environment and deter the spread of the virus. As known from the previous content, both physical health status and the level of the living environment act as important factors affecting mental health. However, few studies have demonstrated the impact of the toilet revolution on psychological health based on the above factors. Therefore, this study will use this to investigate the impact of the toilet revolution on the psychological health of farmers and to quantify the extent of the impact.

Mental disorders are spreading globally, especially in developing countries. Therefore, this study is based on China, the world's largest developing country. While previous studies have focused on the palliation of psychiatric disorders by pharmacological treatments, this study focuses on the palliation of psychiatric disorders by non-pharmacological treatments, which is one of the contributions to the scientific value of this paper. Most existing studies have used a single indicator to measure the depression of farmers, such as Corrigan et al. [17], Hayes and Poland [18], and Makwana [19]. It is difficult for a single

indicator to reflect the overall mental state of farmers. In this study, the Likert scale method and entropy weighting method were used to measure the depression index of farmers. Existing studies have generally used simple empirical methods, such as the DID model [20], Multiple linear regression [21], or the O-probit model [22]. In this way, the endogeneity of farmers' behavioral decisions is ignored, and the results of the study may be biased. Thus, this study uses the IV-Tobit model to introduce instrumental variables to overcome potential endogeneity problems.

2. Theoretical Analysis and Research Hypothesis

Rose et al. [23] indicate that approximately 179 million farming households will still be using traditional dry latrines by 2022. However, this practice poses a significant health risk as human feces contain high levels of organic pollutants, viruses, pathogenic bacteria, and parasite eggs. For instance, diseases such as COVID-19 can be spread through the fecal-oral route as shown by Caruso and Freeman [24]. The absence of proper sanitation facilities can create an environment that promotes the spread of bacteria and viruses. Furthermore, the improper handling of manure can lead to the pollution of air, soil, water, and food, resulting in adverse effects on the living environment [25]. Research has shown that the living environment has a significant impact on mental health. Phillips et al. [13] found that a positive living environment could improve mental health. Li and Zhou [14] suggested that improving indoor home facilities could reduce the risk of depressive symptoms among middle-aged and older adults in China. Studies have also shown that older people benefit from a favorable environment [26–30]. Norling et al. [31] and Ishida et al. [32] found that some toilet environments are perceived as unsafe, dirty, smelly, and unpleasant. However, attitudes towards these environments can be changed by modifying them, such as changing the dark and damp environment, increasing privacy, and reducing exposed feces. Yang and Yuan [33] suggested that the environment has a significant impact on people's moods, behaviors, and habits, and therefore improving sanitation facilities can improve people's living conditions and overall well-being.

Ali et al. [34] and Paddy et al. [35] believe that the virus is transmitted through aerosols produced when flushing water and that the virus comes into contact with the human gut through the respiratory tract, resulting in the onset of diarrhea and malaria. Wang and Liu [36] indicated that COVID-19 transmission is associated with feces, meaning that exposed feces have the potential to transmit the virus. Some scholars believe that the lack of a toilet revolution or the poor condition of the toilets has led to a sharp increase in schistosomes and parasites through the contamination of water by exposed feces. This in turn has affected the rate of schistosomal infections, increased the rate of vector-borne organisms, and increased the number of E. coli, thus affecting health [37,38]. Zhou et al. [39] found that urine and excrement tend to cling to dry concrete toilets, releasing unpleasant odors and bacteria, and spreading disease, posing a threat to human health and environmental safety. Akaishi et al. [40] indicated that the restoration of toilet hygiene was associated with a reduction in the prevalence of gastrointestinal infectious diseases. The rural toilet reform significantly reduced farmers' expenditure on health care and had a significant positive impact on the health level of rural residents. Thus, a well-implemented toilet revolution can be a good way to improve people's physical health. Kiseleva and Strielkowski [41] found that the most important factor affecting well-being is health, and based on this it can be inferred that improved physical health can help reduce depression.

In summary, the toilet revolution will have a positive impact on farmers' mental health through two mechanisms: changing the living environment and improving farmers' physical health. This means that a good implementation site for the toilet revolution has a significant positive impact on farmers' mental health, as shown in Figure 1. Therefore, this paper proposes Hypothesis H1: The toilet revolution has a positive effect on the mental health of farmers.

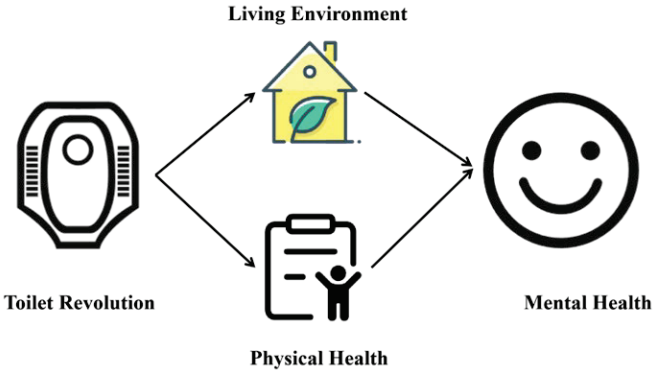

Figure 1. Mechanism diagram.

3. Data, Variables, and Method

3.1. Data

The data used in this article are mainly from the China Land Economic Survey, 2020 and 2021 (http://jscv.njau.edu.cn, accessed on 1 January 2022). This database survey uses the PPS sampling method to sample 52 administrative villages and 2600 farming households in 13 prefecture-level cities in the Jiangsu province, based on the establishment and survey of fixed rural observation points, covering aspects such as ecological environment, green development, poverty alleviation, rural governance, rural construction, etc. The questionnaire includes questions about the toilet revolution, such as the type of toilet and whether it can be flushed, and questions about mental health, such as whether they have felt depressed and happy recently.

The purpose of this study is to examine the impact of the toilet revolution on the mental health of farming households. Reference literature of Cheng et al. [15] and Wang and Shen [20], among the variables selected, were those related to the toilet revolution and mental health, and the remaining sample of 5039 farmers was processed by deleting missing values, and so on.

3.2. Variables

3.2.1. Explained Variables

This study uses the mental health status of farmers as the explanatory variable and aims to discuss the impact of the toilet revolution on the mental health status of farmers. The questionnaire asks respondents if they have felt anything in the past week including a low mood, struggling to do anything, not sleeping well, feeling happy, feeling lonely, living happily, feeling sad and upset, and feeling unable to go on with their lives, and the respondents complete a five-point scale depending on the level of impact. By normalizing the eight indicators through the entropy weighting method, the score is calculated by calculating the entropy value and entropy weighting, that is the depression index (0–100); the higher the index the higher the degree of depression. The process of calculating the depression index is shown in Appendix A.

3.2.2. Explained Variables

The "Availability of flushable toilet conveniences" was used as the core explanatory variable in this study. The question "type of toilet" in the China Land Economic Survey was selected, and toilets with flushing devices were assigned a value of 1, which means 1 = clean toilet, while the rest were assigned a value of 0, which means 0 = non-clean toilet. As the 'toilet revolution' continues, local governments are optimizing their standards and requirements, from standard to comfortable, and from tidy to beautiful. The sanitary code for public toilets issued by the State Administration of Market Supervision and Administration and the National Standardization Administration of China (https://openstd.samr.gov.cn,

accessed on 1 January 2022) clearly states that harmless sanitary toilets are the following: the septic tank type with three or more compartments with front-end treatment facilities, the digester type, the double and triple urn type, the urine and feces separation type, and the flush type with complete water and sewerage. Based on the above requirements, the existing toilet situation can be categorized into toilets with flushing devices and toilets without flushing devices, while the models in the normative standards all belong to toilets with flushing devices. This study focuses on sanitary toilets and therefore uses the availability of flushable toilet conveniences as a criterion for the development of a toilet revolution.

3.2.3. Control Variables

To improve the estimation power of the model, in selecting the control variables, this study refers to Al-Butmeh and Al-Khataib [42], Feng et al. [43], Zeng and Jian [44], Chang et al. [45] and Shields-Zeeman and Smit [46], While these scholars selected age, education level, and economic income as control variables in their studies, this study added some factors affecting the mental health of farmers as control variables. These control variables include personal characteristics of the farm household (for example, age of the farm household, education level of the farm household, whether the farm household is engaged in agricultural production, self-rated health of the farm household), social and economic characteristics of the household (for example, the structure of household education level, household economic income, whether the household is located in a plain area) and environmental characteristics.

3.2.4. Descriptive Statistics

Table 1 presents the definitions of the variables and descriptive statistics for this study. The multiple variables used in the study were binary discrete variables. For example, the toilet revolution situation where it is a clean toilet took the value of 1 and the non-clean toilet took the value of 0. As can be seen from Table 1, the average depression index of respondents in the sample was 12.568, which was relatively good for depression, and 89.8% of households had completed the toilet revolution, indicating that the toilet revolution process was advancing significantly. The average age of respondents was approximately 62 years, indicating that the majority of those living in rural areas are older, middle-aged, and elderly and that middle-aged and elderly groups were more likely to suffer from mental disorders, making it significant to focus on those living in rural areas. Only 14.6% of respondents had a high school or higher degree of literacy, with a generally low level of education in rural areas. A total of 84.2% of the sample used smartphones, but only 45% used the internet. In total, 85.5% of the households in the sample were situated in the plains with relatively flat terrain, and 34.5% of them considered their villages to be polluted, thus showing the need for habitat improvement.

3.3. Method

3.3.1. Baseline Model

This study aims to discuss the quantitative impact of the toilet revolution on the psychological health of farmers. The dependent variable is the depression index of farmers, which is a two-sided restricted truncated model with 0–100, and the independent variable is the status of the toilet revolution, which is a binary variable: 1 = clean toilets, which means a toilet revolution is taking place; and 0 = non-clean toilets, which means no toilet revolution is taking place. Thus, this study uses the Tobit regression model as the baseline model for the study to analyze the quantitative relationship between the toilet revolution and farmers' mental health, with the following estimated equation:

$$y^* = \beta_0 + \beta_1 \text{Clean}_{\text{toilet}i} + \beta_2 X_i + \mu_i \quad (1)$$

$$y = \max(0, y^*) \quad (2)$$

When $y^* > 0$, y = y^*; others, y = 0. The explanatory variable y is mental health status (depression index), y^* is the observed value of mental health status, and the explanatory variable is the status of the toilet revolution, The random error term μ_i follows a normal distribution. The regression coefficient β_0 is a constant term, β_1 measures the impact of the toilet revolution on the mental health of farmers, and β_2 measures the effect of control variables on the mental health of farmers.

Table 1. Variable definitions and descriptive statistics results.

Variable Name	Meaning of Variables	Mean
Depression Index	Depression Index, (The higher the value from 0 to 100, the deeper the depression)	12.568
Clean toilet	The toilet revolution (1 = clean toilet; 0 = non-clean toilet)	0.898
Age	Age of interviewees (year)	61.572
Gender	Gender of interviewees	0.712
Education	Whether have a high school diploma or above (1 = yes; 0 = no)	0.146
Health	Household respondents' self-rated health (1 = healthy; 0 = no)	0.873
Job	Whether the household respondent is engaged in agricultural production (1 = yes; 0 = no)	0.701
Environmental perception	Whether the household respondent believes the village is polluted (1 = yes; 0 = no)	0.345
Household income	Interviewees' annual household income	11.313
Household burden	Annual Household Burden of Interviewees	39.904
Household education	Proportion of high school and above civilian employees in the household to total household size (%)	21.817
Cadre	Is a leader (1 = yes; 0 = no)	0.153
Farm asset	Assets on the farm	0.188
Smartphone	1 = use of smartphone; 0 = other	0.842
Internet use	1 = use of the Internet; 0 = other	0.450
Plain	1 = if the household is located on the plain; 0 = other	0.855
Distance	Distance from town	6.184
Variable name	Meaning of variables	Mean

The Tobit model, as a truncated-tailed regression model, is applicable to the data characteristics of this study. However, the reason for not choosing the OLS model and DID model is that these models do not fit well enough with the data in this study. For example, the OLS model is suitable for a stable linear relationship between the independent and dependent variables and the dependent variable is a continuous variable. However, the independent variable (explanatory variable) in this study is a binary variable.

3.3.2. Description of Model Endogeneity

This study notes that the status of the toilet revolution and the mental health of farmers may be causal, which can lead to endogeneity problems in the above model setting. Specifically, the toilet revolution may affect the mental health status of farmers, which is the area that this study focuses on. However, the state of the toilet revolution may also be influenced by the mental health of the farmers.

For example, a farmer with a mental disorder may need more care and attention from family, friends, and others. The cleaner the toilet, the closer people will be to the household and thus to the farmer with a mental disorder who needs care and attention. Further, to a certain extent, the farmer with a mental disorder can influence the behavior of others and thus contribute to the progress of the toilet revolution. Of course, another possibility exists: because OCD is one of the obvious symptoms of depression, depression and anxiety are the real causes of OCD [47]. Therefore, patients suffering from depression tend to be more compulsive and will have stricter requirements for their living environment, such as rubbish must be in the trash, and so on. Similarly, they will have a stronger desire to renovate unclean toilets as a way of promoting a toilet revolution.

In conclusion, either of the above scenarios implies that the toilet revolution is a self-selected behavior of the farmers rather than a random occurrence. This would lead to the inability of this study to properly infer the impact of the toilet revolution on the mental health of the farmers.

3.3.3. Selection of Tool Variables

To solve the endogeneity problem, this study proposes to introduce instrumental variables to the IV-Tobit model. The criteria require that the instrumental variables are correlated with the endogenous variables and uncorrelated with the explanatory variables. Existing studies chose the amount of investment in rural toilet conversion as an instrumental variable to explain the endogeneity problem, but no relevant data were available in the China Land Economic Survey and could not be used in this study. This study, therefore, uses another more commonly used instrumental variable, the proportion of behavioral occurrences of other people within the same village, by calculating the proportion of behavioral occurrences of other people within the same area. The behavior of others in the same village may influence the person's choice. For example, if people in the same village have renovated the exterior of their houses to make the whole village look neat and tidy, the person may also involuntarily choose to renovate the exterior of their house, either because they are influenced by the herd mentality or because they do not want their house to be out of harmony with the overall environment. Similarly, when the number of farmers who choose to build clean toilets increases throughout the village, it will lead to the rest of the people choosing to build clean toilets as well, that is, it will lead to a toilet revolution for others. The proportion of toilet construction occurring in the same area is not related to mental health and is an exogenous variable for mental health. Thus, the proportion of other people's behavior occurring in the same village was chosen as the instrumental variable for this study, which allows for good control of endogeneity issues.

4. Results

4.1. Tobit Empirical Results

Table 2 presents the estimated results of the impact of the toilet revolution on the level of depression of farmers. Since the level of depression among farmers is a multivariate discrete variable, models (1) to (6) in Table 2 are estimated using the IV-Tobit model. Further, considering that the IV-Tobit model is a non-linear model, model (7) is an estimate of the marginal effect based on model (6) for ease of interpretation of the estimation results. In addition, to maximize the accuracy of the estimation results, a stepwise variable addition strategy was used in this study. That is, based on model (1), model (2) to (6) progressively control for farm household characteristics, household characteristics, and village characteristics. As can be seen from Table 2, all models were significant at the 1% level of significance, which showed that this model was significant.

According to the estimation results in Table 2, the clean toilet variables in models (1) to (6) were all significant at the 1% level, indicating that the toilet revolution does reduce the level of psychological depression of farmers, which means that clean toilets help reduce the depression index of farmers. According to the estimation results of model (7), the depression index of farm households with clean toilets will decrease by 66.9% relative to households without clean toilets.

Current research scholars are more likely to conclude that rural latrine conversion has a significant positive impact on the health of rural residents. Cao [38], Liu and Liu [48], Chai and Liu [49], and Dong et al. [50] found that, by controlling the sources of infection and reducing the density of vector organisms, the rate of schistosomiasis infection and vector organism transmission will significantly reduce, which will, in turn, improve the health level. Consequently, the health level will lead to the improvement of the residents' mental outlook, which will, in turn, lead to the improvement of the appearance and mental health condition of the Chinese countryside, consistent with the theory of this study. However, this study considers that not only is the transmission of the virus blocked, but

the population will be healthier, lighter, and happier without illness. The improvement of the human environment can also improve the psychological well-being of farmers; when the environment is better, the mood is naturally better.

Based on this, this study hypothesizes that the reason for the difference in findings is mainly due to the following two aspects. Firstly, there are geographical limitations in the findings. This study focuses on rural areas, where the overall living environment is worse compared to urban areas, and the degree of influence of the human environment on the mental health of farming households is greater than that of urban areas. Hence, the difference in the mechanisms of influence of the toilet revolution on the mental health of farmers. Secondly, the focus of the study is different. Previous scholars have focused more on people's physical health, while mental health, or only "good mental outlook" is reflected in the article as a co-benefit. Whereas, this study focuses on the mental health of farmers, with more emphasis on the psychological aspect. That is, farmers with clean toilets will experience a 66.9% decrease in the depression index relative to households without clean toilets.

Table 2. Tobit empirical results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Clean toilet	−28.961 ***	−26.839 ***	−45.508 ***	−40.278 ***	−38.610 ***	−38.147 ***	−0.669 ***
	(−9.091)	(−8.675)	(−6.146)	(−5.592)	(−5.180)	(−5.079)	(−5.064)
Age				−0.083 ***	−0.064 **	−0.063 **	−0.001 **
				(−2.933)	(−1.996)	(−1.972)	(−1.974)
Gender				−3.989 ***	−3.651 ***	−3.636 ***	−0.064 ***
				(−6.006)	(−5.536)	(−5.520)	(−5.550)
Education				−1.318 *	−0.141	−0.144	−0.003
				(−1.669)	(−0.152)	(−0.156)	(−0.156)
Health				−11.058 ***	−10.293 ***	−10.316 ***	−0.181 ***
				(−9.928)	(−9.648)	(−9.694)	(−9.888)
Job				−0.702	−0.873	−0.873	−0.015
				(−1.134)	(−1.400)	(−1.403)	(−1.403)
Environmental perception				2.810 ***	2.708 ***	2.679 ***	0.047 ***
				(4.812)	(4.738)	(4.703)	(4.722)
Household income					−1.398 ***	−1.402 ***	−0.025 ***
					(−5.010)	(−5.039)	(−5.073)
Household burden					−0.041 ***	−0.041 ***	−0.001 ***
					(−3.572)	(−3.588)	(−3.595)
Household education					−0.008	−0.008	−0.000
					(−0.532)	(−0.541)	(−0.541)
Cadre					−2.494 ***	−2.490 ***	−0.044 ***
					(−3.513)	(−3.524)	(−3.535)
Farm asset					0.402	0.488	0.009
					(0.497)	(0.601)	(0.601)
Smartphone					0.946	0.922	0.016
					(0.825)	(0.807)	(0.807)
Internet use					−0.598	−0.614	−0.011
					(−0.857)	(−0.881)	(−0.881)
Plain						1.104	0.019
						(0.942)	(0.942)
Distance						−0.040	−0.001
						(−0.741)	(−0.741)
Constant	36.065 ***	30.563 ***	42.490 ***	55.641 ***	69.409 ***	68.123 ***	
	(12.358)	(10.691)	(7.138)	(8.827)	(11.923)	(11.219)	
Year dummies	No	Yes	Yes	Yes	Yes	Yes	Yes
City Dummies	No	No	Yes	Yes	Yes	Yes	Yes
ll	−18,386.84	−18,290.34	−18,191.56	−17,927.71	−17,828.94	−17,827.45	−17,827.45
χ^2	54.773 ***	48.195 ***	29.960 ***	25.470 ***	22.631 ***	21.727 ***	21.727 ***
Obs.	5039	5039	5039	5039	5039	5039	5039

Note: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

In addition, Ali et al. [34] and Paddy et al. [35] believe that the virus is transmitted by aerosols produced during flushing that come into contact with the human gut through the respiratory tract, causing illness. However, the difference between this study and the one in which schistosomes contaminate water sources is speculated to be due to the fact that China is still in the stage of the toilet revolution where flushing toilet waste treatment is still popular, and most of the unreformed rural areas are open defecation and cleaned up by emptying. Therefore, discussing the influencing factors, beyond the actual situation before flushing toilet waste treatment, is popular and is not in line with the actual situation in China, hence, the difference between the findings of this study and others.

4.2. Robustness Tests

The omission of variables may affect the estimation results [51]. To verify the robustness of the baseline regression results, this study replaced the IV-Tobit model with an IV-Probit model to test the estimates of the impact of the toilet revolution on the mental health of the farmers. The explanatory variables were also replaced and each of the eight questions indicating indicators of depression was used as explanatory variables for robustness testing, Table 3 presents the estimation results.

Table 3. Robustness tests.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Clean toilet	−2.091 ***	−1.637 ***	−0.861 **	2.434 ***	−1.337 ***	2.051 ***	−1.871 ***	−0.701
	(−6.574)	(−4.446)	(−1.976)	(6.767)	(−3.290)	(3.855)	(−5.234)	(−1.048)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ll	−3640.34	−3691.58	−3985.70	−1619.74	−3411.62	−1439.48	−3284.62	−1870.34
χ^2	21.034 ***	12.840 ***	3.921 **	17.826 ***	8.143 ***	7.448 ***	15.374 ***	0.796
Obs.	5039	5039	5039	5039	5039	5039	5039	5039

Note: *t* statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The explanatory variables in models (1) to (8) were whether they felt low in mood, struggled to do anything, did not sleep well, felt happy, felt lonely, were happy in life, felt sad and upset, and felt life could not go on in the past week.

In model (1), the coefficient on clean toilets was negative and significant at the 1% level, suggesting that clean toilets help reduce the likelihood of farmers falling into depressed moods.

In model (2), the coefficient on clean toilets was negative and significant at the 1% level, suggesting that clean toilets help reduce the likelihood that farmers are struggling to do anything.

In model (3), the coefficient on clean toilets was negative and significant at the 5% level, indicating that clean toilets help to improve the likelihood of poor sleep.

In model (4), the coefficient on clean toilets was positive and significant at the 1% level, indicating that clean toilets contribute to the likelihood that the farmers feel pleasure.

In model (5), the coefficient on clean toilets was negative and significant at the 1% level, suggesting that clean toilets help to reduce the likelihood of falling into loneliness.

In model (6), the coefficient on clean toilets was positive and significant at the 1% level, suggesting that clean toilets help increase the likelihood of farmers feeling happy in their lives.

In model (7), the coefficient on clean toilets was negative and significant at the 1% level, suggesting that clean toilets help to reduce the likelihood of falling into sadness and grief.

In model (8), the coefficient on clean toilets was negative, indicating that clean toilets help to reduce the likelihood of falling into the emotion of being unable to continue in life.

Feeling low in mood in model (1) was more affected by a clean toilet than by a bad mood in the other models. Feeling happy in model (4) and feeling good about life in model (6) was more affected by a clean toilet.

In summary, clean toilets help to reduce the likelihood of farmers falling into depression. In other words, clean toilets help to improve the mental health of farmers, which also suggests that the estimates are robust.

5. Conclusions and Implications

Based on more than 5000 data from Jiangsu Province, China, this study introduced an instrumental variables approach to address endogeneity in the IV-Tobit model to test the impact of the toilet revolution on the psychological well-being of farm households and conducted a marginal effects analysis. The results showed that clean toilets had a positive impact on the mental health of farmers; farmers with clean toilets experienced a 66.9% decrease in the depression index relative to households without clean toilets. This corroborates the recommendation of this study to encourage rural areas to promote a toilet revolution to improve the mental health of farmers.

Mental disorders such as depression can have varying degrees of impact on individuals, families, and society. A low social climate is detrimental to the country's economic development, and depression is detrimental to family collaboration and personal development. Many studies show that people who have suffered from mental illness have a history of rejection at work, resulting in poor personal and family finances, or that the side effects of the illness, such as obesity, low self-esteem, extreme sensitivity, and other negative emotions that are detrimental to personal development, can lead to self-imposed isolation and a lack of communication with society over time. This study shows that clean toilets help to improve the mental health status of farmers, in that the depression index of farmers with clean toilets will decrease relative to households without clean toilets. Thus, the toilet revolution is a non-pharmacological and effective way to improve mental health problems, which will not only have an impact on the individual farmer but will also have a positive impact on the family atmosphere, economic situation, and neighborhood relations. A healthy mind reduces the amount of money people need to spend on mental health treatment, such as counseling costs and medication costs. At the same time, people with mental disorders lose an average of 10.52 additional years of working time [2], and a healthy mind can help people reduce the loss of work hours and thus have a better economic situation. Based on this, this study will make the following four recommendations to government departments to improve the promotion of the toilet revolution.

Firstly, the government has increased the publicity of the toilet revolution. Rural residents have less access to smartphones and the internet than urban residents, and their ability to access information is weaker due to the terrain and nature of their work. Therefore, they are relatively uninformed and have little understanding of the significance of the toilet revolution and the impact of toilet conversion on them. Great publicity helps to change farmers' stereotypes from a conceptual point of view, which helps to achieve smooth progress of the toilet revolution. This publicity includes but is not limited to, policy advocacy for the toilet revolution, the benefits of the toilet revolution, the significance of the toilet revolution to the farmers themselves, and the significance of the toilet revolution to the villages.

Secondly, the implementation of policy subsidies and the establishment of model households for the toilet revolution. Subsidies for latrine conversion are an important factor in encouraging the implementation of latrine conversion. The implementation of subsidies to households and people, and the elimination of the phenomenon of refusal or under-allocation of funds after conversion, will help to reduce the problem of decreased motivation to convert latrines due to the lack of implementation of policy subsidies. Thus, in addition to improving the distribution of subsidies for the toilet revolution, government departments can also set up relevant working groups to go to the grassroots level to listen to the opinions and questions of household toilet conversion and answer their questions

about subsidies and toilet conversion on time. In addition, a model household for toilet revolution can be set up, and the title of the model household for toilet revolution can be awarded every month to those households that meet the standards and maintain excellence after toilet conversion.

Thirdly, government departments assist farmers to choose a reasonable mode of toilet conversion and promote the toilet revolution. The Five-Year Action Plan for the Improvement and Upgrading of Rural Habitat (2021–2025) calls for water where appropriate and drought where appropriate. For farmers with little knowledge, they need concise, rather than vague, requirements from the government. Thus, it is recommended that the government selects a reasonable model of toilet conversion according to the actual situation in the region, specifies the specific objectives and standards of toilet reform, and provides farmers with precise and clear requirements for conversion. The requirements for conversion include, but are not limited to, the size of the toilet space, whether ventilation facilities such as windows are installed, whether to choose a flush type of toilet waste treatment or other standard waste treatment methods, and the requirement to achieve the simultaneous promotion of toilet waste treatment at the same time as the conversion. In addition, government departments can also introduce water-saving and waterless flushing facilities, which on the one hand will respond to the national call for water conservation, and on the other hand, will reduce farmers' concerns about not using flushing toilets because they are distressed by the water bill. This will greatly contribute to the popularity of clean toilets.

Fourthly, it is essential to address the issue of responsibility for implementation. Although toilets may seem small, they reflect significant aspects of people's livelihoods. The implementation of the toilet revolution should not be merely a slogan or a formal task assigned to government departments. Instead, it requires the active participation of every household. Unfortunately, there are instances in some areas where slogans are shouted without any practical work being performed, and formalism is prevalent at the grassroots level. Thus, to make progress with the toilet revolution practically, it is crucial to address these undesirable phenomena thoroughly. To ensure practical implementation, the government can use performance appraisal to assign each household to a specific staff member and implement a system of checking one household at a time. Additionally, an anonymous reporting channel can be established to encourage farmers to report the existence of problems and urgent issues boldly.

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Appendix A

Appendix A.1. Entropy Method

The entropy weight method is a method to determine the weight of indicators. The principle is to use the information entropy to calculate the entropy weight of each indicator according to the degree of variation of the value of each indicator, and then correct the weight of each indicator through the entropy weight. Compared with other subjective assignment methods, this method can make full use of the original data, avoid errors caused by human factors, and have higher credibility and accuracy.

The depression index in question in this study was then calculated by the entropy method, mainly as follows:

(1) Standardized data

Use as positive indicators whether you feel depressed, whether you find it hard to do anything, whether you feel you do not sleep well, whether you feel lonely, whether you feel sad and upset, whether you feel you can't go on with your life.

Positive indicators:

$$X_{ij}^{'} = \frac{x_{ij} - \min(x_j)}{\max(x_j) - \min(x_j)} \tag{A1}$$

Negative indicators of whether or not you feel happy, and whether or not you feel happy with your life.

Negative indicators:

$$X_{ij}^{'} = \frac{\max(x_j) - x_{ij}}{\max(x_j) - \min(x_j)} \tag{A2}$$

(2) Calculate the value of individual contribution to the total

$$Y_{ij} = \frac{x_{ij}^{'}}{\sum_{i=1}^{m} x_{ij}^{'}} \tag{A3}$$

(3) Calculate the entropy value

$$e_i = -\frac{\sum_{i=1}^{m} y_{ij} \ln y_{ij}}{\ln m} \tag{A4}$$

(4) Calculation of entropy weights

$$w_i = \frac{1 - e_i}{\sum 1 - e_i} \tag{A5}$$

(5) Calculation of scores

$$score_i = \sum_{i=1}^{m} w_i x_{ij}^{'} \times 100 \tag{A6}$$

References

1. Ustün, T. The global burden of mental disorders. *Am. J. Public Health* **1999**, *89*, 1315–1318. [CrossRef] [PubMed]
2. Plana-Ripoll, O.; Weye, N.; Knudsen, A.K.; Hakulinen, C.; Madsen, K.B.; Christensen, M.K.; Agerbo, E.; Laursen, T.M.; Nordentoft, M.; Timmermann, A. The association between mental disorders and subsequent years of working life: A Danish population-based cohort study. *Lancet Psychiatry* **2023**, *10*, 30–39. [CrossRef] [PubMed]
3. Harris, C.; Barraclough, B. Excess mortality of mental disorder. *Br. J. Psychiatry* **1998**, *173*, 11–53. [CrossRef]
4. Doran, C.M.; Kinchin, I. A review of the economic impact of mental illness. *Aust. Health Rev.* **2017**, *43*, 43–48. [CrossRef]
5. Hou, H.; Pei, Y.; Yu, B.; Gao, X.; Wang, W. Age-period-cohort modeling of suicide death trends in a rural Chinese population, 2004–2019. *Med. Health Sci.* **2022**, *26*, 34–39+111. [CrossRef]
6. Rutter, M. How the environment affects mental health. *Br. J. Psychiatry* **2005**, *186*, 4–6. [CrossRef]
7. Clark, C.; Myron, R.; Stansfeld, S.; Candy, B. A systematic review of the evidence on the effect of the built and physical environment on mental health. *J. Public Ment. Health* **2007**, *6*, 14–27. [CrossRef]
8. Evans, G.W. The built environment and mental health. *J. Urban Health* **2003**, *80*, 536–555. [CrossRef]

9. Eaton, W.W.; Martins, S.S.; Nestadt, G.; Bienvenu, O.J.; Clarke, D.; Alexandre, P. The burden of mental disorders. *Epidemiol. Rev.* **2008**, *30*, 1–14. [CrossRef]
10. Thornicroft, G. Most people with mental illness are not treated. *Lancet Psychiatry* **2007**, *370*, 807–808. [CrossRef]
11. Slyepchenko, A.; Maes, M.; Jacka, F.N.; Köhler, C.A.; Barichello, T.; McIntyre, R.S.; Berk, M.; Grande, I.; Foster, J.A.; Vieta, E. Gut microbiota, bacterial translocation, and interactions with diet: Pathophysiological links between major depressive disorder and non-communicable medical comorbidities. *Psychother. Psychosom.* **2017**, *86*, 31–46. [CrossRef]
12. Yang, J.; Zheng, P.; Li, Y.; Wu, J.; Tan, X.; Zhou, J.; Sun, Z.; Chen, X.; Zhang, G.; Zhang, H. Landscapes of bacterial and metabolic signatures and their interaction in major depressive disorders. *Sci. Adv.* **2020**, *6*, eaba8555. [CrossRef]
13. Phillips, D.R.; Siu, O.-L.; Yeh, A.G.; Cheng, K.H. The impacts of dwelling conditions on older persons' psychological well-being in Hong Kong: The mediating role of residential satisfaction. *Soc. Sci. Med.* **2005**, *60*, 2785–2797. [CrossRef]
14. Li, C.; Zhou, Y. Residential environment and depressive symptoms among Chinese middle-and old-aged adults: A longitudinal population-based study. *Health Place* **2020**, *66*, 102463. [CrossRef]
15. Cheng, S.; Li, Z.; Uddin, S.M.N.; Mang, H.-P.; Zhou, X.; Zhang, J.; Zheng, L.; Zhang, L. Toilet revolution in China. *J. Environ. Manag.* **2018**, *216*, 347–356. [CrossRef]
16. Prüss-Ustün, A.; Bartram, J.; Clasen, T.; Colford Jr, J.M.; Cumming, O.; Curtis, V.; Bonjour, S.; Dangour, A.D.; De France, J.; Fewtrell, L. Burden of disease from inadequate water, sanitation and hygiene in low-and middle-income settings: A retrospective analysis of data from 145 countries. *Trop. Med. Int. Health* **2014**, *19*, 894–905. [CrossRef]
17. Corrigan, P.W.; Druss, B.G.; Perlick, D.A. The impact of mental illness stigma on seeking and participating in mental health care. *Psychol. Sci. Public Interest.* **2014**, *15*, 37–70. [CrossRef]
18. Hayes, K.; Poland, B. Addressing mental health in a changing climate: Incorporating mental health indicators into climate change and health vulnerability and adaptation assessments. *Int. J. Environ. Res. Public Health* **2018**, *15*, 1806. [CrossRef]
19. Makwana, N. Disaster and its impact on mental health: A narrative review. *J. Fam. Med. Prim. Care* **2019**, *8*, 3090. [CrossRef]
20. Wang, D.; Shen, Y. Sanitation and work time: Evidence from the toilet revolution in rural China. *World Dev.* **2022**, *158*, 105992. [CrossRef]
21. Liu, S.P. *Study on the Factors Influencing Farmers' Satisfaction with Rural Toilet Renovation in the Context of Rural Revitalization*; Yunnan University of Finance and Economics: Kunming, China, 2022.
22. Ao, X. *Study on the Impact of the "Toilet Revolution" on the Health of Rural Residents*; Jiangxi Agricultural University: Nanchang, China, 2022. [CrossRef]
23. Rose, C.; Parker, A.; Jefferson, B.; Cartmell, E. The characterization of feces and urine: A review of the literature to inform advanced treatment technology. *Crit. Rev. Environ. Sci. Technol.* **2015**, *45*, 1827–1879. [CrossRef]
24. Caruso, B.A.; Freeman, M.C. Shared sanitation and the spread of COVID-19: Risks and next steps. *Lancet Planet. Health* **2020**, *4*, e173. [CrossRef]
25. Phuc, P.-D.; Konradsen, F.; Phuong, P.; Cam, P.; Dalsgaard, A. Practice of using human excreta as fertilizer and implications for health in Nghean Province, Vietnam. *Southeast Asian J. Trop. Med. Public Health* **2006**, *37*, 222.
26. Eisdorfer, C.E.; Lawton, M. *The Psychology of Adult Development and Aging*; American Psychological Association: Washington, DC, USA, 1973.
27. Lawton, M.P. Environment and other determinants of weil-being in older people. *Gerontologist* **1983**, *23*, 349–357. [CrossRef]
28. Magaziner, J.; Cadigan, D.A. Community resources and mental health of older women living alone. *J. Aging Health* **1989**, *1*, 35–49. [CrossRef]
29. Brown, V. The effects of poverty environments on elders' subjective well-being: A conceptual model. *Gerontologist* **1995**, *35*, 541–548. [CrossRef]
30. Brown, V.S. *The Elderly in Poor Urban Neighborhoods*; Routledge: London, UK, 2017.
31. Norling, M.; Stenzelius, K.; Ekman, N.; Wennick, A. High school students' experiences in school toilets or restrooms. *J. Sch. Nurs.* **2016**, *32*, 164–171. [CrossRef]
32. Ishida, Y.; Vyas, R.; Chauhan, G.; Delgado, L.; Kourai, H. Bacterial Contamination Analysis of Residential Toilet Room Environment and Delivery of Residual Bacterial Growth Prevention Efficacy on Residential Toilet Permeable Surfaces Using Toilet Air Freshener Product. *Biocontrol Sci.* **2021**, *26*, 85–93. [CrossRef]
33. Yang, J.; Yuan, C. Application of Cognitive System Model and Gestalt Psychology in Residential Healthy Environment Design. *Comput. Intell. Neurosci.* **2022**, *2022*, 5661221. [CrossRef]
34. Ali, W.; An, D.-Z.; Yang, Y.-F.; Cui, B.-B.; Ma, J.-X.; Zhu, H.; Li, M.; Ai, X.-J.; Yan, C. Comparing bioaerosol emission after flushing in squat and bidet toilets: Quantitative microbial risk assessment for defecation and hand washing postures. *Build. Environ.* **2022**, *221*, 109284. [CrossRef]
35. Paddy, E.N.; Afolabi, O.O.; Sohail, M. Toilet plume bioaerosols in healthcare and hospitality settings: A systematic review. *Am. J. Infect. Control.* **2022**, *51*, 324–333. [CrossRef]
36. Wang, Q.; Liu, L. On the critical role of human feces and public toilets in the transmission of COVID-19: Evidence from China. *Sustain. Cities Soc.* **2021**, *75*, 103350. [CrossRef]
37. Liang, H.S.; Zhang, Y.; Jiang, H.J. The impact of retrofitting sanitary toilets on the quality of rural sanitation in Tongbai County. *Henan J. Prev. Med.* **2002**.
38. Cao, J.G. Effectiveness and factors influencing the retrofitting of sanitary toilets in rural areas. *China Health Ind.* **2019**, *16*.

39. Zhou, Y.; Chen, G.; Ma, J.; Li, Y.; Cao, X.; Xu, Y.; Song, J.; Liu, X. Slippery concrete for sanitation. *Prog. Org. Coat.* **2022**, *171*, 107022. [CrossRef]
40. Akaishi, T.; Morino, K.; Maruyama, Y.; Ishibashi, S.; Takayama, S.; Abe, M.; Kanno, T.; Tadano, Y.; Ishii, T. Restoration of clean water supply and toilet hygiene reduces infectious diseases in post-disaster evacuation shelters: A multicenter observational study. *Heliyon* **2021**, *7*, e07044. [CrossRef]
41. Kiseleva, L.S.; Strielkowski, W. Perception of happiness by Russians. *Sotsiologicheskie Issled.* **2016**, 86–91.
42. Al-Butmeh, S.; Al-Khataib, N. Mental health and quality of life of elderly people in the Bethlehem district: A cross-sectional study. *Lancet Planet. Health* **2018**, *391*, S46. [CrossRef]
43. Feng, S.; Yang, Y.; Xia, N. Associations between healthy lifestyles and depressive symptoms among adults in China: A longitudinal study. *Lancet Planet. Health* **2018**, *392*, S59. [CrossRef]
44. Zeng, J.; Jian, W. Income-related inequality and its effect on depression prevalence in China: A longitudinal, population study. *Lancet* **2018**, *392*, S22. [CrossRef]
45. Chang, T.-Y.; Liao, S.-C.; Chang, C.-M.; Wu, C.-S.; Huang, W.-L.; Hwang, J.-J.; Hsu, C.-C. Barriers to depression care among middle-aged and older adults in Taiwan's universal healthcare system. *Lancet Reg. Health-West. Pac.* **2022**, *26*, 100501. [CrossRef]
46. Shields-Zeeman, L.; Smit, F. The impact of income on mental health. *Lancet Public Health* **2022**, *7*, e486–e487. [CrossRef]
47. Demal, U.; Lenz, G.; Mayrhofer, A.; Zapotoczky, H.-G.; Zitterl, W. Obsessive-compulsive disorder and depression. *Psychopathology* **1993**, *26*, 145–150. [CrossRef]
48. Liu, C.m.; Liu, Y. A study on the impact of rural toilet reform on farmers' health care expenditure. *Agric. Econ.* **2020**, *10*, 89–102. [CrossRef]
49. Chai, Z.Z.; Liu, Y.P. A study on the mechanism of the impact of rural latrine conversion on the health level of rural residents in the central and western regions. *J. Agron.* **2022**, *12*, 85–91.
50. Dong, J.; Yin, X.; Zhang, K.; Li, H. The "toilet revolution" and the health of rural minors: Micro-evidence and mechanisms of action. *Agric. Technol. Econ.* **2022**, 128–144. [CrossRef]
51. Wooldridge, J.M. *Introductory Econometrics: A Modern Approach*; Cengage Learning: Boston, MA, USA, 2015.

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Long-Term Survival of Investments Implemented under Endogenous Rural Development Programs: The Case Study of La Vera Region (Extremadura, Spain)

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Abstract: One of the main objectives of rural development programs is the economic diversification of rural areas. In the context of the European Union, the application of the Leader Initiative (referred to today as the Leader Approach) is perhaps the best example of this type of policy. Based on the case study methodology, the objective of this work is to analyze the viability of the projects promoted by this type of program. A long-term scenario is taken as a reference, and this is precisely one of the main methodological innovations of this research in relation to most of the analyses focused on the impacts of rural development programs. The results of the research show (a) an orientation of the development strategy towards the promotion of rural tourism and (b) differences in the survival of the projects according to the type of productive measure under which they have been implemented: agricultural valorization and marketing projects offer better results than those promoting rural tourism or the promotion of SMEs and crafts and services. These results call into question the notable concentration of investment in projects aimed at creating tourist accommodation.

Keywords: Leader approach; private promoters; semi-structured interviews; rural tourism; SMEs; crafts and services; agricultural valorization; operational; failed and transferred projects

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1. Introduction

In the European Union (EU), the goal of the economic diversification in rural areas took on new meaning when, in the early 1990s, the European Commission (EC) approved the first call for proposals under the Leader Initiative [1]. Since then, the European commitment to rural economic diversification has been a constant in the implementation of EU policies. The origins of this European interest in rural areas lie in the significant internal and external imbalances in the Common Agricultural Policy (CAP) [2–9]. This made CAP reform a real priority. Throughout the 1980s, the EC made this need clear in various documents [10–12] and reported about some of the most negative consequences (loss of agricultural jobs, falling farm incomes). To counter these effects, the EC considered it necessary to reduce the dependence of rural areas on primary activity and promote alternative activities to provide new income sources supplementing rural and agricultural incomes.

From the outset, implementing the Leader Initiative led to unprecedented mobilization of the European rural environment [13]. In fact, some countries (like Spain) had to draw funds from the Community Support Framework (CSF) to implement complementary rural development programs applied in territories unable to access management of Leader II [14] or Leader + [15] initiatives. In Spain, these programs were called Proder I [16] and Proder II [17]; they had minor differences in their management systems but similar characteristics to the development model proposed by the Leader Initiative.

Also from the very beginning, applying the Leader Initiative and other programs mentioned above aroused great interest in the scientific and academic community, both among

those trying to characterize the Leader Approach from a theoretical standpoint [18–26] and those interested in quantifying its impacts from different perspectives [27–34].

In its aim to achieve rural economic diversification, tourism is one of the activities in which implementing rural development programs generated the highest expectations. Bryden [35], Lane [36], Butler et al. [37], Sharpley and Roberts [38], Patmore [39] and Perdue et al. [40] are some of the pioneers of studying this subject. Their research is essential for those interested in the potential of this sector in rural areas. However, beyond these conceptual works, most researchers are interested in quantifying the impacts of rural development programs on the tourism sector. It is common for these works to refer to a specific geographic area, whether a region, province, natural area, etc. For example, García [41] examines the Leader Initiative's impact on the tourism in the northwestern regions of Murcia; Toledano and Gessa [42] study the tourism projects created under Leader II and Proder I in Huelva province; Candela et al. [43] and Hernández et al. [44] look at the strengthening of the tourism sector in mountain areas of Valencia through the Leader Initiative; and García and De la Calle [45] analyze the importance of rural development programs in transforming tourism in the Tiétar Valley (Ávila). Along the same lines are the works of Pérez and López [46], Mondéjar et al. [47], Márquez et al. [48] and Nieto and Cárdenas [49], which refer, respectively, to the Galicia, Castilla La Mancha, Andalusia and Extremadura regions.

In order to achieve the desired economic diversification, rural development programs consider it essential to reactivate the resources available in the territory. To this end, they place great importance on involving the population in defining development strategies. Although authors such as Guiberteau [50], Alberdi [51], Navarro et al. [52,53] and Esparcia et al. [54] are skeptical about real participation of the population in development processes, it is true that from a sociological perspective, many are interested in the ability of these programs to boost the social capital of rural areas. As with analyzing the contribution of rural development programs to the tourism sector, research on this issue also tends to focus on quantifying impacts and on a specific geographical area. Examples include the work of Buciega [55] analyzing social capital within rural development program implementation in Valencia province; Saz-Gil and Gómez-Quintero [56] studying the same subject in Teruel province; and Garrido and Moyano [57] taking Leader II and Proder I implementation in Andalusia as a reference.

Therefore, reviewing the literature on some of the challenges faced by rural development programs leads to the conclusion that much of the research is characterized by: (a) a quantitative vision focused on measuring impacts; and (b) taking official evaluations produced by local action groups (LAGs) as the main analytical source. Without diminishing the value of these contributions, their characteristics limit the scope, as they offer a "static" vision of what they aim to study. Using LAGs' final evaluations as the main information source introduces bias, as these documents refer to when program implementation concludes, thus offering a "fixed picture" of results. This research aims to go further, offering a dynamic and long-term vision of the footprint left on the territory by rural development program implementation [58], focusing, in this case, on the economic viability of investments made under programs implemented in La Vera. To achieve this goal, the following research questions are posed:

1. What is the importance of each of the productive measures? Is investment spread across different activities, fostering desired economic diversification?
2. What are the numbers of operational, failed and carried-over projects in different productive measures, and how much investment has been committed to each?
3. For operational projects, how do promoters assess viability, and are there differences depending on the productive measure?

The long-term perspective is not trivial; analyzing real impact requires going beyond the subsidy eligibility period (five years, after which non-operational projects must return aid). This interest in analyzing the long-term rural development program impact is shared by Navarro et al. [59], evidenced by their study on the continuity of enterprises created

under Leader I and II in Granada; and Cañete et al. [60] and Cejudo et al. [61] in their analyses of program implementation and failed projects in Andalusia.

With its approach, this research shares Navarro et al.'s [62] (p. 349) criticism that official evaluations "do not sufficiently consider the impacts these programs generate in the territory". It also follows previous studies by Castellano-Álvarez et al. [63] comparing tourism development in La Vera and Tajo-Salor; and Castellano -Álvarez et al. [64], also based on the La Vera case study, analyzing the application of Proder I (1996–1999) and Proder II (2000–2006). This new contribution aims to update those results and extend the research time horizon to a new programming period in which the Leader Approach (2007–2013) was implemented [65]. These works add to extensive research where the authors studied La Vera's development strategy from different perspectives [66–70].

As shown by Álvarez-García et al. [71] in their bibliometric study on cultural heritage and tourism as bases for regional development, there is extensive international literature that analyzes rural development and economic diversification without the aforementioned biases. Many of these contributions are case studies that this research takes as references. For example, Quaranta et al. [72] use a case study of a southern Italy region to analyze tourism's potential in activating rural social capital; Iakovidou et al. [73] and Apostolopoulos et al. [74] study rural tourism conditioning factors in Greece; Marques [75] and Gatti et al. [76] analyze wine tourism's capacity as an element of rural development through case studies of regions in northern Portugal and Emilia-Romagna (Italy), respectively; perception of the rural populations regarding tourism development impacts is addressed by Milano et al. [77], Muresan et al. [78,79], Andereck et al. [80], Kayat et al. [81], and Brankov et al. [82]; Robina et al. [83] study the intangibles driving rural tourism; and Ciolac et al. [84] examine agritourism's potential as a rural development tool.

2. Research Methodology

From a methodological perspective, many authors have explored the usefulness of case studies as a research tool [85–87]. Yin [88] advocates applying this methodology when there is interaction between the element being studied and its environment. This occurs in this research: it is impossible to separate the longevity of the projects implemented under rural development programs from the resources and characteristics of the La Vera region; there is interaction between the two factors. Additionally, Coller [87] states that one of the requirements for applying the case study methodology is that the area under study should have well-defined boundaries. La Vera (Figure 1) meets this condition; made up of 19 municipalities, it has a deep-rooted sense of regional identity [89] and clearly defined borders: to the south by the river Tiétar; to the north, by the foothills of the Sierra de Gredos and the Jerte Valley; to the west by municipalities in the Plasencia region; and to the east, by the border between Cáceres and Ávila provinces.

La Vera is a paradigmatic example for evaluating rural development program impact. This is because it possesses all necessary potential for the successfully implementing of such programs, and it is located in the Extremadura region of Spain, considered by González Regidor [90] as an ideal framework for studying this issue.

The region's remarkable environmental and scenic resources derive from its location in the Sierra de Gredos, which shapes its orography and climate. La Vera enjoys milder temperatures than its latitude would indicate, both in winter months (when Gredos protects it from cold Castilian plateau winds) and summer months (when the mountain massif's proximity mitigates high temperatures). In the summer, Sierra de Gredos and its many gorges offer one of the area's most prized tourist resources in the form of countless bathing spots with icy, crystal-clear waters that visitors greatly appreciate [91]. In addition to its natural and scenic resources, La Vera boasts enormous cultural and artistic heritage, as evidenced by the Monastery of Yuste, its five municipalities declared Historic-Artistic Sites, and its many festivals and traditions classified as being of regional tourist interest. All this makes the region ideal for tourism promotion investments.

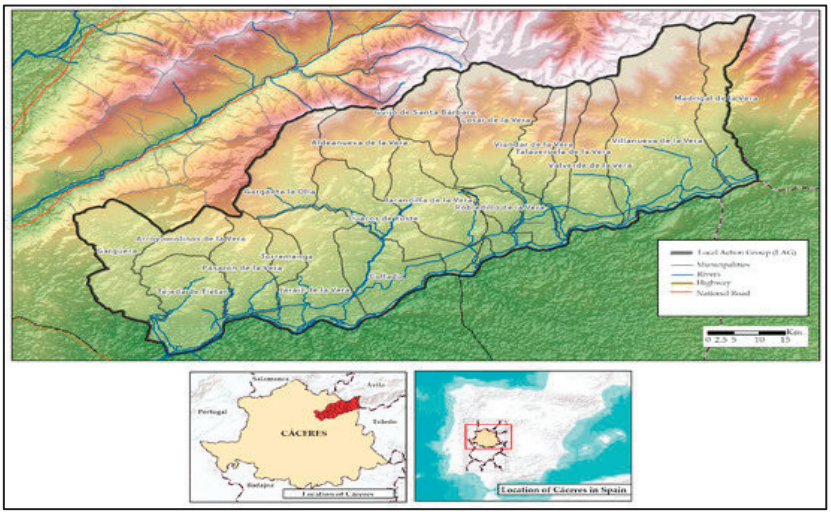

Figure 1. Location of the region of La Vera. Source: Castellano-Álvarez et al. [63].

Also justifying the region's suitability as a case study is, its proven experience processing characteristic agricultural products (paprika, goat cheese, tobacco, etc.). This type of activity (agricultural valorization) is an important component of development programs.

The main part of the research is fieldwork in which (a) projects implemented by ADICOVER over the three programming periods constituting the research time horizon are analyzed; (b) a project sample is drawn; (c) promoters of selected sample projects are interviewed in person at project sites to provide context for interviewee responses and reflections; and d) an attempt is made to correct any biases that may have been incurred during the interviews by triangulating the results.

Prior to fieldwork, ADICOVER's technicians were contacted to study the development strategy, program management applications, project lists, etc.

As is well known, rural development program structure [92] consists of six measures, three "non-productive" measures used for small infrastructure, public facilities, finances for the operation of the LAG, and cross-cutting training activities. The other three measures are of a productive nature and are aimed at: (a) rural tourism development; (b) SME and, crafts and services support; and (c) agricultural marketing and development. Private promoter projects under these last three measures are the fieldwork focus. However, the productive nature of these measures does not preclude financing public actions for general interest like regional tourism promotion, trail restoration, business fairs, etc. To select a project sample in the aforementioned productive measures, criteria used by Castellano-Álvarez et al. [63,64] in previous studies were followed. These are: (1) primarily private investment; (2) minimum €12,000 subsidy; and (3) the subsidy representing at least one-fifth of total investment. Table 1 shows results of applying these criteria to total projects implemented in the three programming periods constituting the research time frame.

Table 1. Sample of private projects by programming period and their representativeness.

Development Program	Private Projects	Project Samples	Investment Private Project Samples	% Sample of Private Projects to the Total Investment of the Measure
Proder I	36	26	2,947,795.40	82.24
Proder II	43	18	2,019,122.78	54.85
Leader Approach	90	38	4,462,697.52	78.91
Total	169	82	9,429,615.70	72.98

Source: Own elaboration.

Table 2 complements the above information with an overview of sample project importance within the productive measures. In the third section, analyzing development strategy will show that, over the three six-year periods, the sample project distribution correlates with the weight of each productive measure in the development program.

Table 2. Sample of private projects by productive measures and their representativeness.

Development Program	Private Projects	Project Samples	Investment Private Project Samples	% Sample of Private Projects to the Total Investment of the Measure
Rural tourism	67	42	6,146,533.27	77.18
SMEs, crafts and services	73	27	2,110,311.47	69.96
Agricultural valorization	29	13	1,172,770.96	60.44
Total	169	82	9,429,615.70	72.98

Source: Own elaboration.

Tables 1 and 2 show that applying the aforementioned criteria to the 169 private projects implemented under the productive measures allows selection of 82 actions whose investment represents 72.98% of total investment in these measures. However, in all cases it is impossible to interview the original promoters, as discussed earlier, since some projects ceased activity or were transferred; moreover, some operational promoters declined participation. Table 3 reflects these factors and filters the sample to determine interview numbers conducted in each productive measure.

Table 3. Number of interviews carried out according to the measure of productivity.

	Project Samples	Project Failed	Project Transferred	Disinterest of the Promoter	Interviews Conducted
Rural tourism	42	12	8	2	20
SMEs, crafts and services	27	10	3	2	12
Agricultural valorization	13	2	1	2	8
Total	82	24	12	6	40

Source: Own elaboration.

Table 4 displays the characteristics of the promoters interviewed. Broadly summarizing the profile, the promoters interviewed tended to be male, between 40 and 60 years old and native to the region and to have a basic level of education.

Table 4. Characteristics of the interviewees in La Vera region.

	Sex		Age			Origin			Formation	
	Man	Woman	<40	Between 40 and 60	>60	Native	Returned	Neorrural	Basic	University
Rural tourism	14	6		18	2	15	2	3	15	5
Accommodation creation	8	3		9	2	6	2	3	7	4
Accommodation modernization	4	3		7		7			6	1
Catering	2			2		2			2	
SMEs, crafts and services	8	4	2	9	1	10	2		6	6
Agricultural valorization	8			7	1	8			7	1
Total	30	10	2	34	4	33	4	3	28	12

Source: Own elaboration.

As the table shows, male promoters outnumbered females by three to one and were predominantly 40–60 years old across productive measures. The majority were also native

to the region, while those of neo-rural origin were concentrated more in rural tourism projects, specifically new accommodation establishments. These promoters also had higher education levels, contrasting with those modernizing existing accommodation or catering projects who had lower education. The training level of SMEs and crafts and services promoters was heterogeneous. Agricultural valorization project promoters were characterized by basic level education and very few women.

Regarding interview structure, semi-structured interviews were chosen as an intermediate option between a closed model (unable to incorporate promoter observations of interest) and an open model (with difficulties focusing attention on research-relevant questions and information processing). In his work on qualitative research, Yin [93] highlights the value of interviews as a research tool, considering them a valuable information source that allows interviewee interaction and proper response contextualization.

Beyond analyzing budget execution and impacts, methodologically, conducting these interviews enriches the research with qualitative analysis tools. This followed Esparcia [94], Viladomiu and Rosell [95], and Esteban et al. [96] who, regarding analysis of regional, rural and local development policies, advocate using such research instruments to transcend the often excessively quantitative results provided by official evaluations.

As a final phase of fieldwork, the initial results were triangulated to correct any biases that may have arisen during the interviews and to reinforce the methodological rigor of the research. For this purpose, working meetings were conducted with key personnel involved in implementing the development program, including technical managers from the LAGs and public representatives.

3. Results

3.1. Analysis of the Development Strategy Implemented by La Vera Region

Table 5 shows the investment distribution across measures in the three programs constituting the research time frame. The analysis shows the tourist specialization inherent in this region's development strategy. Resources for rural tourism promotion account for 41.56% of total investment executed by the three programs and 61.63% of the investment in productive measures. Throughout the three programming periods, this specialization, far from diminishing, intensified under the Leader approach, with 45% of the resources allocated to tourism promotion.

Table 5. Breakdown by measure of the investment implemented.

	Proder I	**%**	**Proder II**	**%**	**Leader Approach**	**%**
Productive measures	3,584,221.93	66	3,681,236.48	68	5,655,422.77	68
Rural tourism	2,157,490.16	40	2,072,606.99	38	3,733,694.87	45
SMEs, crafts and services	943,459.43	17	722,488.60	14	1,350,660.99	16
Agricultural valorization	483,272.34	9	886,140.89	16	571,066.91	7
Non-productive measures	1,835,873.69	34	1,764,438.74	32	2,640,410.60	32
Operating costs	608,532.98	11	666,967.20	12	1,297,185.49	16
Recovery of the environment	1,227,340.71	23	1,097,471.54	20	1,343,225.11	16
Total	5,420,095.62		5,445,675.22		8,295,833.37	

Source: Own elaboration.

At the other extreme is the scant importance given to agricultural development projects in the strategy. This measure accounts for barely a tenth of the total implemented investment and 15% of productive measure resources.

Throughout the three periods, non-productive measure importance remains constant at around one third of program resources. This is despite a clear increase in the LAG's operating costs with Leader approach implementation (due to training actions and technical report preparation).

Figure 2 shows investment distribution in productive measures by project type. Blue depicts tourism project investment. The concentration of investment in the rural tourism measures the conditions of the program's contribution to its economic diversification objective. Above any other, investments in accommodation creation or modernization stand out, accounting for almost 50% of all productive investment. This unequal investment distribution could hamper tourism development itself, as it minimizes resources for other equally necessary tourism projects like complementary activities or catering services. Interviews with promoters will reveal whether the applied strategy has succeeded or introduced a bias hindering sector and regional development.

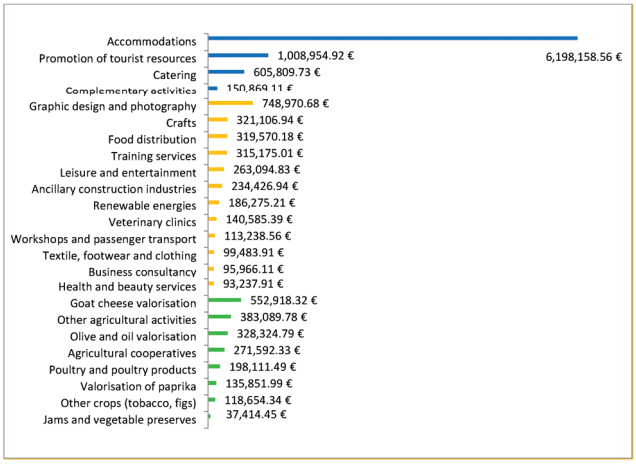

Figure 2. Distribution by type of action of investment in productive measure. Source: Own elaboration.

Neither other productive measure shows such high concentration in a single project type. Figure 2 distinguishes investment under the SME and crafts and services promotion measure in orange; and project types financed under the agricultural development measure in green. Resource distribution in these measures aligns with the desired economic diversification objective. An example is investment aimed at strengthening the business fabric and service provision in rural areas, promoting highly heterogeneous businesses (physiotherapy clinics, garages, taxi services, consultancies, training centers, driving schools, local shops, renewable energies, carpentries, paint shops, photography studios) that provide basic services for rural living quality.

Investment distribution for agricultural valorization benefits all the county's production, with projects improving goat cheese production processes standing out; investments in oil mills, pickle factories, paprika factories, poultry farming, etc. are also worth mentioning. The minimal importance of investments in tobacco cultivation (very important in some regional municipalities) is because these productions channel projects through the regional Department of Agriculture. Agricultural cooperatives in the region use program resources to modernize facilities and improve the services for members.

3.2. Operational Projects, Carryovers and Failures

Table 2 breaks down sample investments by productive measure. Table 6 details operational, failed and transferred projects and the importance of investment linked to each. Distinguishing between failed and transferred projects is significant: although neither allows interviewing the original promoter, a transferred project forms part of the program's contribution to regional development; the original promoters life circumstances may have changed but the project driven by the LAG continues operating.

Table 6. Operational projects, carryovers and failures by productive measures.

	Tourism	SMEs and Crafts	Agricultural Valorisation	Total
Operational projects	22	14	10	46
Investment in operational projects	3,887,130.35	1,308,831.98	888,510.30	6,084,472.63
% of total investment in the sample	63%	62%	76%	65%
Failed projects	12	10	2	24
Investment failed projects	1,261,780.24	580,879.99	122,803.36	1,965,463.59
% of total investment in the sample	21%	28%	10%	21%
Projects carried over	8	3	1	12
Investment in projects carried over	997,622.68	220,599.50	161,457.30	1,379,679.48
% of total investment in the sample	16%	10%	14%	14%

Source: Own elaboration.

Table 6 shows that relative investment importance associated with operational projects is higher for agricultural marketing and development compared to the other two productive measures. It also shows that investment committed to failed projects is less important in this measure than in rural tourism or SMEs and crafts and services; this represents a paradox since this measure commits the fewest resources (Table 5). On the other hand, of the 12 transferred projects, 8 are tourism projects, potentially evidencing greater mobility among these promoters or lower profitability. Interviews with promoters should help clarify this issue.

Table 7 provides an analysis of operational, failed and carried over projects according to the programs under which they have been implemented. As Table 1 shows, sample project numbers vary between programs, with some noticeable differences. Therefore, the percentage of investment linked to operational, failed and transferred projects could be a more reliable indicator here. On this basis, Leader approach results seem more positive across all three parameters, possibly due to the shorter time elapsed since implementation ended. However, Table 7 also seems to show that the time elapsed since the program end is not a major determinant of long-term project success or failure; evidence is the clearly higher percentage of investment associated with operational projects under Proder I compared to Proder II.

Table 7. Operational, carried over and failed projects by programming period.

	Proder I	Proder II	Leader Approach	Total
Operational projects	14	8	24	46
Investment in operational projects	1,794,918.21	969,758.41	3,319,796.01	6,084,472.63
% of total investment in the sample	61%	48%	74%	65%
Failed projects	8	6	10	24
Investment failed projects	697,870.94	452,053.42	815,539.23	1,965,463.59
% of total investment in the sample	24%	22%	18%	21%
Projects carried over	4	4	4	12
Investment in projects carried over	455,006.25	597,310.95	327,362.28	1,379,679.48
% of total investment in the sample	15%	30%	8%	14%

Source: Own elaboration.

3.3. Assessment of the Viability of the Investments Made: Interviews with Promoters

One of the most interesting aspects explored in promoter interviews was their perception of investments viability. Table 8 provides an initial approximation, classifying the promoter responses by productive measure of project implementation.

Table 8. Are you satisfied with the profitability of your business?

Development Program	No	Yes
Rural tourism	13	7
SMEs, crafts and services	-	12
Agricultural valorization	-	8
Total	13	27

Source: Own elaboration.

As the table shows, the promoter responses vary by productive measure. In all cases, these are operational projects, but the tourism promoters' assessments of businesses' profitability are more negative than those in other productive measures. Over 60% of tourism promoters admit their projects do not offer enough profitability to allow them to make a living from them; in fact, 11 of the 20 interviewed combine businesses management with other economic activities.

Table 9 classifies these promoters' responses by type of project, showing that only one of eleven new rural accommodation promoters is satisfied with business economic viability (although they admit complementing their income with other agricultural activity). This project type was chosen by the three neo-rural promoters and two returnees, none of whom are satisfied with the profitability (although neo-rural promoters admit their aim was not profit but lifestyle change).

Table 9. Are you satisfied with the profitability of your tourism project?

Development Program	No	Yes
Creation of accommodation	10	1
Modernisation of accommodation	2	5
Restoration actions	1	1
Total	13	7

Source: Own elaboration.

In contrast, most promoters are satisfied with viability when modernizing rural accommodation. All these investments are by regular residents dedicated exclusively to businesses management. Furthermore, most combine accommodation and catering activities (a circumstance often highlighted by this promoter type to justify their investment's economic viability).

The valuations of tourism promoters necessitate reinterpreting the Table 4 data.It was found then that the percentage of investment associated with operational tourism projects was similar to the SMEs and crafts and services measure (and, in both, lower than the agricultural valorization measure). However, despite remaining operational, tourism promoters' negative viability assessments are not shared by promoters in the other two measures.

However, a distinction should be made between SME and craft and service projects and agricultural valorization projects: the former are more modest in scale and provide promoter self-employment, while the latter have greater income generation potential by enhancing raw materials also produced by farmers and livestock breeders who indirectly benefit from the investment. Given the different viability assessments, average investment for operational sample projects in the productive measures was: €176,687.74 for the rural tourism measure; €93,488 for SMEs and crafts and services; and €88,851.03 for the agricultural valorization and marketing measure.

Regarding the interview content [63,64], analyzing promoters' viability assessments requires focusing on those investing in accommodation creation, since viability is not controversial for other promoters. Guaranteeing anonymity, some of their most interesting reflections are transcribed to identify factors they believe jeopardize project viability.

Most interviewees agree in denouncing the low demand. Promoter 1 reflects this feeling, stating "*official statistics speaking of over 20% occupancy are false*". Similarly, Promoter 2 considers, "*data used by the administrations regarding occupancy levels are totally wrong*". In addition to low demand, this promoter blames these low occupancy levels on excessive supply, not hesitating to blame what he sees as "*erroneous development program execution*"; in fact, he justifies his opinion by referring to the latest Leader Approach aid call, stating: "*where most projects have been presented is in the tourism sector; we are changing tobacco monoculture for tourism monoculture, and rural tourism is not a panacea*". Very similarly, Promoter 3 considers, "*initially, the development program was fundamental for accommodation creation, but once that first phase was over, it did not reorient its role. More accommodation kept being created, meaning the sector became oversized; there is now more supply than demand*". Promoter 4 complains "*we went from a situation with no accommodation capacity to one of oversupply; and this happened before demand decreased due to the economic crisis (. . .) if I didn't have to meet subsidy requirements, I would consider closing down*". This idea is fairly widespread among the interviewees; for example, Promoter 5 insisted that "*there is an oversupply of accommodation places and yet the development program continues to subsidizing more and more rural tourism projects, oversizing the sector*".

Another noted factor conditioning this project type's viability is investments scale. The promoter is a professional architect acknowledging participating in creating many other accommodation projects. Regarding their architectural characteristics, he admits that "all projects I've designed have had quality and scale far superior to the expected return. Investments are not justified and will hardly be recovered". A good example is Promoter 7, who, states, "many things have been done; real project viability is another matter. I will never recover the investment made in the rooms". Similarly, Promoter 2 considers, "a bubble was created around rural tourism and the truth is you can't demand the impossible; you can't ask for wonderful accommodation, with huge investments that can't be maintained, and what about profitability?" This promoter continues: "the investment made was not justified by the existing demand. We did not consider the project as a business and now we are paying the consequences; we have reduced all expenses to the max and still the numbers don't add up".

Other ideas emerging from interviews conditioning viability are seasonality inherent to tourist activity and the necessarily complementary nature of the income derived. Promoter 8 summarizes this, stating "*it's not possible to live exclusively from the rural tourism business. The winter is very long and the season almost depends on August*". This assessment is widely shared by other interviewees, who would also agree with Promoter 1 when he considers that:"*if a study was done on rural tourism businesses viability, the vast majority of them are unviable*". Promoter 2 states that "*tourism is not what it seems and profitability is very limited. it's a complementary income source, but you cannot live on it alone*". Promoter 7 states that "*whoever wants to make money with rural tourism is wrong*"; and Promoter 9 concludes "*if someone thought tourism would be the rural remedy, they were wrong*".

The interviews also explored neo-rural and returnee promoter motivations and perceptions. Regarding the first, the profit motive is often not the main one. For example, Promoter 1 acknowledges that "*creating a Rural Hotel was the way to change my life, and that was the objective*". Similarly, Promoter 5 considers, "*a Rural House is not a business; it's more a lifestyle*". Like these interviewees, when asked about motivations for undertaking his project, Promoter 9 replies, "*I'd lived in Madrid my whole life. I did it for a lifestyle and personal reasons*". For none of these interviewees was the subsidy received a relevant factor in project execution. In fact, Promoter 1 states: "*those who decided to start a business thanks to a subsidy are already closed because ultimately the numbers don't add up (. . .) we carried out our project without going into debt and thanks to this we survived*". Similarly, Promoter 9 considers, "*if someone gets into an investment like this because of the subsidy, they don't know what they're doing*". Regarding his project's viability, this last promoter says, "*if you have the mortgage paid, maybe you can continue living modestly from your rural house, but not as a business*".

4. Discussion

This work shows that not all private projects promoted by rural development programs have the same long-term survival expectations. In line with conclusions by Castellano-Álvarez et al. [63,64], the results question the viability of tourism projects aimed at creating new rural accommodations. Therefore, territories orienting their development strategy towards rural tourism promotion due to their characteristics must address this challenge without renouncing necessary investment diversification. Even within tourism projects, there are investments whose profitability is not questioned by promoters, such as catering projects or those combining catering and accommodation. In this sense, Quaranta et al. [72] consider it necessary to connect different tourism projects, proposed in rural areas, also referring to complementary activities.

If a choice had to be made between creating new accommodation (with the inherent risk of oversizing the supply) and modernizing existing accommodation, research results seem to favor the second option. But, above all, as the Leader Initiative [1] stated in its first call for proposals, those responsible for implementing these types of programs must bear in mind tourism income's complementary nature in rural areas.

Authors like Martins [97] and Leal-Solis and Robina-Ramírez [98] highlight the need for continuous monitoring in implementing these programs. Beyond official evaluations linked to EU fund execution, oversized tourist accommodation supply and viability criticisms from projects would demonstrate the absence of such monitoring mechanisms in implementing La Vera's development strategy.

In the future, it would be interesting to complement this research by focusing on failed and transferred projects. Interviews with these promoters could shed light on the importance of poor project definition or changes in promoter personal circumstances as reasons for project closures or transfers.

It would also be worthwhile to analyze the role of public tourism promotion projects financed by development programs and their real contribution to stimulating demand. As noted by the promoters interviewed, they identify low demand as a fundamental factor jeopardizing private initiative viability in this sector. Finally, it seems necessary to rethink the role of rural development programs in stimulating tourism in areas where this activity has already consolidated. Support should probably focus on innovative and differentiating projects, avoiding potential distortion by subsidizing new accommodation in mature destinations. The technology and sustainability challenges facing the tourism sector open up interesting opportunities in this regard.

5. Concluding Remarks

The La Vera case shows that rural development programs' commitment to economic diversification does not always involve a balanced investment distribution across different economic activities. This territory's tourist vocation means resources concentrate on rural tourism, particularly projects aimed at the creation and/or modernization of rural accommodations. This comes at the detriment of other action types, especially those aimed at agricultural valorization, which, paradoxically, have the highest percentage of operational investment and lowest unsuccessful investments percentage.

When analyzing project economic viability assessment by promoters, it is seen that none questioning operational status are agricultural valorization or SME and craft and service promoters. However, over 60% of tourism promoters recognize profitability does not allow them to devote themselves exclusively to management; these responses concentrate among new rural accommodation promoters, where only one of eleven interviewed is satisfied with business evolution. However, those modernizing rural accommodation or undertaking catering projects are satisfied with viability. Therefore, a tourism project's economic viability is not questionable from a sectorial perspective, but doubts refer to the project type implemented.

Questionable tourism investments viability may be one reason these actions have the highest number of transferred projects. Moreover, new accommodation creation projects

attract developers of neo-rural and returnee origin. The motivations for this promoter type to invest could help explain why economically unviable projects remain operational long-term; these promoters recognize their priority was lifestyle change and that the project, despite modest return, enabled them to achieve this.

Depending on the productive measure under which it was implemented, differences between projects also affect employment generation or income increase capacity. Although average investment in agricultural valorization actions is the lowest of the three productive measures, this investment type has the greatest impact on increasing incomes, benefiting both processors and agricultural producers. The average investment in SME and, craft and service projects would be at an intermediate level, guaranteeing promoter self-employment, while tourism projects (especially new accommodation creation) have the highest average investment and lowest employment impact, since promoters often admit to moonlighting to supplement income.

This research has limitations inherent to the methodology employed. Its results are useful for explaining the rural reality but are not universally extrapolable and must always be interpreted in their context.

However, some reflections can be made that may be of interest when designing rural development strategies, especially in areas with strong tourism appeal. Investment diversification seems necessary to ensure profitability in both primary and service sectors. Within tourism, support should focus on modernization and complementary projects, while monitoring supply evolution to avoid potential distortion. The low viability of some tourism projects also leads to questioning accommodation oversizing and rethinking incentives once the sector reaches maturity.

Finally, the role of these programs should be re-evaluated once rural areas have overcome deficiencies in basic infrastructure and services provision. The sustainable development challenges facing rural environments open up opportunities for support to pilot innovative and differentiating projects with greater local impact.

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References

1. European Commission. *Notice to Member States Laying Down Guidelines for Integral Global Grants for Which the Member States Are Invited to Submit Proposals in the Framework of a Comunity Initiative for Rural Development (91/C 73/14)*; DOCE, no.73/33; Office for Official Publications of the European Communities: Luxembourg, 1991.
2. García Álvarez-Coque, J.M. Las propuestas de liberalización del comercio mundial agropecuario: Una aproximación cualitativa. *Rev. Estud. Agrosociales Pesq.* **1991**, *155*, 11–40.
3. Flores Paredes, J. Las reformas de la PAC y la Ronda Doha. Rev. *Econ. Mund.* **2006**, *15*, 155–177.
4. Massot, A. La reforma de la Política Agraria Común de junio de 2003: Resultados y retos para el futuro. *ICE* **2004**, *2817*, 35–55.
5. Castellano-Álvarez, F.J. Claves del actual proceso de reforma de la PAC: Un análisis de su evolución histórica. In *Sistemas Territoriales y Recursos Para la Sostenibilidad*; En Mora Aliseda, J., Loures, L., Garrido, J., Eds.; Thomson Reuters, Aranzadi: Pamplona, España, 2022; pp. 197–221.
6. Bonete, B. *Condicionamientos Internos y Externos de la PAC*; MAPA: Madrid, Spain, 1994.
7. García Álvarez-Coque, J.M.; Compés, R. Las reformas de la Política Agrícola Común en la Unión Europea ampliada: Implicaciones económicas para España. *Papeles Econ. Española* **2005**, *103*, 230–244.
8. Massot, A. La PAC, entre la Agenda 2000 y la Ronda del Milenio: ¿A la búsqueda de una política en defensa de la multifuncionalidad agraria? *Rev. Estud. Agrosociales Pequeros* **2000**, *188*, 9–66.

9. Castellano-Álvarez, F.J.; Parejo-Moruno, F.M.; Rangel-Preciado, J.F.; Cruz-Hidalgo, E. Regulation of Agricultural Trade and Its Implications in the Reform of the CAP. The Continental Products Case Study. *Agriculture* **2021**, *11*, 633. [CrossRef]
10. European Commission. *Guidelines for European Agriculture*; COM (81) 608 Final; Office for Official Publications of the European Communities: Luxembourg, 1981.
11. European Commission. *Perspectives for the Common Agricultural Policy*; The Green Paper of the Commission; Green Europe News Flash 33, COM (85) 333; Communication of the Commission to the Council and the Parliament: Brussels, Belgium, 1985.
12. European Commission. *The Future of Rural Society*; COM (88) 501; Bulletin of the European Communities, Supplement 4/88; Office for Official Publications of the European Communities: Brussels, Belgium, 1988.
13. Asociación Europea de Información sobre el Desarrollo Local. *La Financiación Local en Los Territorios Rurales*; Cuaderno 9; Observatorio Europeo Leader: Bruselas, Bélgica, 2000.
14. European Commission. *Communication Setting out Guidelines for Global Grants to Integrated Operational Programs, for Which States Are Requested to Submit Applications for Assistance within a Community Initiative for Rural Development (94/C 180/12)*; Official Journal of the European Communities; Office for Official Publications of the European Communities: Luxembourg, 1994.
15. European Commission. *Communication to the Member States, Laying Down Guidelines for the Community Initiative for Rural Development (Leader+) (2000/C 139/05)*; C 139/05, Official Journal of the European Communities; Office for Official Publications of the European Communities: Luxembourg, 2000.
16. Ministerio Agricultura Pesca y Alimentación. *Programa Nacional Proder I*; MAPA: Madrid, Spain, 1996.
17. Ministerio de Agricultura Pesca y Alimentación. *Real Decreto 2/2002, de 11 de Enero, por el que se Regula la Aplicación de la Iniciativa Comunitaria "Leader+" y los Programas de Desarrollo Rural (PRODER)*; BOE, 11 de 12 de enero; MAPA: Madrid, Spain, 2002.
18. Cebrián, A. Génesis, método y territorio del desarrollo rural con enfoque local. *Papeles Geogr.* **2003**, *38*, 61–76.
19. Rodríguez, F. El desarrollo local, una aplicación geográfica. Exploración teórica e indagación sobre práctica. *Eria* **1996**, *39–40*, 57–73.
20. Zapatero, J.; Sánchez, M.J. Instrumentos específicos para el desarrollo rural integrado: La Iniciativa Comunitaria Leader y el Programa Operativo Proder. *Polígonos* **1999**, *8*, 21–23.
21. Musto, S. *Endogenous Development. A Myth or a Path? Problems of Economic Self-Reliance in the European Periphery*; EADE Books Series, No. 5; German Development Institute: Berlin, Germany, 1985.
22. Cebrián, A.; García, R. El modelo LEADER, base del ordenamiento rural en la Unión Europea. *Ágora* **2008**, *14*, 22–48.
23. Esparcia, J.; Noguera, J. Reflexiones en torno al territorio y al desarrollo rural. In *El Desarrollo Rural en la Agenda 2000*; Ramos, E., Ed.; Ministerio de Agricultura Pesca y Alimentación: Madrid, Spain, 1999; pp. 9–44.
24. Etxezarreta, M. *Desarrollo Rural Integrado*; Ministerio de Agricultura Pesca y Alimentación: Madrid, Spain, 1988.
25. Cazorla, A.; De los Ríos, I.; Díaz, J.M. La Iniciativa Comunitaria Leader como modelo de desarrollo rural: Aplicación a la región capital de España. *Agrociencia* **2005**, *39*, 697–708.
26. Asociación Europea de Información sobre el Desarrollo Local. *La Competitividad Territorial. Construir una Estrategia de Desarrollo Territorial con Base en la Experiencia de Leader*; Cuaderno No. 6; Observatorio Europeo Leader: Bruselas, Bélgica, 1999.
27. Nieto, A.; Cárdenas, G. 25 años del método Leader en Extremadura. Su estudio mediante técnicas SIG y análisis multivariado. *Rev. Int. Cienc. Tecnol. Inf. Geográfica* **2016**, *18*, 125–146.
28. Cejudo, E.; Navarro, F.A. La inversión en los programas de desarrollo rural. Su reparto territorial en la provincia de Granada. In *Anales de Geografía de la Universidad Complutense*; Universidad Complutense: Madrid, España, 2009; Volume 29, pp. 37–64.
29. Vargas, M.; Mondéjar, J.A. Análisis de la inversión de los Fondos Europeos para el Desarrollo rural en Castilla-La Mancha. *Rev. Económica Castilla Mancha* **2006**, *9*, 189–238.
30. Alario, M.; Baraja, E. Políticas públicas de desarrollo rural en Castilla y León: "Sostenibilidad consciente o falta de opciones": LEADER II. *Boletín Asoc. Geógrafos Españoles* **2006**, *41*, 267–293.
31. Nieto, A.; Cárdenas, G. Towards Rural Sustainable Development? Contributions of the EAFRD 2007-2013 in Low Demographic Density Terriories: The Case of Extremadura. *Sustainability* **2017**, *9*, 1173.
32. Carvalho, P.; Fernandez, J.L. Iniciativas de desenvolvimiento local no espaço rural portugués. In *Território, Inovaçao e Trajectorias de Desenvolvimiento*; Caetano, L., Ed.; Centro de Estudios Geográficos da Fluc: Coimbra, Portugal, 2001; pp. 241–272.
33. Ruíz, E.; Frutos, L.M.; Climent, E. La iniciativa comunitaria LEADER II y el desarrollo rural: El caso de Aragón. *Geographicalia* **2000**, *38*, 71–84.
34. Delgado, C.; De la Fuente, M.T. Las estrategias de desarrollo rural: Una valoración del PRODER en Cantabria. In *Actas del X Coloquio de Geografía Rural*; Asociación Geógrafos Españoles, Grupo Geografía Rural: Ciudad Real, España, 2000; pp. 623–634.
35. Bryden, J. *Tourism and Development*; Cambridge University Press: Cambridge, UK, 1973.
36. Lane, B. What is rural tourism? *J. Sustain. Tour.* **1994**, *2*, 7–21. [CrossRef]
37. Butler, R.; Hall, C.M.; Jenkins, J. (Eds.) *Tourism and Recreation in Rural Areas*; Wiley: Chichester, UK, 1998.
38. Sharpley, R.; Roberts, L. Rural Tourism: 10 Years on. *Int. J. Tour. Res.* **2004**, *6*, 119–124. [CrossRef]
39. Patmore, J. *Recreation and Resources, Leisure Patterns and Leisure Places*; Blackwell: Oxford, UK, 1983.
40. Perdue, R.; Long, P.; Allen, L. Rural resident tourism perceptions and attitudes. *Ann. Tour. Res.* **1987**, *14*, 420–429. [CrossRef]
41. García, R. Turismo y desarrollo rural en la comarca del Noroeste de la región de Murcia: Los programas europeos Leader. *Cuad. Tur.* **2011**, *27*, 419–435.

42. Toledano, N.; Gessa, A. El turismo rural en la provincia de Huelva. Un análisis de las nuevas iniciativas creadas al amparo de los programas Leader II y Proder. *Rev. Desarro. Rural Coop. Agrar.* **2002**, *6*, 107–122.
43. Candela, A.R.; García, M.M.; Such, M.P. La potenciación del turismo rural a través del programa LEADER: La Montaña de Alicante. *Investig. Geográficas* **1995**, *14*, 77–98. [CrossRef]
44. Hernández, M.; Moltó, E.; Rico, A. Actividades turístico-residenciales en las montañas valencianas. *Eria* **2008**, *75*, 77–97.
45. García, M.; De la Calle, M. Turismo en el medio rural: Conformación y evaluación de un sector productivo en plena transformación. El caso del Valle del Tiétar (Ávila). *Cuad. Tur.* **2006**, *17*, 75–101.
46. Pérez, M.; López, E. La contribución del turismo a la diversificación de actividades en un espacio rural periférico. Análisis del impacto de la iniciativa LEADER en Galicia. Rev. *Estud. Agrosociales Pesq.* **2005**, *206*, 111–135.
47. Mondéjar, J.A.; Mondéjar, J.; Vargas, M. Análisis del turismo cultural en Castilla-La Mancha (España). El impacto de los programas europeos de desarrollo rural Leader y Proder. *Estud. Perspect. En Tur.* **2008**, *17*, 359–370.
48. Márquez, D.; Foronda, C.; Galindo, L.; García, A. Eficacia y eficiencia de Leader II en Andalucía. Aproximación a un índice-resultado en materia de turismo rural. *Geographicalia* **2005**, *47*, 137–142.
49. Nieto, A.; Cárdenas, G. 25 años de políticas europeas en Extremadura: Turismo rural y método Leader. *Cuad. Tur.* **2017**, *39*, 389–416. [CrossRef]
50. Guiberteau, A. Fortalezas y debilidades del modelo de desarrollo rural por los actores locales. In *Nuevos Horizontes en el Desarrollo Rural*; Márquez, D., Ed.; Universidad Internacional de Andalucía, AKAL: Madrid, España, 2002; pp. 87–104.
51. Alberdi, J.C. El medio rural en la agenda empresarial: La difícil tarea de hacer partícipe a la empresa del desarrollo rural. *Investig. Geográficas* **2008**, *45*, 63–91. [CrossRef]
52. Navarro, F.; Woods, M.; Cejudo, E. The Leader Iniciative has been a victim of its own success. The decline of the bottom-up approach in rural development programmes. The cases of Wales and Andalusia. *Sociol. Rural.* **2016**, *56*, 270–288. [CrossRef]
53. Navarro, F.; Cejudo, E.; Maroto, J.C. Reflexiones en torno a la participación en el desarrollo rural. ¿Reparto social o reforzamiento del poder? LEADER y PRODER en el sur de España. *EURE* **2014**, *40*, 203–224. [CrossRef]
54. Esparcia, J.; Noguera, J.; Pitarch, M.D. LEADER en España: Desarrollo rural, poder, legitimación aprendizaje y nuevas estructuras. *Doc. D'anàlisi Geogràfica* **2000**, *37*, 95–113.
55. Buciega, A. *Capital Social en el Marco de los Grupos Leader Para el Desarrollo Rural: Análisis de Casos en la Provincia de Valencia*; Universitat de València, Instituto Interuniversitario de Desarrollo Local: Valencia, España, 2009.
56. Saz-Gil, M.I.; Gómez-Quintero, J.D. Una aproximación a la cuantificación del capital social: Una variable relevante en el desarrollo de la provincia de Teruel, España. *EURE* **2015**, *41*, 29–51. [CrossRef]
57. Garrido, F.; Moyano, E. Capital social y desarrollo en zonas rurales. Un análisis de los programas Leader II y Proder en Andalucía. *Rev. Int. Sociol.* **2002**, *60*, 67–96. [CrossRef]
58. Castellano-Álvarez, F.J.; Loures, L.C.; Mora Aliseda, J. Análisis de los efectos a largo plazo de los programas de desarrollo rural a partir de la metodología del Estudio de Caso. In *Planeamiento Ecológico en las Iniciativas de Desarrollo*; Mora Aliseda, J., Castanho, R.A., Garrido, J., Eds.; Thomson Reuters, Aranzadi: Pamplona, España, 2022.
59. Navarro, F.; Cejudo, E.; Cañete, J.A. Balance de la Iniciativa Comunitaria de desarrollo rural tras 25 años. Continuidad de las empresas creadas con apoyo de Leader I y II. El caso de las Alpujarras. In *Treinta años de Política Agraria Común en España. Agricultura y Multifuncionalidad en el Contexto de la Nueva Ruralidad*; Ruiz, A., Serrano, M., Plaza, J., Eds.; Asociación de Geógrafos Españoles: Ciudad Real, España, 2016; pp. 385–398.
60. Cañete, J.A.; Cejudo, E.; Navarro, F. Proyectos fallidos de desarrollo rural en Andalucía. *Boletín Asoc. Geógrafos Españoles* **2018**, *78*, 270–301. [CrossRef]
61. Cejudo, E.; Cañete, J.A.; Navarro, F.A.; Capote, A. Fracaso en la implementación de los proyectos Leader en el rural profundo de Andalucía (España): Juventud y mujer. *Ager Rev. Estud. Sobre Despoblación Desarro. Rural* **2021**, *33*, 249–278.
62. Navarro, F.; Cejudo, E.; Maroto, J.C. Aportaciones a la evaluación de los programas de desarrollo rural. *Boletín Asoc. Geógrafos Españoles* **2012**, *58*, 349–379.
63. Castellano-Álvarez, F.J.; Robina Ramírez, R.; Nieto Masot, A. Tourism Development in the Framework of Endogenous Rural Development Programmes: Comparison of the Case Studies of the Regions of La Vera and Tajo-Salor. *Agriculture* **2023**, *13*, 726. [CrossRef]
64. Castellano-Álvarez, F.J.; Del Río Rama, M.; Álvarez-García, J.; Durán-Sánchez, A. Limitations of Rural Tourism as an Economic Diversification and Regional Development Instrument. *The Case Study of the Region of La Vera. Sustainability* **2019**, *11*, 3309.
65. European Commission. *Regulation 1974/2006 of 15 December 2006 Laying down Detailed rules for the Application of Council Regulation 1698/2005 on Support for Rural Development by the European Agricultural Fund for Rural Development (EAFRD)*; Official Journal of the European Communities, L/368; Office for Official Publications of the European Communities: Luxembourg, 2006.
66. Castellano-Álvarez, F.J.; Fundación de Estudios Rurales. La estrategia de Desarrollo rural en la comarca de La Vera (Extremadura, España). In *Agricultura Familiar en España. Anuario 2018*; Moyano, E., Ed.; UPA: Madrid, España, 2018; pp. 142–147.
67. Castellano-Álvarez, F.J.; Nieto, A.; Castro-Serrano, J. Intangibles of Rural Development. The Case Study of La Vera (Extremadura, Spain). *Land* **2020**, *9*, 203. [CrossRef]

68. Castellano-Álvarez, F.J.; Del Rio, M.D.L.C.; Durán-Sánchez, A.; Álvarez-García, J. Strategies for Rural Tourism and the Recovery of Cultural Heritage: Case Study of La Vera, Spain. In *Capacity Building through Heritage Tourism. An International Perspective*; Srivastava, S., Ed.; Apple Academic Press: Palm Bay, FL, USA, 2021; pp. 53–70.
69. Castellano-Álvarez, F.J. The Restoration of Religious Heritage as a Rural Development Strategy. In *Handbook of Research on Socio-Economic Impacts of Religious Tourism and Pilgrimage*; Álvarez-García, J., Del Río-Rama, M.C., Gómez-Ullate, M., Eds.; IGI Global: Hershey, PA, USA, 2019; pp. 129–147.
70. Castellano-Álvarez, F.J.; Durán-Sánchez, A.; Del Rio, M.C.; Álvarez-García, J. Innovation and Enterpreneurship as Tools for Rural Development: Case Study Region of La Vera, Extremadura, Spain. In *Enterpreneurship and the Comumnity. A Multidisciplinary Perspective on Creative, Social Challenges and Business*; Ratten, V., Ed.; Springer: Cham, Switzerland, 2020; pp. 125–140.
71. Álvarez-García, J.; Maldonado-Erazo, C.P.; Del Río-Rama, M.d.l.C.; Castellano-Álvarez, F.J. Cultural Heritage and Tourism Basis for Regional Development: Mapping of Scientific Coverage. *Sustainability* **2019**, *11*, 6034. [CrossRef]
72. Quaranta, G.; Citro, E.; Salvia, R. Economic and Social Sustainable Synergies to Promote Innovations in Rural Tourism and Local Development. *Sustainability* **2016**, *8*, 668. [CrossRef]
73. Iakovidou, O.; Koutsouris, A.; Partalidou, M. The development of rural tourism in Greece, through the initiative Leader II: The case of northern and central Chalkidiki. *Mediterr. J. Econ. Agric. Environ.* **2002**, *4*, 32–38.
74. Apostolopoulos, N.; Liargovas, P.; Stavroyiannis, S.; Makris, I.; Apostolopoulos, S.; Petropoulos, D.; Anastasopoulou, E. Sustaining Rural Areas, Rural Tourism Enterprises and EU Development Policies: A Multi-Layer Conceptualisation of the Obstacles in Greece. *Sustainability* **2020**, *12*, 7687. [CrossRef]
75. Marques, H. Searching for complementarities between agriculture and tourism: The demarcated Wine-producing regions of northern Portugal. *Tour. Econ.* **2006**, *12*, 147–155. [CrossRef]
76. Gatti, S.; Incerti, F.; Ravagli, M. Wine and tourism: New perspectives for vineyard areas in Emilia-Romagna. *Cah. D'economie Sociol. Rural.* **2002**, *62*, 97–117. [CrossRef]
77. Milano, C.; Novelli, M.; Cheer, J. Overtourism and Tourismphobia: A Journey Through Four Decades of Tourism Development, Planning and Local Concerns. *Tour. Plan. Dev.* **2019**, *16*, 353–357.
78. Muresan, I.; Harun, R.; Arion, F.; Oroian, C.; Dumitras, D.; Mihai, M.; Ilea, M.; Chiciudean, D.; Gigla, I.; Chiciudean, G. Residents Perception of Destination Quality: Key Factors for Sustainable Development. *Sustainability* **2019**, *11*, 2594. [CrossRef]
79. Muresan, I.; Oroian, C.; Harun, R.; Arion, F.; Porutiu, A.; Chiciudean, G.; Todea, A.; Lile, R. Local Residents Attitude toward Sustainable Rural Tourism Development. *Sustainability* **2016**, *8*, 100. [CrossRef]
80. Andereck, K.L.; Valentine, K.M.; Knopf, R.C.; Vogt, C.A. Residents' perceptions of community tourism impacts. *Ann. Tour. Res.* **2005**, *32*, 1056–1076. [CrossRef]
81. Kayat, K.; Sharif, N.M.; Karnchanan, P. Individual and collective impacts and residents' perceptions of tourism. *Tour. Geogr.* **2013**, *15*, 640–653. [CrossRef]
82. Brankov, J.; Jojić, T.; Milanović, A.; Petrović, M.; Tretiakova, T. Resident's Perceptions of Tourism Impact on Community in National Parks in Serbia. *Eur. Ctry.* **2019**, *11*, 124–142.
83. Robina Ramírez, R.; Ripoll, R.; Castellano-Álvarez, F.J. The trinomial health, safety and happiness promote rural tourism. *BMC Public Health* **2023**, *23*, 16. [CrossRef] [PubMed]
84. Ciolac, R.; Adamov, T.; Iancu, T.; Popescu, G.; Lile, R.; Rujescu, C.; Marin, D. Agritourism: A Sustainable Development Factor for Improving the "Healt" of Rural Settlements. Case Study Apuseni Mountains. *Sustainability* **2019**, *11*, 1467. [CrossRef]
85. Durán, M. El estudio de caso en investigación cualitativa. *Rev. Adm.* **2012**, *3*, 121–134. [CrossRef]
86. Jiménez, V.; Comet, C. Los estudios de casos como enfoque metodológico. *ACADEMO Rev. Investig. Cienc. Soc. Humanidades* **2016**, *3*, 1–11.
87. Coller, X. *Estudio de casos. Colección de Cuadernos Metodológicos*; Centro de Investigaciones Sociológicas: Madrid, España, 2000.
88. Yin, R. *Investigación y Aplicaciones de Estudios de Casos: Diseño y Métodos*; SAGE: Los Ángeles, CA, USA, 2018.
89. Castellano-Álvarez, F.J.; Robina Ramírez, R. La comarca como ámbito de intervención en los programas de desarrollo rural. El Estudio de caso de la comarca de La Vera. In *Organización de la producción, Instituciones y Cooperación Empresarial. Estudios Aplicados Para el Desarrollo Rural*; Parejo, F., Rangel, J.F., Linares, A., Eds.; Dykinson, S.L.: Madrid, España, 2023; pp. 365–378.
90. González Regidor, J. *Desarrollo Rural de Base Territorial: Extremadura*; Ministerio de Agricultura, Pesca y Alimentación y Consejería Desarrollo Rural Junta Extremadura: Badajoz, España, 2006.
91. Centro de Estudios Socioeconómicos de Extremadura. *Diagnóstico Ambiental y Estratégico de la Mancomunidad de La Vera*; Consejería de Desarrollo Rural de la Junta de Extremadura: Mérida, España, 2008.
92. Castellano-Álvarez, F.J.; Del Río Rama, M.; Durán-Sánchez, A. Effectiveness of the Leader Initiative as an Instrument of Rural Development. Case Study of Extremadura (Spain). *Rev. Port. Estud. Reg.* **2020**, *55*, 61–78. [CrossRef]
93. Yin, R. *Investigación Cualitativa de Principio a fin*; The Guilford Press: Nueva York, NY, USA, 2016.
94. Esparcia, J. Las políticas de desarrollo rural: Evaluación de resultados y debate en torno a sus orientaciones futuras. In *El Mundo rural en la era de la Globalización: Incertidumbres y Potencialidades*; García, F., Ed.; MAPA: Madrid, España, 2001; pp. 267–309.
95. Viladomiu, L.; Rosell, J. Evaluando políticas, programas y actuaciones de desarrollo rural. *Rev. Española De Econ. Agrar.* **1998**, *182*, 297–308.
96. Esteban, M.; Rodríguez, A.; Moreno, J.; Altuzarra, A.; Larrañaga, J. La evaluación de la Política Regional Europea. Análisis empírico de las metodologías aplicadas. *Investig. Reg.* **2009**, *14*, 157–184.

97. Martins, M. Tourism Planning and Tourismphobia: An Analysis of the Strategic Tourism Plan of Barcelona 2010-2015. *J. Tour. Herit. Serv. Mark.* **2018**, *4*, 3–7.
98. Leal-Solís, A.; Robina-Ramírez, R. Tourism Planning in Underdeveloped Regions. What Has Been Going Wrong? The Case of Extremadura (Spain). *Land* **2022**, *11*, 663. [CrossRef]

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Article

A Case Study of Farmers' Behavioral Motivation Mechanisms to Crack the Fractal Multidimensional Relative Poverty Trap in Shaanxi, China

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Abstract: China's approach to addressing rural poverty has evolved from a thorough resolution of absolute poverty to a focus on providing essential support for vulnerable individuals and improving the income and welfare conditions of those who are relatively poor, taking into account multiple dimensions. This study utilizes a dataset consisting of 526 research sets collected from the central region of Shaanxi Province. The research employs structural equation modeling to examine the fractal multidimensional relative poverty trap experienced by farm households. Additionally, the study investigates the behavior motivation mechanism that can potentially alleviate the multidimensional relative poverty trap at the farm household level. The study found that (1) farm households in the central Shaanxi region are caught in a multidimensional relative poverty trap, with education poverty and health poverty having a conduction and amplification effect; health poverty and education poverty amplify employment poverty; and consumption poverty amplifies education poverty and health poverty, and education poverty further amplifies information poverty. (2) Multidimensional relative poverty in farming households creates a self-reinforcing poverty trap, and community relative poverty amplifies the multidimensional poverty trap in farming households. (3) Farmers can overcome the multidimensional relative poverty trap through the behavior motivation mechanism.

Keywords: multidimensional relative poverty; poverty trap; behavior motivation

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1. Introduction

The degree of poverty varies over time, depending on people's subjective and objective requirements as well as on their environment and social expectations. The United Nations has identified poverty eradication as the primary sustainable development goal, with the target year for achieving this objective set at 2030. In recent years, the Chinese government has implemented several measures to address the issue of poverty, resulting in a notable increase in the average income level among rural inhabitants. Consequently, significant progress has been made in alleviating absolute poverty, leading to a shift in focus toward addressing the issue of "relative poverty". However, the current focus lies on addressing the issue of relative poverty. Despite notable advancements, there are numerous obstacles to attaining inclusive social development, reducing the disparity in development between urban and rural areas and regions, and guaranteeing complete growth and equitable prosperity for all individuals [1]. China's poverty alleviation strategy has also shifted from realizing "Two Assurances and Three Guarantees" (no worries about food, no worries about clothing, and guarantees for compulsory education, basic medical care, and housing security) to alleviating the multidimensional relative poverty of unbalanced and inadequate development. The issue of multidimensional poverty within the population necessitates future attention, encompassing not only income poverty but also other elements of economic poverty and welfare poverty [2].

From a historical, geographic, environmental, and institutional perspective, it is evident that the income growth of Chinese poor people has been sluggish. Consequently, there has been a widening disparity in the standard of living and welfare between urban and rural areas. This unfortunate circumstance has resulted in a significant proportion of poor people experiencing relative poverty across various dimensions, including income, health, culture, and consumption [3,4]. In contrast, within the Loess Plateau region (located in the north-west of China), the presence of disparate socio-economic development, significant population outflow, and an aging demographic, together with the ongoing SARS-CoV pandemic over the past three years, have all contributed to a persistent and elevated state of multidimensional relative poverty among farming households residing in the area [5].

Academics summarize this state of poverty as a persistent and self-reinforcing trap. A number of studies have argued that external policy interventions have a long-term positive impact on breaking the poverty trap [6]. In addition, some scholars have emphasized that individual attitudes and perceptions are critical to cracking poverty [7]. It has also been found that there is a dynamic trap of socio-ecological interactions in the countryside [8]. Poverty traps manifest at both the individual and community levels among smallholder farmers residing in rural regions [9–12].

Studying the pathways and cross-scale effects within the multidimensional relative poverty trap requires consideration of three drivers [8]. Firstly, one of the reasons that can contribute to agricultural challenges is the individual farmer's lack of capability [13] and lack of initiative [14]. Second is the influence of environmental conditions, such as insufficient rural economic security, inadequate rural community cohesion, and inadequate rural industry integration [15]. Thirdly, due to policy factors, the necessity to continually adjust poverty governance policies aimed at enhancing farmers' prosperity in response to evolving conditions and temporal dynamics is evident [16]. For example, China's "Precision Poverty Alleviation" policy emphasizes precise identification, precise management, and precise assistance [17]. External policy incentives place more emphasis on income poverty alleviation, industrial poverty alleviation, and labor poverty alleviation [18], whereas top-down policy incentives lack the subjective and objective impact on smallholder farmers and other dimensions of poverty beyond income, making it difficult to create resilience among poverty farmers. The persistence of long-term, multidimensional relative poverty has resulted in the development of a poverty mentality among farmers. This mentality is characterized by the belief that the assets and resources they possess are insufficient to fulfill their actual needs or generate independent income. Consequently, farmers have come to perceive themselves as trapped in the predicament of multidimensional relative poverty, with little hope of escaping it. This poverty mentality can cause low-income people to fall into the relative poverty trap, i.e., to hesitate and wander and give up on getting out of poverty [19] and a lack of psychological capital such as the courage to get down to work and the confidence, optimism, and resilience to escape the trap of multidimensional relative poverty.

Some of the low-income farming families in Shaanxi have "resilience in adversity" and have the psychological and physical capital that helps them build their resistance to the complex threats they confront on a daily basis. The majority of multidimensional collectives comprised of farmers with limited financial resources often exhibit a lack of understanding regarding income generation and a lack of determination to overcome poverty. These groups tend to display cautiousness in their consumption and investment decisions, prioritizing immediate sustenance over long-term goals. Additionally, they have a tendency toward short-sightedness and a lack of ambition. Stimulated by the subsidy policy, some farmers are reluctant to leave their poverty status, and egalitarianism [20] may lead these farmers to take advantage of the loopholes in the policy and realize their own interests in the treatment of poor households; behind this phenomenon of voluntary poverty and unwillingness to lift themselves out of poverty is a lack of psychological resilience on the part of some rural households to lift themselves out of poverty. They lack the ability to

identify poverty, match resources, and choose actions to eliminate poverty, and they are "psychological poverty" because of their dependence on the culture of poverty [21].

Uncertainties, such as the instability of livelihoods and the variability of environmental conditions, might undermine the confidence of individual farmers and provide them with a quandary regarding their willingness to engage in proactive measures. Higher psychological resilience can help individuals cope with changing situations and strengthen their beliefs in the face of difficulties and risks. Enhancing psychological resilience requires the stimulation of personal effectiveness and the use of a strong will and a positive mindset to maximize one's own interests by integrating available resources, which is the first prerequisite for escaping from the multidimensional relative poverty trap. Enhance prospective productivity and well-being through the implementation of incentives that encourage individuals to reintegrate currently available resources. Developing strong endogenous dynamics for escaping multidimensional relative poverty requires improving the viability of farmers. This psychological expectation based on trust can improve the self-regulatory capacity of multidimensionally relatively poor farmers [22], and it can further prevent the reverse evolution of ability poverty into "spiritual poverty" [23]. On the other hand, an individual's efforts to escape poverty are also influenced by the community environment. Social welfare [24], public services [25], and financial services [26] in rural China are still poorly constructed, and as the income gap between urban and rural areas is widening, the multidimensional relative poverty in rural areas is unable to benefit from the trickle-down effect of economic growth. Farm households residing in underdeveloped rural communities face challenges in terms of access, security, and overall well-being [27]. These challenges are exacerbated by the absence of adequate community support, substandard infrastructure conditions, and the inadequate provision of public services. Consequently, farmers in such communities are constrained in their options for pursuing viable livelihood strategies.

To view multidimensional relative poverty among farm households simply as a problem addressed by one dimension and one mechanism, and to analyze only the interactions between the behavioral choices of farm households and their community environments, ignores the interplay between the poverty trap of the farm household and the poverty trap of the community. Improving the psychological resilience of farm households and establishing a perfect dynamic mechanism and welfare improvement mechanism for multidimensionally relatively poor farm households is the key to breaking the multidimensional relative poverty trap. In order to break the trap of low-level multidimensional relative poverty, it is necessary to stimulate farmers' personal capabilities, improve their initiative, stimulate the internal motivation of farmers to become rich and live happily, establish a stable and sustainable community mechanism for poverty eradication, and break the traps of "poverty of ability", "welfare poverty" and "spiritual poverty". Therefore, the research questions in this paper are: (1) What dimensions of relative poverty exist in Shaanxi farming households? (2) How is the multidimensional relative poverty trap formed, and what is its interaction mechanism? (3) How does behavior motivation mechanism action stimulate the personal effectiveness of multidimensional relative poverty farmers? (4) How does the behavior motivation mechanism action break the multidimensional relative poverty trap? Therefore, the contribution of this paper lies in verifying the self-reinforcing effect of the fractal multidimensional relative poverty trap in which Shaanxi farmers live and proposing a mechanism for farmers' behavior motivation mechanism action to crack the multidimensional relative poverty trap.

2. Theory and Assumptions

2.1. Relative Poverty Dimension

Relative poverty emphasizes that the poverty of individuals is below average. Multidimensional relative poverty includes dimensions such as "spatial poverty", "intergenerational poverty", and "hidden poverty" [28–30], whose dynamic characteristics need to be taken into account. Existing studies have examined the dimensions of income, education, health, housing, livelihood, and assets [3,31]; some scholars have also introduced

information technology levels [32] with infrastructure development [33], food nutrition structure [34], energy [35], and residential deprivation [36] dimensions. There is a downward trend in the multidimensional poverty level in rural areas of China, with obvious spatial disequilibrium [37]. In central Shaanxi, the economic income of farming households is relatively inadequate compared to the requirements of education, health, and overall well-being. This situation is influenced by historical, geographic, cultural, and economic factors; the development of farming households' communities is hindered by challenging natural conditions, remote geographic location, and regional development disparities (Table 1).

Table 1. Multidimensional relative poverty.

First Dimension	Second Dimension	Connotation
Relative economic poverty	Relative income poverty	The income of farming households is less than 50% of the average income of society, reflecting the relative disparity in economic status and income inequality [38].
Relative capability poverty	Relative education poverty	Insufficient and poor quality of public education resources in the rural areas where individuals or families live, even to the extent that they are unable to satisfy the need for all school-age members of local rural families to participate in and complete the compulsory stage of education, and there is a gap between them and the average level of education [39].
	Relative employment poverty	Insufficient labor force, insufficient hours of work, high labor burden coefficient, inequality, and relative disparity in comparison with society as a whole or with specific groups in farm households [40].
	Relative health poverty	The existence of sub-health or disease states among members of farming households, including physical and mental health poverty, reflects inequalities and relative disparities in the area of health [41].
	Relative information poverty	Farmers still have a single way of obtaining outside information, a weak awareness of the use of new information, a low sensitivity to new information, and an insufficient ability to judge the truth or falsity of the information, reflecting the inequality and relative disparity in information acquisition and utilization [8].
Relative welfare poverty	Relative consumption poverty	Family consumption of basic necessities, such as clothing, food, housing, and transportation, is lower than the average level of social consumption, making it difficult to meet the normal living needs of family members [42].

2.2. The Fractal Poverty Trap

The poverty trap is a state of persistent poverty that is autonomously reinforced at the individual or community level [8]. The poverty trap keeps the farm household or community in a stable and inefficient systemic equilibrium [43]. Therefore, escaping from relative poverty requires breaking this self-reinforcing equilibrium system and placing farmers or community groups in an alternative equilibrium with a higher sense of well-being [44,45].

Fractal Poverty Trap Theory explains the simultaneous occurrence of multiple levels of poverty traps [46]. Fractal poverty traps are poverty traps that are self-reinforcing with multiple dimensions, self-recycling and amplifying at different levels at the same time, and self-reinforcing through cross-feedback. Therefore, in lower productivity environments, dynamic poverty reduction focusing on only one dimension has little effect, while integrated interventions in all dimensions can reduce poverty significantly. Some farming households in central Shaanxi are in a fractal multidimensional relative poverty

trap. Farming households are confronted with various factors that contribute to their entrapment in multidimensional relative poverty. These factors include population aging, a limited labor force comprised of immediate family members, a high burden coefficient, possession of small plots of arable land that are of low quality, the poverty health status of household members, and a decline in income [47]. In addition, community factors such as industrial development, social network relationships [48], and infrastructural environments determine the relative poverty traps in the communities where Shaanxi farmers live. The multidimensional poverty trap arises from a combination of factors. Firstly, it is influenced by the value choices made by farmers, the accumulation of negative emotions within individuals, and the depletion of resources that are essential for farmers' livelihoods. Secondly, it is exacerbated by the inadequate development of infrastructure and public services, the degradation of the natural environment, and the unfavorable subsistence conditions prevalent in the communities where farmers reside. Ignoring the key cross-scale interactions between the relative poverty trap of the farm household and the relative poverty trap of the community may lead to a wrong assessment of multidimensional relative poverty, which in turn biases poverty reduction strategies and policy formulation. Therefore, in analyzing the fractal relative poverty trap in Shaanxi, the interplay of multidimensional relative poverty across levels should be emphasized. The self-reinforcing of the poverty trap posits that there exists a reciprocal relationship between multidimensional relative poverty in agricultural households and multidimensional relative poverty in communities, whereby each reinforces the other. Therefore, a hypothesis is postulated as follows:

Hypothesis 1 (H1): *The interaction between community multidimensional relative poverty and farm household multidimensional relative poverty results in a mutually reinforcing relationship.*

Self-recycling effects of poverty exist between different dimensions of the same dimension. If one dimension of multidimensional relative poverty in the same dimension is negatively correlated with another dimension of relative poverty, there is an offsetting effect of these dimensions of poverty; if different dimensions of relative poverty in the same dimension are positively correlated, there is a magnifying effect between them. For instance, farmers with limited financial resources possess a modest amount of livelihood capital. The majority of their available cash or savings is allocated towards meeting essential life necessities, leading to a state of relative poverty in various aspects such as education, skills, employment, and health. Conversely, farmers who possess stable and substantial cash reserves are more inclined to increase their consumption expenditures. This, in turn, elevates the overall consumption level of farmers, enhances the composition of their consumption patterns, and facilitates the transition from inflexible consumption to more adaptable forms of consumption [49]. Farmers engage in the diversification of their consumption patterns, encompassing sectors such as education and health, which consequently leads to a reduction in relative poverty levels, particularly in domains associated with subsistence consumption. Relatively affluent incomes can significantly improve the cognitive ability of farm households, thereby improving their relative educational poverty [50]. The higher the level of education of a farm household, the more livelihood options it has and the more income it generates from livelihood diversification; therefore, a reduction in relative poverty in terms of education is better able to reduce relative poverty in terms of income [51]. At the same time, education protects and improves farmers' own rights and interests, enhances life skills and their innovative capacity, promotes diversified employment of the labor force, and increases non-farm income [52]. Thus, reducing relative poverty in education means reducing relative poverty in employment. More income for farm households enhances their stock of assets such as physical capital, durables, and property [53], which in turn leads to better living conditions [54]. In conclusion, at the farm household level, there is a positive correlation between multidimensional relative poverty. Therefore, a hypothesis is postulated as follows:

Hypothesis 2 (H2): *There is an amplification effect within the multidimensional relative poverty of farm households.*

2.3. Mechanisms of Farmers' Behavior Motivation to Crack the Multidimensional Poverty Trap

The behavior motivation mechanism consists of two components: personal effectiveness and future value orientation. Personal effectiveness is one of the three elements of an individual's mechanism to address poverty [55] and refers to the ability of a farmer to change his or her poverty situation through his or her own actions and efforts. This mechanism places significant emphasis on the active engagement of economically disadvantaged farmers with diverse dimensions in enhancing their socio-economic status. It also aims to regulate the efficacy of farmers in stimulating their own productivity, thereby establishing a foundation for their involvement in poverty alleviation initiatives and preventing relapse into poverty. Due to a deficiency in inherent motivation within the rural impoverished population, rural households have experienced a reduction in their needs, a decline in cultural practices, diminished confidence, inadequate commitment to combat poverty and pursue independent development, and a persistent reliance on external assistance through the mindset of "waiting, relying, and asking for help". Consequently, their behavioral initiative is insufficient, and their sense of participation is weak. Behavior motivation mechanisms reduce the risks and losses associated with shocks by mobilizing farmers' own personal effectiveness to adapt to new modes of production activities, policies, and environments and to change adaptive behaviors in the face of shocks [56] and losses [57]. Therefore, the long-term income-generating mechanism for low-income farmers is a mechanism for farmers to adapt on their own under the government's program adaptation and to realize farmers' income increase by improving their livelihood capital [58]. The effective resolution of the multidimensional relative poverty trap is contingent upon a substantial reliance on ambition and proactive measures to elevate individuals from impoverished conditions [59]. Enhancing "income aspirations" constitutes a significant element of individual initiative, as it can serve as a driving force behind investment behavior, engagement in non-agricultural jobs, and consequent alleviation of poverty within farm households and families.

Existing research on the subjective factors influencing poverty highlights the significance of the future value orientation of impoverished populations. This research underscores the notion that individuals in poverty, such as farmers, engage in decision-making processes that enable them to break free from multidimensional relative poverty. These decision-making processes involve carefully considering various options and opportunities, as well as making predictions and formulating plans based on anticipated future outcomes [60]. The future value orientation requires that multidimensional groups of relatively poor people have long-term goals and visions for their productive lives, are able to grasp the state of their future economies, and are able to make clear and rational decisions in pursuit of their future goals. If multidimensional groups of relatively poor people believe they have the ability to change their lives, have a clear goal, have a high level of psychological resilience, and have confidence in their future prospects as well as an unambiguous understanding of them, then they may be more motivated to pursue that goal and be willing to change the status quo. On the contrary, if they do not have clear goals for the future and are not confident that they will be able to achieve them, they may give up and are more likely to fall into the poverty trap, which also implies a lack of psychological resilience. Personal efficacy beliefs, personal control beliefs, fear of failure, and future development planning influence poverty people to increase production and income [61]. Therefore, the mechanism of behavior motivation in this paper can stimulate personal effectiveness, increase the willingness to get rid of poverty, enhance belief in action, reduce concern about risk, increase the future value orientation to plan for the future and help farmers choose familiar paths to get rid of poverty in advance. Therefore, a hypothesis is postulated as follows (Figure 1):

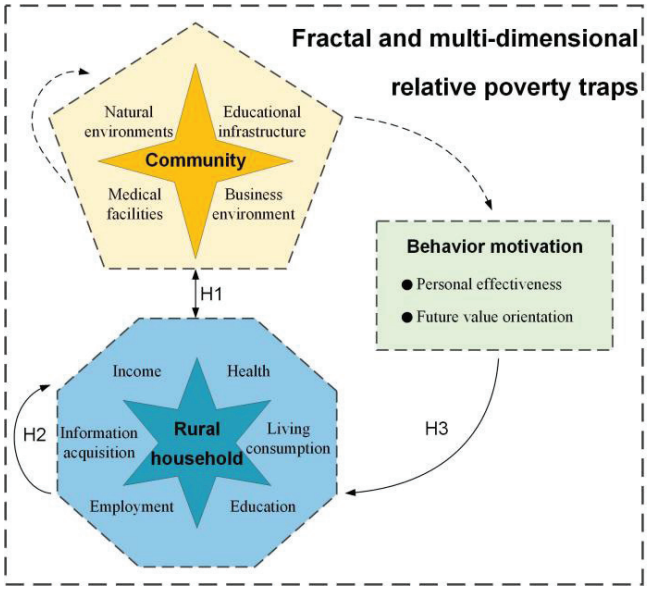

Figure 1. A theoretical framework for farmers' behavior motivation to crack the farmer-community fractal multidimensional relative poverty trap. Note: The arrows in the figure indicate poverty self-reinforcing effects, the solid arrows indicate the hypotheses to be tested, and the related concepts are shown in the list of variables. The yellow color represents the multidimensional relative poverty trap of the community, the blue part indicates the multidimensional relative poverty trap of the farm household, and the green part represents the behavior motivation mechanism.

Hypothesis 3 (H3): *Behavior Motivation mechanisms are effective in reducing multidimensional relative poverty among farm households.*

3. Methodology

3.1. Data

In this paper, based on the documents (The aforementioned documents include the Opinions on the Establishment of a Poverty Withdrawal Mechanism and the Implementation Measures for the Special Assessment and Inspection of the Withdrawal of Poverty Counties in Shaanxi Province.) presented by the Shaanxi Provincial Government, the last exited poverty counties in Shaanxi Province were selected as the study area, covering 10 districts and counties in the northern part of Guanzhong, Shaanxi, including Fufeng County, Qianyang County, Long County, Linyou County, Xunyi County, Baishui County, Pucheng County, Fengxiang District of Baoji City, Yaozhou District of Tongchuan City, and Yintai District (as shown in Figure 2 below). We used regional stratified sampling with the sample random sampling method; under each district and county, we randomly selected three towns, and under each town, we randomly selected three villages and conducted household face-to-face interview questionnaire research. Based on the proposed calculation of the income-relative poverty line based on a fixed proportional value of 50 percent of the median disposable income, income-related poverty is used as the threshold for determining multidimensional relative poverty for farm households. That is when income relative poverty exists, then individuals are in multidimensional relative poverty. We collected 600 questionnaires in May–August 2022 and screened 526 valid questionnaires from multidimensional relative poverty groups for empirical analysis in this paper.

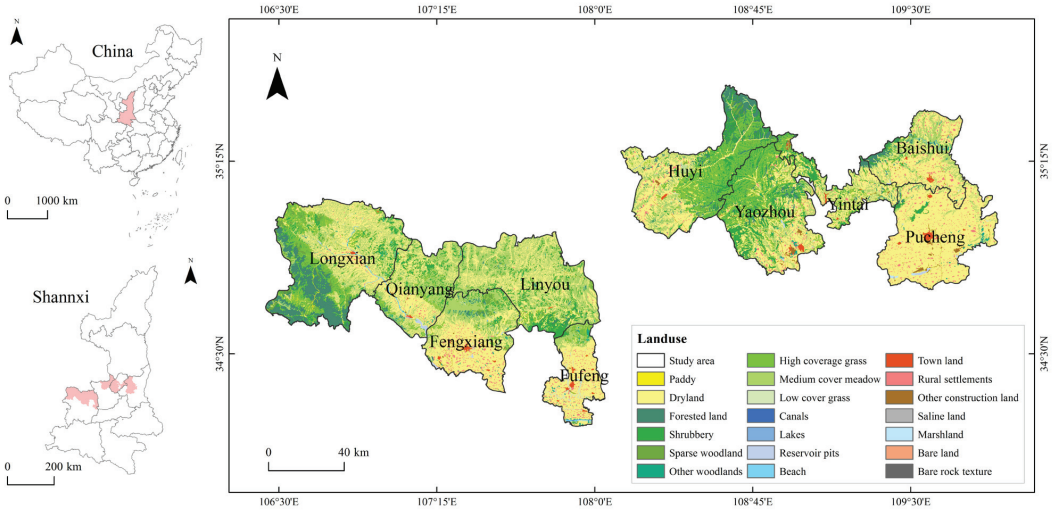

Figure 2. Study area located in central Shaanxi.

3.2. Measurement Scale

In order to assess the multidimensional relative poverty of farm households, we employ data pertaining to income, employment, health, education, access to information, and consumption. Similarly, to gauge the multidimensional relative poverty of the community, we consider factors such as the natural environment, local education and medical care, and the local business environment. The measurement indicators were assessed using Likert five-point scales. The descriptive statistical analysis of the entire dataset (Table 2) reveals that the average values for income, information, and living consumption among farm households are comparatively low. Conversely, the levels of employment, health, and the natural environment within the community, as well as the personal effectiveness and future value orientation of farm households, are relatively high.

Table 2. Measurement scale and descriptive statistical analysis.

Latent Variable	Indicator Description	Five-Point Likert Scale	Mean	SD	Median
Income	Annual disposable household income (IN1)	1 = ¥0–¥1400; 2 = ¥1400–¥2800; 3 = ¥2800–¥4200; 4 = ¥4200–¥5600; 5 = ¥5600–¥7000 (RMB)	2.049	1.213	2.000
	Annual household income from agriculture (IN2)	1 = ¥0–¥1000; 2 = ¥2000–¥3000; 3 = ¥3000–¥4000; 4 = ¥4000–¥5000; 5 = ¥5000–¥6000 (RMB)	2.103	1.170	2.000
	Annual household income from employment (IN3)	1 = ¥0–¥1000; 2 = ¥2000–¥3000; 3 = ¥3000–¥4000; 4 = ¥4000–¥5000; 5 = ¥5000–¥6000 (RMB)	1.922	1.141	2.000
	Discounted value of the family's main real estate, car, and financial assets (IN4)	1 = 0–1; 2 = 1–2; 3 = 2–3; 4 = 3–4; 5 = over 4 (Ten Thousand RMB)	2.279	1.151	2.000
Employment	Number of family laborers (EM1)	1 = 0; 2 = 1; 3 = 2; 4 = 3; 5 = over 3	3.951	0.988	4.000
	Percentage of labor hours per year for household heads (EM2)	1 = 0–20%; 2 = 20–40%; 3 = 40–60%; 4 = 60–80%; 5 = 80–100%	4.139	0.895	4.000
	Household labor burden ratio (EM3)	1 = 0–20%; 2 = 20–40%; 3 = 40–60%; 4 = 60–80%; 5 = 80–100%	3.850	1.028	4.000

Table 2. *Cont.*

Latent Variable	Indicator Description	Five-Point Likert Scale	Mean	SD	Median
Information	Number of agricultural materials purchased through the Internet (INF1)	1 = 0; 2 = 1; 3 = 2; 4 = 3; 5 = over 3	1.677	0.935	1.000
	Amount of agricultural materials purchased by households through the Internet (INF2)	1 = ¥0–¥50; 2 = ¥50–¥100; 3 = ¥100–¥150; 4 = ¥150–¥200; 5 = over ¥200 (RMB)	1.819	0.972	2.000
	Household access to agricultural information (INF3)	Number of devices accessing information 1 = 0; 2 = 1; 3 = 2; 4 = 3; 5 = over 3	2.150	1.059	2.000
Education	Number of family members completing primary education (ED1)	1 = 0; 2 = 1; 3 = 2; 4 = 3; 5 = over 3	2.935	1.222	3.000
	Family education budget (ED2)	1 = Spend very little; 2 = Lower spending; 3 = Moderate cost; 4 = More expenses; 5 = Spending a lot	2.504	1.315	2.000
	Number of family members completing junior high school (ED3)	1 = 0; 2 = 1; 3 = 2; 4 = 3; 5 = over 3	2.641	1.263	2.000
	Educational level of the head of household (ED4)	1 = Illiterate; 2 = Primary school; 3 = Junior high school; 4 = High school; 5 = Bachelor's degree or above	2.359	1.281	2.000
Consumption of life	Monthly household expenditure on travel (CL1)	1 = Spend very little; 2 = Lower spending; 3 = Moderate cost; 4 = More expenses; 5 = Spending a lot	1.951	1.028	2.000
	Monthly household expenditure on fuel (CL2)	As above	2.338	1.211	2.000
	Monthly household spending on clothing (CL3)	As above	1.589	0.857	1.000
	Monthly household expenditure on food (CL4)	As above	2.106	1.058	2.000
Health	Household spending on medical care in the past year (HE1)	1 = Spending more than ¥5000; 2 = Spending ¥4000–¥5000; 3 = Spending ¥3000–¥4000; 4 = Spending ¥3000–¥2000; 5 = Spending less than ¥2000	2.648	1.197	2.000
	Number of persons in the household who are incapable of self-care due to illness or disability (HE2)	1 = 4 and above; 2 = 3; 3 = 2; 4 = 1; 5 = 0	3.846	0.847	4.000
	Number of persons living in households with chronic diseases (HE3)	1 = 4 and above; 2 = 3; 3 = 2; 4 = 1; 5 = 0	2.243	1.162	2.000
Natural resources	Percentage of household crops affected (NR1)	1 = 0–20%; 2 = 20–40%; 3 = 40–60%; 4 = 60–80%; 5 = 80–100%	3.570	1.063	4.000
	Cultivated land at the disposal of the household (NR2)	1 = 0–0.82 acres; 2 = 0.82–1.65 acres; 3 = 1.65–2.47 acres; 4 = 2.47–3.29 acres; 5 = more than 3.29 acres	3.312	1.079	3.000
	Level of green cover around household cultivated land (NR3)	1 = Strongly disagree; 2 = Quite disagree; 3 = Neutral; 4 = Quite agree; 5 = Strongly agree	3.738	1.072	4.000
	Duration of crop damage (NR4)	1 = 0–5 days; 2 = 5–10days; 3 = 10–15 days; 4 = 15–20 days; 5 = over 20 days;	2.323	1.105	2.000
	Types of crops affected (NR5)	1 = 0 disasters; 2 = 1 disaster; 3 = 2 disasters; 4 = 3 disasters; 5 = more than 3 disasters	2.108	1.073	2.000

Table 2. *Cont.*

Latent Variable	Indicator Description	Five-Point Likert Scale	Mean	SD	Median
Educational institutions	There are enough schools in your neighborhood to meet your needs (EI1)	1 = Strongly disagree; 2 = Quite disagree; 3 = Neutral; 4 = Quite agree; 5 = Strongly agree	1.968	1.041	2.000
	The educational institution attended by the family member boasts a very competent faculty (EI2)	As above	2.414	1.161	2.000
	The school in which the family member resides has a commendable standard of e-learning. (EI3)	As above	2.243	1.093	2.000
	The provision of educational enrichment within the school attended by family members. (EI4)	As above	2.198	1.061	2.000
Medical institution	The quality of service provided by the physicians at the hospital that your family regularly visits is of exceptional standard. (MI1)	As above	3.228	1.123	3.000
	The quality of medical facilities provided by the hospital catering to your family is of a commendable standard. (MI2)	As above	3.017	1.112	3.000
	There are enough hospitals, clinics, and health centers near your home (MI3)	As above	2.850	1.120	3.000
Business environment	Number of people in your household working in the tertiary sector in the local area (BE1)	1 = 0; 2 = 1; 3 = 2; 4 = 3; 5 = over 3	1.899	0.978	2.000
	Number of people in your household working in the secondary sector in your local area (BE2)	As above	2.502	1.109	2.000
	Sufficient number of rural institutions, and cooperative organizations in the village (BE3)	1 = Strongly disagree; 2 = Quite disagree; 3 = Neutral; 4 = Quite agree; 5 = Strongly agree	2.703	1.104	3.000
	The village has a large area of cooperative facility agriculture, shared farm machinery and equipment (BE4)	As above	1.802	0.962	2.000
Personal effectiveness	Regarding farming, you are in a positive state of mind. (PE1)	As above	3.435	1.100	3.000
	Throughout the agricultural production process, you have the ability to continuously inspire yourself. (PE2)	As above	3.390	1.054	3.000
	You've been able to maintain a sense of normalcy in your productive life (PE3)	As above	3.819	1.067	4.000
	You are able to be conscientious in the agricultural process (PE4)	As above	3.517	1.041	4.000
Future value orientation	You are certain to continue your current production model in the future and are at an advantage (FO1)	As above	3.930	1.033	4.000
	You are optimistic about the future of the agricultural production you are currently engaged in (FO2)	As above	3.502	1.085	4.000
	You have a clear plan for your future production strategy (FO3)	As above	3.593	1.089	4.000
	You have a solid understanding of the agricultural industry's future growth (FO4)	As above	3.152	1.088	3.000

3.3. Model Setting

Based on the covariance matrix of variables, structural equation modeling can effectively analyze the structural relationship between latent variables that cannot be directly

observed, and it has gradually become one of the most important research methods in economics and management. The types of indicators in structural equation modeling usually include reflective and formative types, but if reflective and formative indicators are misused, it will lead to bias in parameter estimation. Reflective structural equations need to satisfy five criteria for modeling: (1) Causality needs to be from latent variables to observed variables. (2) The observed variables must be internally consistent. (3) Observed variables need to be moderately to highly correlated. (4) A latent variable must have at least three observed variables. (5) Removing a particular observed variable from a latent variable does not affect the significance of the latent variable. In this paper, changes in the poverty level of some dimensions will lead to changes in the corresponding poverty characteristics of individuals or communities; for example, a bad business environment will affect the development of local rural institutions, community rural cooperatives, and agricultural machinery sharing organizations, which is contrary to the principle of formative structural equations, i.e., changes in latent variables will not lead to changes in the observed variables [62]. Therefore, with reference to the above criteria, the relationship between observed and latent variables in this paper is more applicable to reflective measurement models.

This paper constructs a fractal multidimensional relative poverty trap structural equation model (Model I) and a farmer's behavior motivation cracking multidimensional relative poverty trap structural equation model (Model II), respectively. Model I aims to test hypotheses one (H1) and two (H2) by demonstrating the existence of amplification and cross-layer transmission effects within the fractal multidimensional relative poverty trap. Model II aims to test hypothesis three (H3), which proves that the behavior motivation mechanism is effective in cracking the multidimensional relative poverty trap of farm households. Structural equation modeling can better explain the relationship between different latent variables that are difficult to observe directly compared to ordinary regression models, as a way to better analyze the amplifying or offsetting effects between different dimensions of relative poverty.

3.4. K-Mean Clustering and Multicluster Analysis

In the application of reflective structural equation modeling, the importance of multicluster analysis cannot be ignored. Its role lies in (1) the validation of model robustness, assessing whether the model is consistent across different clusters. (2) Enhanced theoretical generalizability, which enhances the generalizability of a model if it is supported across multiple clusters. (3) Multi-cluster analysis can deepen research insights into important associations that may exist within specific subclusters. Multi-cluster analysis provides researchers with the opportunity to explore these relationships in depth within specific clusters. Therefore, multi-cluster analysis requires the data to be classified or clustered first. Clustering offers greater flexibility than classification, allowing researchers to explore and understand the patterns inherent in data without pre-conditions. This delineation can be done based on requirements or modeling needs, or it can simply help us explore the natural structure and distribution of the data without relying on a priori labels or classifications, thus reducing subjective bias [63]. K-mean clustering can group multiple sets of data based on their characteristics. This type of method needs to find a number of random clustering centers, then, according to the distance between each data point and the center of some of these clusters, decide which data points are suitable for the same group, and then, according to these groups, get the new center of clusters, reuse the new center of clusters to correct the results of clustering, repeat the implementation of these steps until the termination of the set conditions is met, and finally get the clustering results successfully. This algorithm belongs to the most typical segmented clustering algorithms, where each data point, the distance from the center of the cluster can have the smallest squared error. Assuming that the individual endowment of a group of farmers has h cluster centers, where the kth cluster can be represented by the set Gk, μ is the center point in the

cluster, assuming that the clustering cluster G*k* {x_{1k}, x_{2K}, x_{3K}, ... x_{nk}} contains n*k* sets of data, then the squared error e_k of this cluster can be defined as follows:

$$e_k = \sum_i |x_{ik} - \mu_k|^2 \quad (1)$$

which then yields the summed squared error E of the number of *h* clusters:

$$E = \sum_{k=1}^{h} e_k^2 \quad (2)$$

The overall sum of the squares of the groups gets smaller and smaller as the center point keeps changing. When the iteration ends and the sum of squares of the cluster reaches the minimum value, the center point no longer changes, and the grouped cluster at this point is the one we need.

4. Results

4.1. Reliability and Validity Tests

To ensure the reliability and validity of the findings, we first tested the model for reliability and validity. We used the alpha reliability coefficient method to evaluate the reliability of the latent and observed variables required for the model, which, according to the existing criteria, indicates that the internal consistency of the scale is good and the reliability of the data is high [64]. In Table 3, the "Cronbach's alpha If Item Deleted" test shows that there is no significant increase in the reliability coefficient if any item is deleted, thus indicating that the item should not be deleted. The CITC values for each question item were greater than 0.6, indicating a good correlation between the analyzed items as well as a good level of reliability. KMO value and Bartlett's spherical test were carried out, and the KMO value was calculated to be 0.789, and the significance of Bartlett's spherical test was 0.000, which passed the 1% significance test, indicating that the scale can be analyzed by factor analysis, and therefore the original hypothesis that the perturbation terms in the equations are independent of one another can be rejected, which proves the applicability of structural equations. Validated factor analysis of the 12 selected factors showed that all 12 factors corresponded to AVE values greater than 0.6 and all CR values higher than 0.8, implying that the data from this analysis had good convergent validity. Therefore, the measurement model passed the validity test.

Table 3. Reliability and Validity tests.

Variable	Indicator Description	Corrected Item-Total Correlation (CITC)	Cronbach's Alpha If Item Deleted	Cronbach α	Average Variance Extracted	Combinatorial Reliability
Income1	IN1	0.820	0.877	0.911	0.721	0.912
Income2	IN2	0.804	0.882			
Income3	IN3	0.815	0.879			
Income4	IN4	0.752	0.900			
Employment1	EM1	0.735	0.761	0.845	0.649	0.847
Employment2	EM2	0.677	0.819			
Employment3	EM3	0.731	0.767			
Information1	INF1	0.680	0.737	0.816	0.603	0.820
Information2	INF2	0.694	0.720			
Information3	INF3	0.634	0.786			
Education1	ED1	0.733	0.888	0.901	0.696	0.902
Education2	ED2	0.806	0.862			
Education3	ED3	0.805	0.862			
Education4	ED4	0.770	0.875			

Table 3. *Cont.*

Variable	Indicator Description	Corrected Item-Total Correlation (CITC)	Cronbach's Alpha If Item Deleted	Cronbach α	Average Variance Extracted	Combinatorial Reliability
Consumption of life1	LI1	0.674	0.858	0.873	0.649	0.880
Consumption of life2	LI2	0.790	0.816			
Consumption of life3	LI3	0.764	0.834			
Consumption of life4	LI4	0.724	0.839			
Health1	HE1	0.730	0.721	0.827	0.633	0.838
Health2	HE2	0.669	0.802			
Health3	HE3	0.704	0.746			
Natural resources1	NR1	0.752	0.881	0.902	0.649	0.902
Natural resources2	NR2	0.708	0.890			
Natural resources3	NR3	0.764	0.878			
Natural resources4	NR4	0.798	0.870			
Natural resources5	NR5	0.752	0.881			
Educational institutions1	EI1	0.707	0.819	0.859	0.605	0.860
Educational institutions2	EI2	0.706	0.821			
Educational institutions3	EI3	0.716	0.815			
Educational institutions4	EI4	0.690	0.826			
Medical institution1	MI1	0.664	0.777	0.825	0.612	0.826
Medical institution2	MI2	0.693	0.747			
Medical institution3	MI3	0.687	0.753			
Business environment1	BE1	0.717	0.833	0.868	0.626	0.870
Business environment2	BE2	0.699	0.841			
Business environment3	BE3	0.733	0.826			
Business environment4	BE4	0.737	0.826			
Personal effectiveness1	PE1	0.745	0.830	0.873	0.634	0.874
Personal effectiveness2	PE2	0.706	0.846			
Personal effectiveness3	PE3	0.700	0.848			
Personal effectiveness4	PE4	0.761	0.824			
Future value orientation1	FO1	0.745	0.838	0.876	0.641	0.877
Future value orientation2	FO2	0.723	0.846			
Future value orientation3	FO3	0.762	0.830			
Future value orientation4	FO4	0.707	0.852			

Standardized Cronbach α: 0.837.

4.2. Model Fit Test

The overall model fitness test index of structural equation modeling mainly includes Absolute Goodness-of-Fit Indices and Value-Added Fitness Index. According to the test results in Table 4, $\chi^2/df < 3$ as well as CFI, TLI, and IFI were all greater than 0.9, so the overall model fit was good. In addition, the obtained Variance Inflation Factors of the observed samples are all less than 10, indicating that there is no multicollinearity between the measured variables.

Table 4. Model Fit Test.

Model	χ^2	*df*	*p*	χ^2/df	GFI	RMSEA	CFI	TLI	IFI
Model I	1589.605	879	>0.050	<31.808	0.872	0.039	0.951	0.945	0.951
Model II	1051	367	>0.050	<32.865	0.877	0.060	0.925	0.917	0.925

4.3. Structural Equation Results

4.3.1. The Interdimensional Role of Fractal Poverty

Structural equation model I (shown in Figures 3 and 4, Table 5) is a multidimensional relative poverty internal amplification network as well as a cross-layer interaction network. At the community level, the magnifying effect of the natural level on income is 0.314, the magnifying effect of educational facilities and education is 0.309, the narrowing effect of medical facilities and health is 0.303, and the magnifying effect of doing business level on

employment is 0.151. This suggests that rural community multidimensional traps in central Shaanxi amplify farmer multidimensional traps, which confirms hypothesis H1. From the model, there is a significant mediating effect between the dimensions of the farm household, especially the three dimensions of income, health, and labor, which are key nodes in the self-reinforcing of the multidimensional relative poverty trap of the farm household. The difference is that there is no significant amplification effect among the community-relative poverty dimensions, which may be because the community-relative poverty dimensions are relatively independent of each other, and there is no strong collaboration and bonding among the natural resources, educational institutions, medical institution and business environments of the community.

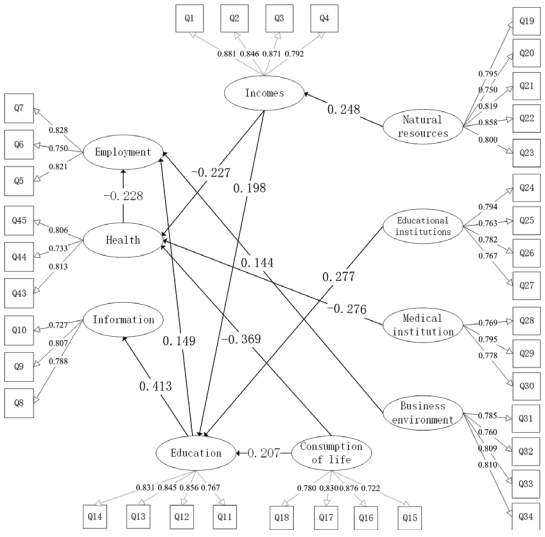

Figure 3. Structural equation modeling of the individual-community fractal multidimensional relative poverty trap (Model I).

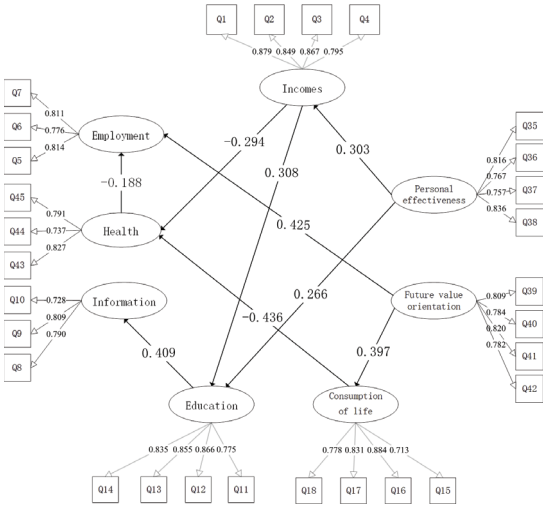

Figure 4. Structural Equation modeling of behavior motivation on multidimensional relative poverty cracking mechanisms (Model II).

Table 5. Path coefficients and significance among latent variables.

	Pathway	Estimate	S.E.	C.R.	*p*	Std. Est
Model I	IN←NR	0.248	0.060	5.209	***	0.248
	HE←IN	−0.227	0.039	−5.192	***	−0.227
	ED←IN	0.198	0.038	4.513	***	0.198
	ED←CL	0.207	0.075	3.429	***	0.207
	HE←CL	−0.369	0.065	−7.248	***	−0.369
	HE←MI	−0.276	0.056	−5.415	***	−0.276
	ED←EI	0.277	0.069	4.487	***	0.277
	EM←HE	−0.270	0.046	−4.989	***	−0.270
	INF←ED	0.413	0.041	7.964	***	0.413
	EM←ED	0.149	0.044	2.969	0.003	0.149
	EM←BE	0.144	0.055	2.759	0.006	0.144
Model II	CL←FO	0.397	0.044	7.851	***	0.397
	IN←PE	0.303	0.057	6.293	***	0.303
	ED←IN	0.308	0.042	6.444	***	0.308
	HE←IN	−0.294	0.041	−6.469	***	−0.294
	HE←CL	−0.436	0.066	−8.688	***	−0.436
	ED←PE	0.266	0.051	5.488	***	0.266
	EM←HE	−0.188	0.04	−3.839	***	−0.188
	INF←ED	0.409	0.04	7.938	***	0.409
	EM←FO	0.425	0.048	8.390	***	0.425

Note: *** is significant at the 1% levels.

At the farm household, IN amplifies HE and thus EM, such that a 1 standard deviation increase in IN will increase HE by 0.227 standard deviations (as shown in Table 5), and a 1 standard deviation increase in HE will increase EM by 0.270 standard deviations. Therefore, in the single chain "IN→HE→EM", the indirect amplification effect of farm household income on employment is 0.061 ($0.227 * 0.270 = 0.061$). Second, in the single chain of "IN→ED→EM", the indirect amplification effect of the multidimensionality of farm households is 0.030 ($0.198 * 0.149 = 0.030$). Finally, in the single chain of "CL→ED →INF", the indirect amplification effect of the multidimensionality of farmers is 0.085 ($0.207 * 0.413 = 0.085$); the health amplifies the employment effect is 0.270. This suggests that there is a multidimensional amplification trap at the farm household level for farmers in central Shaanxi, which confirms hypothesis H2.

4.3.2. Behavior Motivation Mechanism

From Model II, personal effectiveness has an amplification effect of 0.303 on income and 0.266 on education, with further transmission to health and employment. This implies that when the subjective will of the population to alleviate multidimensional relative poverty strengthens, their sense of responsibility and awareness increases, intensifying the imperative to enhance their income and well-being and bolstering their psychological resilience. Individual Behavior Motivation can stimulate the sense of employment and income of multidimensionally relatively poor farmers to alter their state of multidimensional relative poverty by actively seeking long-term stable agricultural production and non-farm employment and by being willing to invest more time, money, and effort in education. There is no significant relationship between education and employment, suggesting that basic education at the primary, junior, and senior high school level for multidimensional relatively poor farmers in central Shaanxi is not able to provide farmers with the experience and competencies needed for traditional agriculture. Furthermore, farmers who are relatively poverty in multiple dimensions face the highest levels of relatively poor in terms of income. These farmers have limited financial resources available for investing in education, primarily due to the heavy financial burden associated with educational expenses. Moreover, they must prioritize healthcare expenditures for their family members before considering higher education. This financial strain, coupled with the inability to support

the determination and resilience of farmers in expanding their production, contributes to the lack of psychological resilience observed among certain groups of farmers.

On the other hand, future value orientation has an amplification effect of 0.397 on farm household life consumption and 0.425 on employment. The decision-making process of farmers is contingent upon their individual experiences and future-oriented choices, ultimately influencing their present and future consumption expenditures. When individuals possess greater confidence in their future prospects, they are inclined to allocate a larger portion of their precautionary savings toward enhancing their quality of life. Consequently, this enables them to transcend the state of relative poverty associated with the current consumption patterns of farmers. The level of consumption of farm households will also have an impact on the channels and efficiency of the household to obtain information, and households with a relatively privileged life can obtain the information they need to be relatively poor through channels such as the Internet, learn new technologies, and thus reduce the relative poverty of information. Therefore, hypothesis H3 has been confirmed.

4.3.3. K-Mean Cluster Robustness Test Based on Hierarchical Clustering

To further test the robustness of the above model, to rule out possible data bias and sensitivity to assumption violations, and to improve the reliability of parameter estimates, the farming households are categorized by two indicators: relative poverty in education and relative poverty in income. K-mean clustering was implemented through SPSS statistics 23 to categorize the farmers into high-endowment as well as low-endowment categories. And using the non-parametric hypothesis Mann–Whitney U test, the test p-value is significant, indicating that the two types of samples in the level of education and income level of 2 indicators are significantly different. The clustering results are shown in Table 6, the first category of high-education-income endowment farmers has 160 households, accounting for 30.42%, and the second category of low-education-income endowment farmers has 366 households, accounting for 69.58%. The scatter plots of the two clusters are shown in Figure 5.

Table 6. Hierarchical clustering results.

Clustering Category	Frequency	Percentage (%)	Income	Health
High	160	30.42%	3.40	2.32
Low	366	69.58%	1.52	3.42
Total	526	100%		

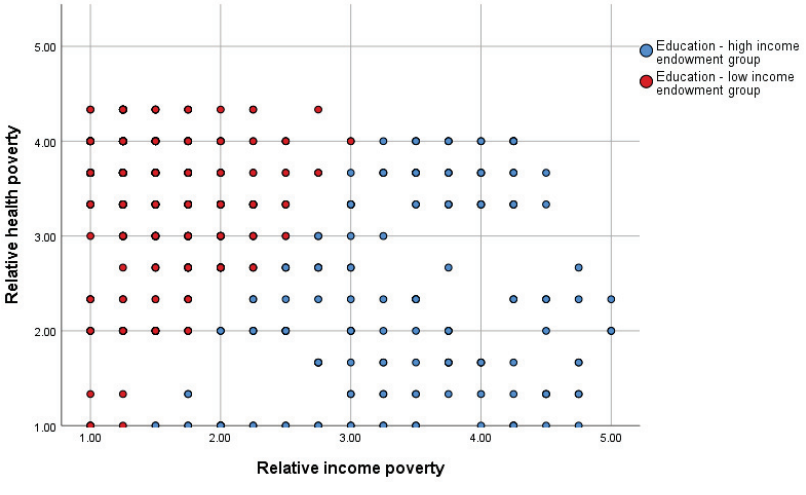

Figure 5. Scatterplot of clustering distribution.

A multi-cluster analysis of two types of farmers was conducted to analyze the differences in the multidimensional relative poverty cycle traps as well as the behavior motivation mechanisms of the farmers. The RMSEA for both Model III and Model IV is less than 0.1, and the GFI, AGFI, and CFI are all greater than 0.8, resulting in a better model fit. Table 7 shows that the significance of the path coefficients is basically consistent with Models I and II; the cyclic effect of multidimensional relative poverty for high-endowment farmers is greater than that for low-endowment farmers, and the effect of the behavior motivation mechanism to reduce the cycle of multidimensional relative poverty traps is more obvious. The reason is that health and income are the key mediating dimensions of the multidimensional relative poverty trap, and only when the endowment of health and income is high will the impact among other dimensions be more significant, whereas low-endowment farmers are unable to satisfy their basic needs on the mediating dimensions of health and income, and it is difficult to have a further impact on the other dimensions.

Table 7. Results of multi-cluster analysis of high and low endowment farmers.

Model III	Highly Endowed Group		Low Endowment Group	
	Path Coefficient	*p*	Path Coefficient	*p*
IN←NR	−0.018	0.843	0.421	***
HE←IN	0.359	***	0.019	0.821
ED←IN	0.093	0.180	0.046	0.538
HE←CL	0.040	0.799	0.068	0.277
HE←CL	−0.459	***	−0.080	0.255
HE←MI	−0.296	***	−0.372	***
ED←EI	0.646	***	0.056	0.383
EM←HE	−0.523	***	−0.337	***
INF←ED	0.661	***	−0.020	0.753
EM←ED	0.325	0.001	0.142	0.012
EM←BE	−0.296	0.009	0.374	***
Model IV	**Highly Endowed Group**		**Low Endowment Group**	
	Path Coefficient	***p***	**Path Coefficient**	***p***
FO←CL	0.488	***	0.149	0.018
PE←IN	−0.101	0.267	0.340	***
IN←ED	0.226	0.007	−0.062	0.461
IN←HE	0.358	***	−0.092	0.286
CL←HE	−0.548	***	−0.17	0.019
PE←ED	0.428	***	0.208	0.002
HE←EM	−0.496	***	−0.098	0.121
ED←INF	0.629	***	−0.023	0.716
FO←EM	0.076	0.345	0.571	***

Note: *** is significant at the 1% levels.

5. Discussions

The phenomenon of the multidimensional relative poverty trap is influenced by a range of elements, encompassing restricted opportunities for education, healthcare, and jobs, with instances of discrimination and social marginalization. At the farmer level, multidimensional relative poverty traps can occur when farmers lack access to basic services such as health care, education, clean water, and sanitation facilities [44]. At the community level, multidimensional relative poverty traps can occur when entire communities lack access to basic services and opportunities such as education, health care, and employment. The absence of opportunity to obtain necessary resources can result in adverse health outcomes, reduced educational achievements, and restricted economic prospects, hence perpetuating intergenerational poverty. Furthermore, it is important to note that social exclusion and discrimination can serve as additional barriers that restrict the potential for upward socioeconomic mobility and perpetuate the self-reinforcement of poverty within certain communities.

Individuals belonging to impoverished communities may have lower levels of psychological resilience due to a multitude of factors. (1) Insufficient access to fundamental necessities and services: Individuals residing in impoverished conditions may encounter limited access to essential provisions, including sustenance, potable water, adequate housing, healthcare, and educational opportunities. This could potentially restrict their capacity to fulfill their fundamental needs and achieve their aspirations. (2) Constrained economic chances: Individuals residing in impoverished conditions may face restricted access to economic opportunities, including employment prospects and entrepreneurial ventures. This could potentially restrict their capacity to create revenue and enhance their socioeconomic status. (3) Social exclusion and discrimination: Individuals experiencing poverty may encounter social exclusion and prejudice, constraining their ability to obtain resources and avail themselves of opportunities. (4) Mental health issues: Poverty can exert detrimental effects on mental well-being, precipitating conditions such as depression, anxiety, and various other mental health disorders. These factors may potentially intensify sensations of despondency and contribute to a diminished sense of ambition.

Multidimensional groups of relatively poor people can become highly psychologically resilient by developing a sense of collective identity and working together to address the underlying factors that lead to poverty and limited ambition. (1) By building social capital, poorer groups with shorter ambitions can work together, share resources, and knowledge, and support each other to achieve their goals [65]. (2) Encourage collective action and promote the active participation of individuals and groups in development. This includes the formation of community-based organizations, participatory planning processes, and other mechanisms that enable individuals to have a say in how resources are allocated and policies are developed [66]. (3) Promote Leadership Development: Promoting leadership development includes identifying and developing emerging leaders in the community [67]. (4) Mitigating structural barriers: The process of mitigating structural barriers includes the identification and resolution of fundamental problems that contribute to the existence of poverty and hinder the development of aspiration. This may entail the implementation of policies and initiatives aimed at fostering inclusive economic growth, mitigating discriminatory practices, and enhancing accessibility to resources and opportunities [68]. (5) Commemorate accomplishments: Commemorating success entails acknowledging and appreciating the achievements of a community. By engaging in the practice of acknowledging and commemorating accomplishments, socioeconomically disadvantaged communities with limited aspirations can cultivate a collective sentiment of self-esteem and assurance in their capacity to surmount obstacles and attain objectives.

In order to further assist poverty groups with low psychological resilience to escape the multidimensional relative poverty trap, it is important to address the underlying factors that lead to poverty and having limited aspirations with effective strategies, including the following: (1) Facilitate educational and training opportunities: The provision of access to education and training can enable individuals to gain the necessary skills and knowledge required to seek economic opportunities and enhance their overall quality of life. This intervention has the potential to disrupt the perpetuation of poverty and foster a heightened sense of ambition. (2) Fostering entrepreneurship and innovation: The promotion of entrepreneurship and innovation can serve as a catalyst for generating novel economic prospects and stimulating economic advancement. This can potentially offer a means of upward social mobility for people and families with ambitious aspirations, enabling them to escape poverty. (3) Provision of support and resources: The provision of assistance and resources to individuals and families residing in impoverished conditions might contribute to the disruption of the cyclical nature of poverty, hence facilitating social mobility. This may encompass the provision of financial resources, healthcare, and several other social services. (4) It is imperative to engage the communities that are directly impacted by interventions in both the design and implementation processes. This approach ensures that interventions are tailored to address the specific needs and priorities of these groups.

6. Conclusions and Implications

Based on a survey of 526 multidimensionally relatively poor households in central Shaanxi, this paper used structural equations to identify the fractal relative poverty traps of farm households and communities and their behavior motivation mechanisms. The study reached the following conclusions: First, there is a self-reinforcing poverty trap in the multidimensional relative poverty of farm households. Second, there is a transmission mechanism between community multidimensional relative poverty and farm household multidimensional relative poverty, which amplifies the overall fractal multidimensional relative poverty trap. Thirdly, the mechanism of behavior motivation of farmers can break the trap of multidimensional relative poverty of farmers. Personal effectiveness stimulates the production will and income-generating drive of farmers, and enhances their confidence in education investment, thus solving the relative poverty of farmers in the dimensions of education, health, income, employment, and information; future value orientation has a stabilizing effect on the production and life of farmers, enabling the proper allocation of resources within limited resources. The future value orientation will have a stabilizing effect on the production and life of farmers, enabling them to allocate resources properly within limited resources and solve consumption and employment poverty.

The study's findings suggest several key insights. Firstly, it is recommended to increase investment in infrastructure development within rural communities located in central Shaanxi. Additionally, it is advised to enhance government expenditure on community education and health care services. These measures aim to effectively address the multidimensional relative poverty trap within the community, taking a top-down approach. Furthermore, individuals can enhance their psychological resilience by forming cohesive groups, cultivating a shared sense of identity, and collaborating to tackle the root causes of poverty and the constraints on their goals. Additionally, it is crucial to enhance educational opportunities and training, foster entrepreneurship and innovation, allocate necessary assistance and resources, and engage impacted communities in the development and execution of strategies aimed at assisting impoverished populations in breaking free from the multidimensional state of relative poverty. Furthermore, there is a pressing need for further research in the crucial field of examining multidimensional relative poverty traps. (1) There is heterogeneity in relative poverty traps at the individual level across different demographics, ages, geographies, and modes of agricultural operation. (2) The operational processes by which community-level multidimensional poverty traps function remain unclear. The involvement of community groups and the creation of policies have a significant impact on the internal dynamics of multidimensional relative poverty within communities, as well as the interactions that occur across different levels. (3) In the future, there will be an expansion of research efforts to encompass a broader area, hence enhancing the generalizability and value of the findings. Ultimately, it is anticipated that this research will serve as a catalyst for generating interest in the examination of rural relative poverty, as well as for the exploration of poverty traps across several levels of analysis.

The operational processes by which community-level multidimensional poverty traps function remain unclear.

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References

1. Tang, J.; Gong, J.; Ma, W.; Rahut, D.B. Narrowing urban–rural income gap in China: The role of the targeted poverty alleviation program. *Econ. Anal. Policy* **2022**, *75*, 74–90. [CrossRef]
2. Wang, J.X.; Wang, C.; Li, S.H.; Luo, Z. Measurement of relative welfare poverty and its impact on happiness in China: Evidence from CGSS. *China Econ. Rev.* **2021**, *69*, 101687. [CrossRef]
3. Wang, B.B.; Luo, Q.; Chen, G.P.; Zhang, Z.; Jin, P.B. Differences and dynamics of multidimensional poverty in rural China from multiple perspectives analysis. *J. Geogr. Sci.* **2022**, *32*, 1383–1404. [CrossRef]
4. Zhang, Z.; Ma, C.Y.; Wang, A.P. A longitudinal study of multidimensional poverty in rural China from 2010 to 2018. *Econ. Lett.* **2021**, *204*, 109912. [CrossRef]
5. Changyun, J.; Junru, L.; Yijie, W.; Weike, Z. The Characteristics, Problems and Future Choices of Farmers' Income Increase in China in recent Years. *J. Nanjing Agric. Univ. (Soc. Sci. Ed.)* **2021**, *21*, 1–21. (In Chinese)
6. Kraay, A.; McKenzie, D. Do Poverty Traps Exist? Assessing the Evidence. *J. Econ. Perspect.* **2014**, *28*, 127–148. [CrossRef]
7. Davis, R.P.; Williams, W.R. Bringing Psychologists to the Fight Against Deep Poverty. *Am. Psychol.* **2020**, *75*, 655–667. [CrossRef]
8. Haider, L.J.; Boonstra, W.J.; Peterson, G.D.; Schluter, M. Traps and Sustainable Development in Rural Areas: A Review. *World Dev.* **2018**, *101*, 311–321. [CrossRef]
9. Sewell, S.J.; Desai, S.A.; Mutsaa, E.; Lottering, R.T. A comparative study of community perceptions regarding the role of roads as a poverty alleviation strategy in rural areas. *J. Rural Stud.* **2019**, *71*, 73–84. [CrossRef]
10. Foster, W.; Valdes, A.; Davis, B.; Anriquez, G. The Constraints to Escaping Rural Poverty: An Analysis of the Complementarities of Assets in Developing Countries. *Appl. Econ. Perspect. Policy* **2011**, *33*, 528–565. [CrossRef]
11. Qin, X.D.; Wu, H.T.; Shan, T.C. Rural infrastructure and poverty in China. *PLoS ONE* **2022**, *17*, e0266528. [CrossRef] [PubMed]
12. Yu, C.; Gao, J.B.; Han, Y.; Wang, Y.M.; Sun, J.W. Eliminating deprivation and breaking through dependence: A mechanism to help poor households achieve sustainable livelihoods by targeted poverty alleviation strategy. *Growth Chang.* **2022**, *53*, 1436–1456. [CrossRef]
13. Su, F.; Song, N.N.; Ma, N.N.; Sultanaliev, A.; Ma, J.; Xue, B.; Fahad, S. An Assessment of Poverty Alleviation Measures and Sustainable Livelihood Capability of Farm Households in Rural China: A Sustainable Livelihood Approach. *Agriculture* **2021**, *11*, 1230. [CrossRef]
14. Wang, H.Z.; Bai, K.; Wang, H.M.; Rafiqul, I. Research on the Motivation Mechanism of Precise Poverty Alleviation in Rural Tourism in China. *Sustainability* **2022**, *14*, 14328. [CrossRef]
15. Liu, J.K.; Zhang, Y.L. The Impact of Social Quality on the Subjective Welfare of Rural Residents in China in the Perspective of Common Prosperity Perspective of Common Prosperity. *J. Beijing Univ. Technol. (Soc. Sci. Ed.)* **2023**, 36–49. (In Chinese)
16. Vera-Toscano, E.; Shucksmith, M.; Brown, D.L. Poverty dynamics in Rural Britain 1991-2008: Did Labour's social policy reforms make a difference? *J. Rural Stud.* **2020**, *75*, 216–228. [CrossRef]
17. Li, Y.H.; Su, B.Z.; Liu, Y.S. Realizing targeted poverty alleviation in China People's voices, implementation challenges and policy implications. *China Agric. Econ. Rev.* **2016**, *8*, 443–454. [CrossRef]
18. Yang, Y.; Chen, L.J. Why Can't Rational Systems Achieve Rational Results?—Three Perspectives of Research on the Implement ation Deviation of Industrial Poverty Alleviation Policy and Its Enlightenment. *J. Northwest AF Univ. (Soc. Sci. Ed.)* **2021**, *21*, 60–71. (In Chinese)
19. Zhang, Y.C.; Tong, D.D.; Chen, C.; Guo, Y.Y. The Impact of Poverty Mindset on Intertemporal DecisionMaking: The Mediating Role of Analytical Thinking and The Moderating Role of Loss-Gain Frame. *J. Psychol. Sci.* **2023**, *46*, 419–426. (In Chinese)
20. Piff, P.K.; Wiwad, D.; Robinson, A.R.; Aknin, L.B.; Mercier, B.; Shariff, A. Shifting attributions for poverty motivates opposition to inequality and enhances egalitarianism. *Nat. Hum. Behav.* **2020**, *4*, 496. [CrossRef]
21. Guo, W.W.; Ma, Y.X. A fuzzy analysis of spiritual poverty alleviation in deep poverty-stricken areas of gansu. *Singap. Econ. Rev.* **2023**, *68*, 1493–1505. [CrossRef]
22. Chen, C.F.; Li, J.X.; Shuai, J.; Nelson, H.; Walzem, A.; Cheng, J.H. Linking social-psychological factors with policy expectation: Using local voices to understand solar PV poverty alleviation in Wuhan, China. *Energy Policy* **2021**, *151*, 112160. [CrossRef]
23. Hu, Z.P. Basic public services, internal dynamics of poverty eradication and governance of relative rural poverty. *Seeker* **2021**, *6*, 146–155. (In Chinese)
24. Han, Y.D.; Huang, J. Evolution of social welfare in rural China: A developmental approach. *Int. Soc. Work* **2019**, *62*, 390–404. [CrossRef]
25. Liu, H.T.; He, Q.Y. The effect of basic public service on urban-rural income inequality: A sys-GMM approach. *Econ. Res.-Ekon. Istraživanja* **2019**, *32*, 3205–3223. [CrossRef]
26. Huang, Y.X.; Zhang, Y. Financial Inclusion and Urban-Rural Income Inequality: Long-Run and Short-Run Relationships. *Emerg. Mark. Financ. Trade* **2020**, *56*, 457–471. [CrossRef]
27. Zhu, Z.K.; Ma, W.L.; Leng, C.X.; Nie, P. The Relationship Between Happiness and Consumption Expenditure: Evidence from Rural China. *Appl. Res. Qual. Life* **2021**, *16*, 1587–1611. [CrossRef]
28. Zhou, Y.; Huang, H. Geo-environmental and socioeconomic determinants of poverty in China: An empirical analysis based on stratified poverty theory. *Env. Sci. Pollut. Res.* **2023**, *30*, 23836–23850. [CrossRef]

29. Karpinska, L.; Smiech, S. Invisible energy poverty? Analysing housing costs in Central and Eastern Europe. *Energy Res. Soc. Sci.* **2020**, *70*, 101670. [CrossRef]
30. Bird, K.; Higgins, K.; Mckay, A. Conflict, education and the intergenerational transmission of poverty in northern uganda. *J. Int. Dev.* **2010**, *22*, 1183–1196. [CrossRef]
31. Alkire, S.; Foster, J. Counting and multidimensional poverty measurement. *J. Public Econ.* **2011**, *95*, 476–487. [CrossRef]
32. Zhang, J.P.; Zhang, Y.; Cheng, M.W.; Yu, N.; Wei, X.Y.; Zhang, Z.Y. Impact of Information Access on Poverty Alleviation Effectiveness: Evidence From China. *IEEE Access* **2019**, *7*, 140925–149013. [CrossRef]
33. Akbar, M.; Abdullah; Naveed, A.; Syed, S.H. Does an Improvement in Rural Infrastructure Contribute to Alleviate Poverty in Pakistan? A Spatial Econometric Analysis. *Soc. Indic. Res.* **2022**, *162*, 475–499. [CrossRef]
34. Govender, L.; Pillay, K.; Siwela, M.; Modi, A.; Mabhaudhi, T. Food and Nutrition Insecurity in Selected Rural Communities of KwaZulu-Natal, South Africa-Linking Human Nutrition and Agriculture. *Int. J. Env. Res. Public Health* **2017**, *14*, 17. [CrossRef] [PubMed]
35. Zhao, J.; Dong, K.Y.; Dong, X.C.; Shahbaz, M. How renewable energy alleviate energy poverty? A global analysis. *Renew. Energy* **2022**, *186*, 299–311. [CrossRef]
36. Aliu, I.R.; Akoteyon, I.S.; Soladoye, O. Living on the margins: Socio-spatial characterization of residential and water deprivations in Lagos informal settlements, Nigeria. *Habitat Int.* **2021**, *107*, 102293. [CrossRef]
37. Alkire, S.; Fang, Y.F. Dynamics of Multidimensional Poverty and Uni-dimensional Income Poverty: An Evidence of Stability Analysis from China. *Soc. Indic. Res.* **2019**, *142*, 25–64. [CrossRef]
38. Blackburn, M.L. Trends in poverty in the united states, 1967–1984. *Rev. Income Wealth* **1990**, *36*, 53–66. [CrossRef]
39. Zhang, K.; Cai, S.X.; Wang, Y.Y. How education reduces urban relative poverty? Evidence from China. *J. Asia Pac. Econ.* **2023**. [CrossRef]
40. Marx, I.; Vandenbroucke, P.; Verbist, G. Can higher employment levels bring down relative income poverty in the EU? Regression-based simulations of the Europe 2020 target. *J. Eur. Soc. Policy* **2012**, *22*, 472–486. [CrossRef]
41. Yang, Y.Y.; Zhou, L.L.; Zhang, C.M.; Luo, X.; Luo, Y.H.; Wang, W. Public Health Services, Health Human Capital, and Relative Poverty of Rural Families. *Int. J. Env. Res. Public Health* **2022**, *19*, 11089. [CrossRef]
42. Chen, F.F.; Qiu, H.G.; Zhang, J. Energy consumption and income of the poor in rural China: Inference for poverty measures. *Energy Policy* **2022**, *163*, 112865. [CrossRef]
43. Barrett, C.B.; Bevis, L. The self-reinforcing feedback between low soil fertility and chronic poverty. *Nat. Geosci.* **2015**, *8*, 907–912. [CrossRef]
44. Radosavljevic, S.; Haider, L.J.; Lade, S.J.; Schlüter, M. Implications of poverty traps across levels. *World Dev.* **2021**, *144*, 105437. [CrossRef]
45. Lade, S.J.; Haider, L.J.; Engstrm, G.; Schlüter, M. Resilience offers escape from trapped thinking on poverty alleviation. *Sci. Adv.* **2017**, *3*, e1603043. [CrossRef] [PubMed]
46. Barrett, C.B.; Swallow, B. Fractal Poverty Traps. *World Dev.* **2005**, *34*, 1–15. [CrossRef]
47. Huang, Z.G.; Li, J.; Wang, J. Optimization Analysis of the Combination Effect of Livelihood Capitals on Family Income in Poverty Areas-Based on 778 Rural Households'Survey Data in Shaanxi Province, China. *J. Agrotech. Econ.* **2021**, *7*, 79–91. (In Chinese)
48. Peng, W.H.; Li, H. The Distribution of Social Capital and the Poverty Reduction in Rural Areas-Based on the Investigation and Analysis of Shandong, Henan and Shaanxi Provinces. *Economist* **2018**, *9*, 98–104. (In Chinese)
49. Zhao, Y.Y.; Huang, J.L.; Li, R.M.; Wang, L.Q. Study on the Influence of the Expiry of Farmland Return Subsidy on the Consumption of Farmers in Poor Areas. *Chin. J. Agric. Resour. Reg. Plan.* **2021**, *7*, 1–9. (In Chinese)
50. Barnett, W.S. Long-term cognitive and academic effects of early childhood education on children in poverty. *Prev. Med.* **1998**, *27*, 204–207. [CrossRef]
51. Paula, B.; Gruskin, S. Poverty, equity, human rights and health. *Bull. World Health Organ.* **2003**, *7*, 539–545.
52. Yang, Y.; Guo, X. Universal basic education and the vulnerability to poverty: Evidence from compulsory education in rural China. *J. Asia Pac. Econ.* **2020**, *25*, 611–633. [CrossRef]
53. Sackey, H.A. Poverty in Ghana from an assets-based perspective: An application of probit technique. *Afr. Dev. Rev.* **2005**, *17*, 41–69. [CrossRef]
54. Pfoertner, T.K.; Andress, H.J.; Janssen, C. Income or living standard and health in Germany: Different ways of measurement of relative poverty with regard to self-rated health. *Int. J. Public. Health* **2011**, *56*, 373–384. [CrossRef] [PubMed]
55. Brady, D. Theories of the Causes of Poverty. *Annu. Rev. Sociol.* **2019**, *45*, 155–175. [CrossRef]
56. Markandya, A.; Galarraga, I.; Murieta, E. *Routledge Handbook of the Economics of Climate Change Adaptation*; Routledge: London, UK, 2014. [CrossRef]
57. Fankhauser, S.; Mcdermott, T. *The Economics of Climate-Resilient Development*; Edward Elgar: Cheltenham, UK, 2016. [CrossRef]
58. Zhang, Y.; Huai, J.J. Autonomous Adaptation Mechanism for the Long-term Income Increase of Low-income Farmers: Based on the Impacts of Livelihood Capital. *Sci. Decis. Mak.* **2022**, *305*, 1–20.
59. Deng, D.C. Effective Government and Active Poor: Anti-poverty Factors and Combination Models -Taking China's Local Government's Poverty Alleviation Strategy as the Research Object. *Theor. Investig.* **2021**, *3*, 26–33. (In Chinese)
60. Kane, T.J. Giving Back Control: Long-Term Poverty and Motivation. *Soc. Serv. Rev.* **1987**, *61*, 405–419. [CrossRef]
61. Hill, M.; Ponza, M. Poverty and Welfare Dependence across Generation. *Econ. Outlook* **1983**, *10*, 61–65.

62. Sarstedt, M.; Hair, J.F.; Ringle, C.M.; Thiele, K.O.; Gudergan, S.P. Estimation issues with PLS and CBSEM: Where the bias lies! *J. Bus Res.* **2016**, *69*, 3998–4010. [CrossRef]
63. Diamantopoulos, A.; Riefler, P.; Roth, K.P. Advancing formative measurement models. *J. Bus. Res.* **2008**, *61*, 1203–1218. [CrossRef]
64. Pham, D.T.; Dimov, S.S.; Nguyen, C.D. Selection of K in K-means clustering. *Proc. Inst. Mech. Eng. J. Mech. Eng. Sci.* **2005**, *219*, 103–119. [CrossRef]
65. Wang, J.F.; Xiao, H.; Liu, X.J. The Impact of Social Capital on Multidimensional Poverty of Rural Households in China. *Int. J. Env. Res. Public Health* **2023**, *20*, 217. [CrossRef] [PubMed]
66. Beard, V.A. Community-based planning, collective action and the challenges of confronting urban poverty in Southeast Asia. *Environ. Urban.* **2019**, *31*, 575–596. [CrossRef]
67. Barling, J.; Weatherhead, J.G. Persistent Exposure to Poverty During Childhood Limits Later Leader Emergence. *J. Appl. Psychol.* **2016**, *101*, 1305–1318. [CrossRef] [PubMed]
68. Hong, P.; Wernet, S.P. Structural reinterpretation of poverty by examining working poverty: Implications for community and policy practice. *Fam. Soc.* **2007**, *88*, 361–373. [CrossRef]

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A Sustainable Approach to Tourism Development in Rural Areas: The Example of Poland

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Abstract: The research presented in this article concerns the issue of rural tourism, which is associated with significant economic and landscape changes in the countryside. It is important that tourist development in these areas be subject to the principles of sustainable development, which are important for the preservation of the environment in which tourism operates. The research topic is related to two of the most salient features of rural tourism today, environmental sustainability and pro-environmental behavior, which are considered the right ways to achieve sustainability goals. The main research aim presented is to indicate which of the postulates of sustainable development are being implemented and how concerning the functioning and development of rural tourism is on the Polish tourism market. Another goal is to indicate what types of resources in the rural environment are the basis for the preparation of a tourist product; for whom and how these resources are to be used; as well as the participation of the local community in the management of the resources that constitute its own environment, one of the basic principles of sustainable development. The primary method used was a document analysis and an analysis of selected websites presenting rural environmental resources used in this form of tourism. The research identified that sustainable approaches to tourism development in rural areas in Poland are appropriate with respect to the resources available there and to both natural and cultural values. For resources used in a rural environment, emphasis is placed on the protection of both elements. It has been identified that one idea for their protection is sustainable sharing, which assumes rational use to an extent that would not affect the nature of the assets but at the same time could benefit the local community. Both values are used in different ways but, in addition to their purely recreational value, their educational value is equally important each time.

Keywords: sustainable development; rural tourism; educational homesteads; participation; local action group

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1. Introduction

Nowadays, it comes as no surprise that tourism can be counted as one of the most significant global economic sectors. Since the end of World War II, it has become one of the fastest-growing sectors of the world economy [1]. The multiplicity of forms of tourism and leisure activities is due to many factors. These could be a tourist's interests, curiosity about the world, cultural or recreational offerings, tourist resources, infrastructure, technical possibilities, or a destination understood as a specific area or type of landscape. One of the more popular forms nowadays, which combines some of these factors, is rural tourism. Recent decades have been a period of particularly intensive development for this type of tourism [2,3], and this is connected to changes in the rural economy and landscape. It is satisfying, however, when such tourist development is subject to the principles of sustainable development. These are important for the preservation of the environment in

which tourism operates on the one hand and, on the other, for the possibility of a type of tourism that minimizes its negative impact on both natural and social environments. Many studies point out [4–7] that rural tourism is becoming increasingly important all over the world and is seen as a kind of subsidiary strategy for the sustainable development of rural areas. Rural tourism, through the concept of sustainability, focuses on the protection of natural and cultural environmental resources, and explicitly emphasizes the participation of local people and the responsibility of the tourists using its resources [8,9]. The central, or one of the main roles in the development of sustainable rural tourism, is pointed out by many researchers [10–12]. It is emphasized in EU documents that sustainability is a contributing factor in the competitiveness of a destination, including rural environments [13], and rural tourism is a viable alternative that can positively influence sustainable regional development in villages and communes with less environmental impact compared with classic tourism models [14–16].

Furthermore, global agendas indicate the need to apply sustainable development to the management of rural areas to create a quality tourism product. Agenda 21 pointed out environmental problems and how to manage resources in terms of eco-development above all, as well as guaranteeing a participatory management system for these areas [17]. Rural sustainable tourism also fits in with the objectives set by Agenda 2030 [18] by referring to the following:

- Objective 1: end poverty (drawing attention to the earning potential of those living in rural poverty).
- Objective 4: good quality education (improving the quality of education through learning by example and exposure to nature).
- Objective 7: clean and accessible energy (promoting renewable energy sources in the countryside).
- Objective 10: less inequality (redressing gender inequalities in tourism product development).
- Objective 12: responsible consumption and production (sustainable use of space for cultivation and recycling).
- Objective 13: climate action (sustainable crops and agricultural production).
- Objective 15: life on land (protection of biodiversity).

In the coming years, the implementation of the goals contained in Agenda 2030 for the economy, including rural tourism, and the monitoring of their implementation, will become one of the most important challenges for the politics and economics of countries worldwide [19].

The need for consultation when initiating a tourism development process in a region is pointed out by many authors [20–22]. In recent years and even decades, tourism has become one of the main economic activities in rural areas. It has the potential to definitively generate new sources of income and employment [23] and appears to be crucial to the long-term sustainability of rural areas that attract tourism [24]. Rural tourism can be used as a diversification or adaptation strategy to supplement existing livelihoods and improve the ability of local people to secure income to reduce the risk of economic decline. However, this will not take place without the involvement of the people living in these areas [5]. As long as the local community is increasingly aware of the role of tourism in providing them with additional income or even wealth, a shift in the local economy towards tourism to improve livelihoods is an almost natural direction [23,25]. It can also be a tool for revitalization.

Contemporary approaches to tourism that address negative impacts are not only concerned with minimizing the impacts of tourism but also look at the long-term viability of good quality natural and social resources, the quality of life of communities receiving tourism, visitor satisfaction, and the conservative use of natural and social resources in the context of sustainable tourism development [26–28]. The tourism industry was one of those hardest hit by the COVID-19 pandemic in 2020. In addition to being an important branch of an economy

with a large impact on the value of its gross domestic product (GDP), it is also a powerful job base, providing employment for many inhabitants of depopulating villages.

The main goal of the analysis presented is to indicate which postulates of sustainable development of rural tourism are concerned with the Polish tourism market. The research is related to rural areas in Poland that, according to the definition, are areas outside the administrative boundaries of cities, consisting of rural communes and rural parts of urban–rural communes. According to EUROSTAT, 'rural areas' are all areas outside urban clusters. 'Urban clusters' are clusters of contiguous grid cells of 1 km^2 with a density of at least 300 inhabitants per km^2 and a minimum population of 5000 [9]. For statistical surveys in Poland, they are distinguished on the basis of the territorial division of the country using the identifiers of the National Official Register of the Territorial Division of the Country (TERYT) [29]. According to data from the Central Office of Geodesy and Cartography, in 2020, rural areas occupied 29.0 million ha, which accounted for 92.9% of Poland. In 2020, there were 1533 rural communes and 642 urban–rural communes, and the largest percentage were those with a population of less than 5000 (37.8%) [30]. As of 31 July 2020, there were 4700 tourist accommodation facilities in rural areas (45.6% of all such facilities), which had 30,690 beds (39.6% of the total). Compared with 2010, the number of facilities in rural areas had increased by 61.9% and the number of beds by 29.7%.

2. Sustainable Tourism in the Rural Environment: Literature Review

In tourism, sustainability is usually linked to the issue of development and is defined as 'new tourism' [31,32], the essence of which is its low environmental impact. Sustainable tourism in rural areas is often reduced to farms hosting tourists, local food and crafts, small-scale businesses, and transport. Almost always in tandem with the development of rural tourism, which emphasizes a sustainable approach, is the need for nature conservation [30]. Its absence can have consequences for the future quality of life of the local community but also for the tourism product offered [33]. Sustainable tourism, including that practiced in the rural environment, focuses on natural and cultural environmental resources in order to protect them, and emphasizes the responsibility of tourists and the need for the local community to participate in these efforts [34]. One of the most salient features of rural tourism today is environmental sustainability, and pro-environmental behavior is recognized as one of the ways to achieve this goal [34–39]. Such development is more than just sustainable economic growth. The concept of sustainable development takes into account environmental, economic, cultural, and social factors in rural areas. As Erokhin [40] emphasizes, each element matters, and rural tourism represents a new element of sustainable development in the tourism industry [41,42].

According to Gilbert and Tung [43], rural tourism is a form of tourism in which farmers play an important role, providing tourists with accommodation and the necessary conditions for various leisure activities in a farm environment. It can be seen that rural tourism is multi-faceted, not only because of farming activities but also in terms of the tourist product offered. Bramwell and Lane [44] emphasize other forms such as nature tourism, ecotourism, exploratory tourism, sports tourism, health tourism and other forms of active tourism such as hiking, mountain biking, horse riding, fishing, etc. They also point to forms of tourism related to heritage such as cultural and traditional tourism, folk and ethnic tourism [44–46], and educational tourism. Many researchers [47,48] emphasize the link between tourism activities and the rural environment. So far, literature on the subject has emphasized the small scale of the rural tourism market and few have noticed that it is not only seasonal tourism but all year round. This type of tourism has been particularly appreciated since lockdown when the excellent organization of this market was noticed. Two decades ago, Roberts et al. [4] had already emphasized that it is a small-scale but well-managed market, often of great educational value. Thus, proper management and a responsible policy influencing the promotion of rural tourism is crucial. In the EU, the development of rural areas is pivotal. Both Cork declarations 1.0 and 2.0, concerning the future of rural areas, set out the main policy goals to reverse rural migration; fight

poverty in the rural environment; stimulate employment; and, finally, meet the demand for quality, health, safety, and personal growth to increase rural environmental quality. Declaration 2.0 goes even further, advocating the promotion of prosperity in rural areas with an emphasis on entrepreneurship, investment, and innovation. It emphasizes the need to invest in their vitality, and this would include the elimination of digital exclusion. An important demand is the protection of the environment, and this should translate into local economic development; the development of ecological forms of tourism; and, more broadly, recreation in rural areas. It is also important to support climate action, especially in the production of sustainable energy from renewable sources, and to increase knowledge and innovation [49]. These postulates have a direct or indirect impact on the development of tourism in rural areas. Sustainable rural tourism is seen in this context as a tool for the development not so much of agriculture (although that too) but as an element stimulating the development of the rural collective economy, which will increase employment opportunities for farmers, promote the marketing of agricultural and other local products, ultimately improve production in rural areas, and improve living conditions by effectively increasing the income received by rural residents [50–52]. Non-agricultural activities in the countryside can contribute to the economic growth of a region [14,15,53], and rural tourism provides the opportunity for regional economic, socio-cultural, and environmental sustainability [54–56]. This element may also be important in building global food security. Climate change along with the liberalization of trade affect rural agricultural areas and, consequently, the practical survival of small farmers all over the world [57–59]. Therefore, the postulate of developing sustainable rural tourism, referring to the principles of social justice and economic profitability, is all the more important [60–62].

2.1. The Concept of Sustainable Development in Rural Tourism

Sustainability in tourism is reflected in three dimensions: economic, social, and environmental. The first refers to income management and the development of institutions and business ventures; the second translates into mutual cooperation, innovation, and creativity; while the third includes environmental awareness, the management of environmental resources in the spirit of rational use, and the management of tourism that occurs in the region [63]. However, other researchers [64,65] point to four dimensions of sustainable activities in the rural environment, which should be coherent at economic, social, environmental, and ecological levels so as to be able to satisfy present needs without harming future generations who will use the same resources. Sustainable development involves appropriate progress simultaneously in all four dimensions [66,67]. This reaches back to the definition proposed in the 1987 Brundtland Report, which defines sustainable development as development that meets the needs of the present without depriving future generations of the opportunity to meet their needs [68]. Three characteristics of sustainable development are mentioned by He [69]. Firstly, both present and future development should be taken into account to avoid harming future generations. Secondly, the development of one aspect should not undermine or restrict the development of others. Thirdly, natural resources—or more broadly, the natural environment—should be protected without abandoning the development of the economy; however, care should be taken to ensure a harmonious relationship between the economy, society, and natural resources. In this view, sustainable tourism development has become widely accepted and is seen as an important and politically appropriate tool for tourism development [70]. It resonates with an approach to tourism as a tool for improving the livelihoods of local communities by identifying tourism as the main remedy to eradicate poverty [71,72]. This is also the case for rural tourism, whose objectives are essentially aligned with those of sustainable development, e.g., eradicating poverty (Objective 1), promoting inclusive and sustainable economic growth as well as full and productive employment and work (Objective 8), and ensuring sustainable consumption and production (Objective 12) [73].

2.2. Sustainable Rural Tourism and the Local Community

Rural areas are important for tourism development due to the fact that they are ecologically attractive areas offering, in addition to nature, the usually well-preserved traditional culture of the region with its ethno-cultural heritage [74]. Sustainable tourism can, therefore, be an important element of sound socio-economic development. However, nature or traditional folk culture are still not enough for sustainable rural tourism development. A key factor is the local community and its attitude to the functioning of tourism in the region, as its involvement determines possible success in this field [75–77]. Without acceptance for various forms of tourism, and products offered in the region expressed in the active involvement of villagers, success cannot be expected [78,79]. By engaging in tourism activities, communities switch from a product-based economy to a service-providing one [80]. Sustainable rural tourism has a better chance of success if all participants in the rural area where tourism activities are to be developed are willing to actively participate in sustainability initiatives [81]. Community-based tourism includes all interactions between local people and external stakeholders [82–84].

Community participation in decision-making regarding the tourism product, information exchange, development of knowledge about the tourism industry, and the specifics of its operation can positively influence sustainable rural tourism as well as its social, economic, and environmental characteristics [85–87]. Thus, rural tourism appears as another important factor in the development of rural communities [72,88,89]. Studies emphasize the strategic role of rural residents as a group convinced of the need to protect natural resources and aware of their importance [90,91]. Many authors [92,93] focusing on the role of a community in relation to sustainable development have pointed out that a sustainable approach requires a fair distribution of economic benefits among the community when putting forward the need to protect this environment as a fundamental resource both for present and future generations. Therefore, this resource should be skillfully shared with tourists [94].

The local community can also have a significant impact on the tourists using the rural environment and any intention to revisit the region [95]. In order for this to happen, the local community should be properly prepared to act. Thus, stimulation of their creativity, innovation, managerial and social skills, as well as environmental awareness are essential [96]. It is thought that the participatory approach [97] enables the application of sustainable tourism principles by creating more opportunities for local people to gain greater and more sustainable benefits from tourism, leading to the need to protect nature and resources, which stems from this bottom-up belief [98]. Therefore, there is an emerging awareness that it is in their own interest to participate in the decision-making process because all preparatory undertakings affect the life of the community. Participation translates into an opportunity to express hopes, fears, and desires regarding tourism development [99]. The aim of such participation is to protect local residents and the resources available to the region from the impact of tourism planning, and at the same time to be able to benefit from rural tourism development [100]. Community participation is also important because local people are the main stakeholders in rural tourism areas. Stakeholder training should be a top priority, as lack of awareness and participation may lead to failure to implement rural tourism in a sustainable manner. Guo and Huang [101] recognize the interactive relationship between rural community development and rural tourism. Jing-Ming, Du, and Su [102,103] go a step further by arguing that it is even the responsibility of rural communities to support and participate in tourism development. Regardless of their level of involvement, rural community residents are not mere observers of activities undertaken in rural tourism. Their active participation fosters sustainable rural environment development; the rational and subordinate use of both cultural and natural resources; and also an improvement in living standards and the economic situation of farmers, thus increasing employment opportunities. All this can happen provided there is the participation of the rural community in the rural tourism designed for the region.

3. Research Questions, Methods, and Sources of Research Material

One of the main goals that the authors of this publication want to achieve is to indicate which postulates of sustainable development are implemented and how, as far as the functioning and development of rural tourism in the Polish tourism market is concerned. Is it possible to indicate a scheme of sustainable activities that will ensure the success of tourism in the rural environment (success measured not so much in terms of the number of tourists visiting the region or economic prosperity but in terms of sustainability, where local resources and the community are the main element and where profit is of secondary importance)? It is also important to indicate what types of rural environmental resources constitute the basis for a tourist product; for whom and how these resources are used; as well as how one of the basic principles of sustainable development, i.e., participation of the local community in the management of resources that constitute their living environment, is implemented on the Polish market. An important objective is the assessment of information distribution, being pivotal for tourism development, and whether sustainability is relevant here as well. What matters is its accuracy [104,105], reliability [106–109], and its completeness and relevancy [110]. Therefore, it is necessary to check which elements of the rural environment resources used in tourism are highlighted (how, why, and with what tools).

The conducted research is causal and concerns rural sustainability. The research method is connected to case study analysis and includes collecting and categorizing data related to aspects of rural sustainability, both empirical and theoretical, and its organization, systematization, and evaluation. The primary method used is document analysis related to rural environmental resources and the sustainable development of local communities. The postulate of the sustainable functioning of a rural community was analyzed on the basis of strategic planning documents. This was important for several reasons. First of all, these documents were developed by institutions responsible for rural development, as is the case with the whole project of 'Educational Homesteads', the principles of its functioning; the use of rural environment resources; and the method of promotion, which was prepared by the Agricultural Advisory Center. These are units directly subordinate to the state administration, specifically the Minister for Agriculture and Rural Development. The Agricultural Advisory Centre cooperates with national and local government administration institutions, industry organizations, scientific and research institutions, and others working for rural development and agriculture. For the detailed analysis, we chose two groups of well-established rural communities operating in Poland: 'Wrzosowa Kraina' (Heather Land) and 'Ogólnopolska Sieć Zagród Edukacyjnych' (National Educational Homesteads Network). These groups are two of the most active groups of their kind operating in Lower Silesia, a region of Poland that has for years been one of the most effective in exploiting its tourism potential. In the case of 'Heather Land', the main motive for its selection was that it is an example of bottom-up action. While 'Educational Homesteads' is an idea for the use of resources in tourism developed by the state administration, 'Heather Land' is an example in which the local community is involved, aware of its resources, and independently develops the rules for using them. It is one of the longer and better-functioning associations of this kind in Lower Silesia, one of the most attractive Polish tourist regions with diverse tourist potential. A library investigation was conducted to collect and systematize information on sustainable rural tourism from local strategic programs, spatial development plans, and tourism development strategies; among them is the Local Development Strategy of 'Heather Land' [111] and documents related to the activities of the National Educational Homesteads Network, the largest network in Poland comprising 305 homesteads (as of 8 August 2023). We have analyzed factors such as its statute, relevant reports, and the organizing principles for operating homesteads on the basis of the quality and authenticity of the product (Figure 1). Both organizations' strategies were analyzed in terms of information about the tourism products offered by its network members, as mentioned in paragraph 6 of the Network Regulations [112]. This is one of the popular methods to evaluate web resources [113–116]. The following websites were analyzed:

- https://zagrodaedukacyjna.pl (accessed on 8 August 2023)—the official website of the National Network of Educational Homesteads [117];
- https://wrzosowakraina.pl (accessed on 8 August 2023)—the official website of the 'Heather Land' Local Action Group [118].

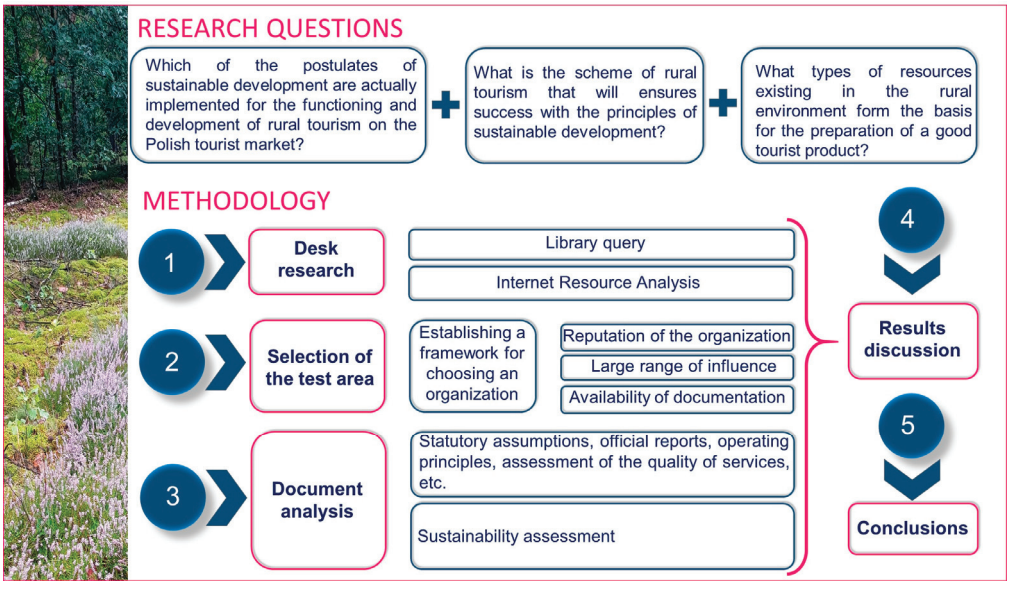

Figure 1. Research methodology (authors' elaboration).

Simultaneously with the analysis of strategic documents, field studies were carried out in January and July 2023 in order to take into account possible changes in the development of the research area. At that time, exploratory, in-depth, and open talks with members of the National Network of Educational Homesteads and 'Heather Land' were also conducted. These were to provide information not only of a factual but also an ideological nature, expand and deepen the initial plan for the study, as well as suggest new ideas and hypotheses.

4. Results and Discussion

An important aspect of properly functioning rural tourism is the use of local resources in combination with sustainable policies and appropriate management from the administrative level. In this way, the local potential of both the area, the products offered, and the community can be fully exploited.

4.1. Educational Homesteads

In tourism space, an interesting idea to increase such potential is the so-called Educational Homesteads, which are based on the idea of using the existing resources of a farm to create new income for its owners [4,46,48,51]. The creation of Educational Homesteads is not only focused on additional income but also provides an opportunity to sustain a family's existing lifestyle in familiar surroundings and at a good economic level while maintaining social contacts. One idea for using a homestead in the countryside is to combine the resources of the rural environment, both natural and cultural, with an educational function [119–121]. Today, fewer and fewer people are familiar with the rural environment, its way of life, traditions, and culture. For example, in Poland, about 60% of the population live in cities [122], which is not far from the world average; so, the need to create an appropriate educational offering becomes an opportunity for rural farms. The purpose of education used in rural tourism is to learn about and experience the environment in a

different way than in school [119]. Rural tourism in this view is an event that promotes rural farms, the culture of farm work, traditional activities, animal husbandry, growing crops and herbs, all while discovering traditions and rituals [123,124]. These challenges can be met by Educational Homesteads, which have already become a recognizable tourist product. In Poland, the largest organization representing them is the National Network of Educational Homesteads, an idea developed in 2010–2011 by the Kraków branch of the Agricultural Advisory Centre in Barwinów. The Centre is a national organizational unit under the authority of the Minister for Agriculture and Rural Development. Its tasks as defined by law are mainly to improve the level of agricultural income, support the sustainable development of rural areas, and improve the professional qualifications of farmers and other rural residents. Cooperating with governmental and local authority institutions, branch organizations, scientific and research institutions, and others for the development of rural areas, e.g., agricultural advisory staff; representatives of institutions and organizations; local action groups; and rural inhabitants through conferences, training sessions, seminars, etc. [125].

The idea to create Educational Homesteads grew out of the idea of sustainable development, whose elements are based on three key ideas:

- Farmers' work and the origin of food need to be brought closer to society to counter globalization processes;
- A farm has the potential to provide attractive educational activities that will result in desirable environmental and consumer attitudes [126,127];
- Educational services represent an opportunity for additional income for farmers and the motivation to continue farming and maintain the vitality of rural areas [115].

The National Network of Educational Homesteads gives its own detailed definition of an educational homestead; in practice, it is a set of conditions that need to be met in order to apply for participation in the project. According to the guidelines, an 'educational homestead' is a facility located in a rural area that is run by a resident of the village. In addition, it will welcome children and young people on school programs and extracurricular activities. It is worth noting that targeting activities primarily at the young is quite common and this group as a particular audience for the offering is also highlighted in the literature [23,128]. There must be livestock and it should present agricultural crops. Based on its resources, it should pursue at least two educational objectives out of the five set by the organization:

- Crop growing;
- Livestock rearing;
- Crop processing;
- Environmental and consumer awareness;
- Rural material culture heritage, traditional professions, handicrafts, and folk art.

The minimum mandatory technical requirement is to have a roofed place for the activities so as to ensure a minimum of comfort during educational tasks. Hygiene requires the provision of toilets for participants. The organizer must also meet any safety conditions stipulated by law.

It is also interesting to note that §2.2 of the regulations of the National Network of Educational Homesteads [112] defines three objectives for the network's functioning. These are to raise the prestige of the farming profession and to disseminate knowledge on the origin of food, to diversify non-agricultural activities in rural areas, and to preserve the cultural heritage of the countryside. The project, which aims to span under a single name previously dispersed over several educational initiatives, involves the creation of a brand that promotes better use of resources and an increase in the quality of educational programs. It will also help attract external funding and increase the effectiveness of promotional activities. It is important to maintain quality when becoming widespread; therefore, according to §4 of the regulations, any facility meeting the above conditions may join the Network. Furthermore, according to §2, participation in the Network is voluntary

and free of charge. Access takes place on the basis of an application questionnaire together with a program for educational activities (§4.3) [112]. The application is verified in terms of the compatibility of the educational activity profile with the farm's resources and the Network's objectives. Quality is guarded by §4, which specifies that the application requires the recommendation of an authorized advisor from the territorially competent agricultural advisory center (AAC). Membership of the organization entails not only obligations but also tangible benefits, including the following:

- The right to identify the educational offer using the logo;
- Promotion of offers on a nationwide internet site;
- Promotion at trade fairs and other events, and in the media;
- Access to content guides;
- Participation in periodic training courses;
- Advisory support from the AAC;
- Exchange of experience on a social networking site.

The benefits of educational activities on farms are manifold and concern both sides of the education process: the teachers (here, farmers) and the education sector (schooling). Farmers undertaking activities of a teaching nature on the farm obtain additional income, which affects their overall economic situation, as emphasized many times in the literature [24,25,60,129,130]. It is also an excellent promotion for the products that the farm offers available for direct sale. Besides, educational activities are a way to extend the tourist season. As a rule, the use of the accommodation offered in the rural environment coincides with the high season in the region, i.e., summer. Educational activities can be conducted all year round, provided the facility is suitably adapted. Schoolchildren who follow part of their syllabus outside school are excellent customers. Schools offer their pupils a varied and enriched learning process of practical and workshop activities in a variety of subjects conducted in the rural environment as an alternative to their daily learning process. The benefits are mutual as the farmers through educational activities can enrich and diversify their daily lives, feel the satisfaction and joy of working with children and young people, influence their personal development and that of their families, and offer new prospects for development.

At present, 305 farms in Poland function within the National Network of Educational Homesteads. This number has been increasing steadily in the last decade.

The growing popularity of the offer means that nowadays practically every region in Poland offers an educational homestead, although their distribution is not even and is not necessarily derived from a concentration of rural areas. Almost from the beginning of the Network's establishment, the most popular region has been the southwestern part of the country: the Dolnośląskie voivodeship (Figure 2). There are 38 homesteads there (12.5% of the total number). Somewhat fewer are in Małopolska (33), and third is the Mazovian Voivodeship with 28 homesteads. These three regions account for one third of Poland's examples. Surprisingly few homesteads can be found in the eastern, less-urbanized regions: Podlaskie, Lubelskie, and Podkarpackie have a total of 44 homesteads, comprising 14.5% of the total (Figure 3).

The themes offered by Network members are quite varied and reflect the farms' potential in the rural environment. There are a total of twelve thematic groups where references to both natural and cultural resources can be found (Figure 4).

Figure 2. Eco-museum Bee Trail, Godzięcin—Educational Farm (photos taken by authors).

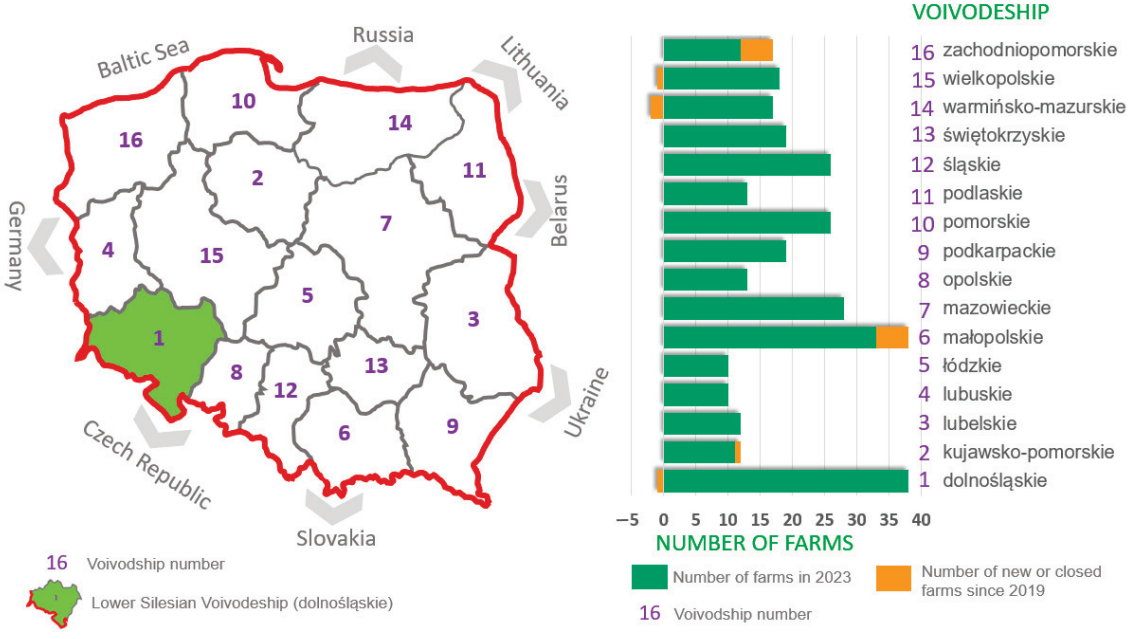

Figure 3. Division of educational farms by regions (created by the authors based on data [115]).

According to the analysis, the most popular themes relate to the natural resources available in the countryside. Almost 82% of all homesteads base their didactic offer on nature in its broadest sense; agricultural and daily farm activities are also important. It is worth noting that of the twelve themes proposed for the homesteads, most relate to cultural potential.

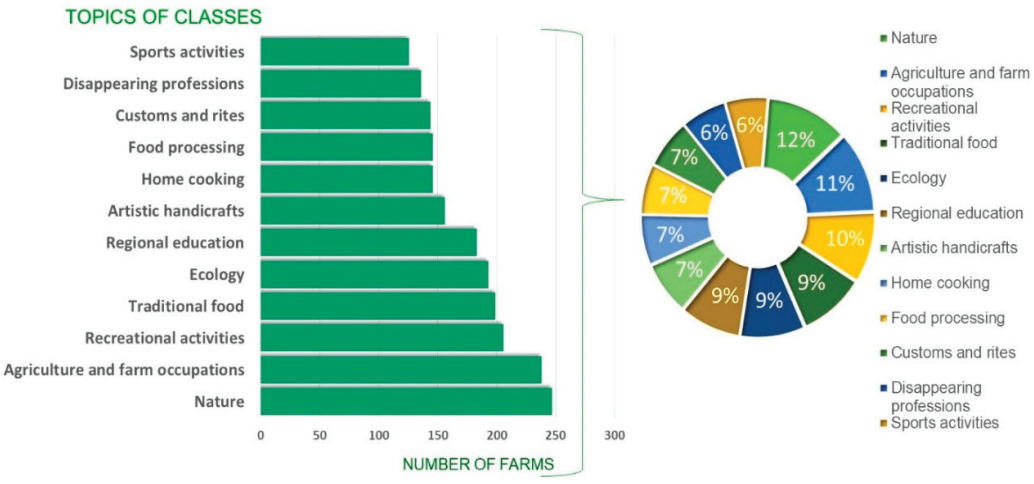

Figure 4. Examples of thematic activities carried out on the farms belonging to the National Network of Educational Homesteads (created by the authors based on data [115]).

The National Network of Educational Homesteads defines the target groups to which it addresses its offer [115]. There are six main groups: children and adolescents without adult supervision, kindergarten children, primary-school-aged children, special groups, adults, and school-aged adolescents (Figure 5).

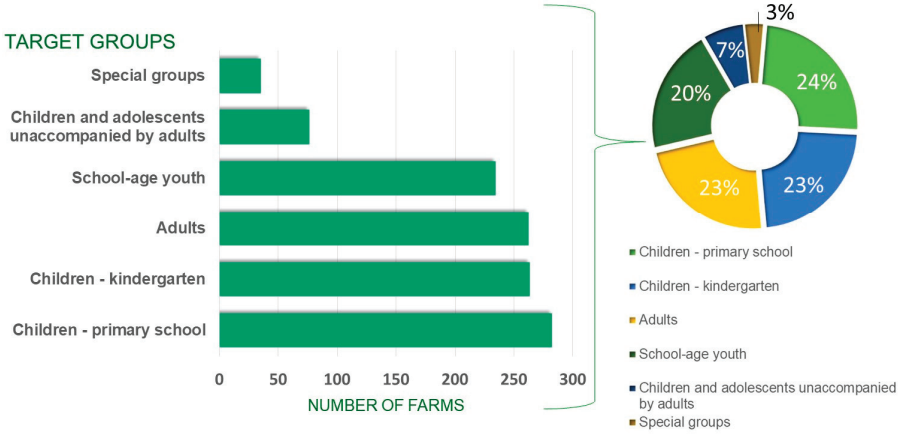

Figure 5. Main addressees of an educational homestead offer: analysis based on applications to farms belonging to the National Network of Educational Homesteads (created by the authors based on data [115]).

The research indicates that of the six target groups defined by the Network, they are mainly formed of groups of children or schoolchildren; however, 263 educational homesteads have mixed offers for adults with children. There is also an important educational offer for special groups, emphasizing the therapeutic nature of the resources important for those groups, as well as an offer aimed at specialists. Staying and participating in activities at the educational homesteads can vary in duration and price (Figure 6).

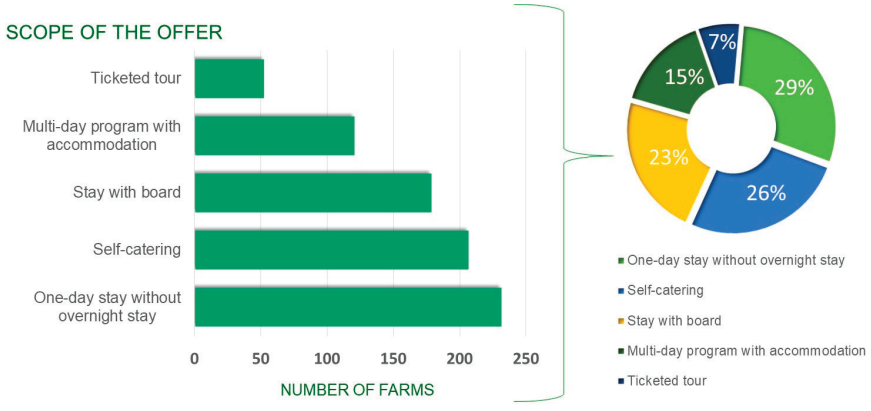

Figure 6. Scope of the offer in an educational homestead: analysis based on applications to farms belonging to the National Network of Educational Homesteads (authors based on data [115]).

Previously, the educational offer was complementary to the basic tourism activity present in the rural environment, which was accommodation. Nowadays, education is an equally important activity, which often does not presuppose the possibility of staying longer than one day, and this is enough to visit a farm or take part in a proposed program.

4.2. The 'Heather Land' Association: An Example of Integrating a Region's Potential

The 'Heather Land' Association, a local action group (LAG), is an example of an organization able to foreground the region's potential. The association is located in Lower Silesia in southwestern Poland—a geographical region and at the same time an administrative one at the rank of voivodeship. The total area of the communes comprising the association is 1590.32 km^2, which is slightly more than 10% of the voivodeship's area. The population, however, accounts for approximately 3% of the total for the region with 94,860 inhabitants.

'Heather Land' is in the east of the Lower Silesian Forests, one of the largest forested areas in Central Europe (forest cover ratio—44%), which influences the profile of tourist use. Nature tourism, green tourism, ecotourism, and sustainable tourism naturally fit into the economic activity in the region. Monuments of nature, five Natura 2000 areas, six nature reserves, and the Przemków Landscape Park mean that almost 80% of the area is protected; therefore, tourism in this area should be carried out in a sustainable way. The association is committed to environmental sustainability in its strategy by operating within the European Green Deal, which will improve the quality of EU citizens' lives while helping to play a leading role in the global fight against climate change. The Common Agricultural Policy (CAP) combines social, economic, and environmental approaches to build sustainable agricultural systems in the EU. The CAP also recognizes and promotes the links between rural communities and the rural environment. Measures that protect the landscape, wildlife, and natural resources, such as clean air and rivers, benefit not only agriculture and the environment but also contribute to improving the quality of life in rural areas and open up opportunities for recreational activities and tourism, all while serving to support rural communities [111].

In addition to the most valuable natural resources, cultural resources are also important for the tourist offer (the heritage of the local community organized in various ways, from local products to eco-museums, educational homesteads, and thematic villages). This heritage is a reflection of the complicated history of Poland and the region. After World War II, the area where the association now operates was settled by immigrant populations from various regions of pre-war Poland. The communities brought their own traditions and customs to their new, small homeland, which are translated into the current way of life, wealth, and diversity of resources. This is seen in regional products having their roots

either here or coming from areas hundreds of kilometers away that are recognized as its own. These include the following:

- Preserves, especially heather honey from the Lower Silesian Forests, which has held a European Protected Geographical Indication certificate since 2008, as well as nuts in honey, bee platter in honey, and jams and fruit preserves;
- Venison sausage and pâté from 'Heather Land';
- Keselica—smoked Przemków carp;
- Wine vinegars with herbs;
- Pressed oils;
- Local wines;
- Honey gingerbread from Przemków;
- Country bread.

Local products and traditions are a pretext for organizing cultural events of tourist value as well (Figure 7). Tourist assets are accompanied by tourist infrastructure and the tourists that use them. In 2021, the region offered 53 catering establishments and 51 accommodation facilities, which were used by 26,873 tourists (this is an increase of 11.5 per cent compared to 2014), and the number of nights provided amounted to 49,026 in 2021. It should be noted that the above figures do not take into account the number of tourists using the agrotourism offer; therefore, it slightly underestimates the volume of tourism in the region [111].

The beginning of the 'Heather Land' Association was the Przemków Landscape Park Partnership Group, established on 17 September 2004 and co-founded by representatives of local governments, companies, NGOs, and state and scientific institutions. The aim was to prepare and implement actions to solve the economic, social, and environmental problems of the associated municipalities. In 2005, the name was changed to the 'Heather Land' Partnership Group, and in 2006, the 'Heather Land' Local Action Group Foundation was established. In 2008, the 'Heather Land' Foundation and local government units were established, which still operate today. The association works on the basis of the Act of 7 March 2007, supporting rural areas through the participation of the European Agricultural Fund for Rural Development [131], and Council Regulation (EC) No 1698/2005 of 20 September 2005, supporting rural development by the European Agricultural Fund for Rural Development [132]. The association covers the rural communes of Gromadka, Lubin, Chojnów, Bolesławiec, Miłkowice, and Kunice; the urban–rural communes of Przemków and Chocianów; and the town of Chojnów.

According to the statute of the 'Heather Land' Foundation, its objectives include supporting the development of the rural areas of the communes that are its members, promoting its area; stimulating the initiatives of the local community; protecting what is of historical, cultural, urban, natural, or landscape value; as well as giving opinions on undertakings related to the development of the region. Finally, it promotes social integration, activities on the labor market, as well as building a common identity. According to §8 of the statutes, the Foundation pursues its objectives through the following:

- Creating and implementing strategies, programs, plans, and projects related to the development of the region;
- Carrying out research, analyses, giving expert opinions, and collecting materials concerning the area;
- Organizing meetings, seminars, training courses, conferences, competitions, exhibitions, concerts, and other forms of cultural life;
- Conducting informational, promotional, and publishing activities;
- Organizing and supporting charitable activities;
- Acting as an opinion-former with regard to the decisions of local authorities;
- Providing free advice on the preparation of projects related to the implementation of the Integrated Rural Development Strategy for the region;
- Cooperation and exchange of experience with public institutions and NGOs at national and international levels [133].

Figure 7. 'Heather Land' (**A**); Village of tastes (**B**); Agritourism farm: Village of Darów Lasu (**C**); Capercaillie heath (**D**); Gajówka Głuszec Eco-museum (**E**); Village of Gifts, Forest Lipa Wróżka, Mill Pond (**F**); Village of Gifts of the Forest Blueberries Path of the Senses, a path on which tourists walk barefoot (**G**) (photos taken by the authors).

The objectives of the association are defined in the Local Development Strategy to be implemented in the years 2023–2027:

- Objective 1. Development of the tourist offer and the local brand 'Heather Land'.
- Objective 2. Activating the local community to strengthen local capital.

Activities supporting Objective 1 are addressed to entities operating in tourist and tourism-related services who want to operate under the 'Heather Land' brand. The implementation of this objective will foster the development of entrepreneurship and the creation of new jobs; this will translate into economic development in the spirit of innovation and an increase in residents' incomes, which itself will translate into a better quality of life of the region's inhabitants. Emphasis is placed on giving preference to undertakings of an innovative nature, and pro-climate investments will allow synergies to be achieved in terms of natural resources and environmental protection. Reducing emissions, increasing energy efficiency, and implementing good practices for nature and climate protection will allow the local community to gain additional benefits from living in a healthy and clean environment. A conscious approach to environmental protection and heritage conservation in the region will promote responsible tourism and support the education of both local residents and tourists on ecological forms of travel and the preservation of local culture and traditions [111]. Within this objective, two main undertakings have been identified: infrastructure for tourism and local heritage as well as support for entrepreneurship in tourism and local branding. Within the infrastructure framework, support will be given to those activities that will improve the tourist attractiveness of the area through the creation of new places for recreation and tourist activities along with a dispersion of tourists through a network of cycle routes and educational paths, taking into account the promotion of natural potential. Support for entrepreneurship will give preference to those tourism service activities that will relate to investments of an innovative and pro-climate nature, such as RES (Renewable Energy Sources) installations in local tourist entities. Objective 2 supports initiatives for the broadly defined activities of the local community, especially for young people; the implementation of the Smart Village concept; and the social inclusion of the elderly and identified socially disadvantaged groups. The strategy defines quite precisely the groups of people who are disadvantaged or at risk of exclusion, which includes women, those with disabilities and their carers, those seeking employment, low-skilled and young people without work experience, subsistence farmers, young people under 25, and seniors older than 60. Measures to stimulate social activity and combat digital exclusion are important here.

4.3. The Participatory Nature of Associations Promoting Rural Tourism Based on the Example of 'Heather Land'

The 'Heather Land' LAG relies on a holistic approach in acting and in implementing tasks. The idea of the LAG is to work in each of the three sectors—public, social, and economic—together with the inhabitants. The LAG's 104 co-founding members include 15 institutions representing the public sector, 69 members from the social sector, and 20 entities from the economic sector [111]. Decisions made within the LAG are taken by a 15-member council comprising representatives of all three sectors. In addition, each member of the council should be a resident of the LAG area. The participatory character of the LAG is best seen in its activities, which are regulated and formed through actions defined in detail in relevant documents and development strategies formulated for specific periods of time. In strategy development, many bodies have been involved, representing all sectors co-founding the LAG, i.e., local entrepreneurs; tourism service providers; representatives of institutions cooperating with excluded groups such as Social Assistance Centers or the Poviat Employment Office; representatives of those excluded groups; local leaders from each commune; the local community; representatives of the senior citizens' community; representatives of educational institutions; the National Agricultural Support Centre; the Social Economy Support Centre in Legnica; members of the Council and the Management Board; the General Meeting and employees of the LAG office; communes and their em-

ployees; representatives of cultural centers; and, finally, representatives of eco-museums, educational homesteads, and thematic villages. The Local Development Strategy was drawn up based on widely applied participatory methods, including information meetings, setting up a working group for the Local Development Strategy, setting up an on-line information and consultation point with the use of the ZOOM platform, holding call-in meetings in the LAG office, questionnaire surveys among the region's inhabitants and interested groups, consultation meetings with LAG members, consultations with groups of excluded people, social consultations on the draft document, data collection using a contact form, thematic meetings of LAG authorities, and making everything available on the website dedicated to the document. Activities using the above methods were carried out between June 2022 and May 2023 [116]. It was also decided to set up a working team for the Local Action Strategy, an Enterprise Club, a Senior Citizens' Forum, and an e-sports league for young people. It was assumed that they will be actively involved in the implementation of the document under development as well as in the implementation of regional innovations for LAG activities. They will also become platforms for cooperation in the implementation of new ideas and concepts.

The idea of sustainable development is included in the declaration signed when joining the 'Heather Land' Association as a member, which is an annex to the statute and contains a significant section specifying the means of achieving the objectives set out in that document. In the first place, emphasis is put on the sustainable development of rural areas with regard to the protection and promotion of the natural environment as well as the landscape, historical and cultural resources, and equal opportunities. Some other points are as follows:

- To activate the rural population.
- To promote rural areas and LAG communes.
- To mobilize the local community to participate in the process of sustainable rural development in the LAG area.
- To take initiatives and actions to stimulate the activity of local communities and their active participation in the development and implementation of the Local Development Strategy (LDS) and other programs, and to support and disseminate the idea of self-governance in this framework.
- To undertake initiatives and actions for the development of the LDS area aimed at the development of regional products, tourism, entrepreneurship, human resources, and civil and information society; improvement of the aesthetics of the villages in the LAG area and the safety of the inhabitants; aesthetic and artistic education of the inhabitants; economic and professional activation; counteracting social exclusion and social pathologies; promotion of a healthy lifestyle; and the preservation of cultural heritage in the LAG area.
- The creation of local products and services, particularly tourist services and the creation of a tourist infrastructure in the area covered by the LDS.
- Protection of women's rights and activities for equal rights for women and men [134].

One of the main tasks of sustainable rural development is to raise the standard of living of local communities without them having to leave their home environment. This is important in the case of Poland because a significant part of the community lives in the countryside and, two decades ago, made a living from agricultural activity. In addition, economic changes and accession to the EU have caused a decline in the profitability of agricultural production. There was a threat that the village, for economic reasons, might begin to depopulate. Hence, the idea of creating a center coordinated at the ministerial level (which indicates the importance attached to it by the national administration and the government) was put forth, which works for rural development in four main areas:

- Supporting non-agricultural forms of economic activity for farmers and their families;
- Cultural heritage of the countryside;
- Support for rural tourism;
- Support for rural households.

Three of them directly or indirectly relate to non-agricultural activities linked to the development of tourism. The key is a balanced approach that gives local communities a chance to prepare a tourist product that concerns spatially dispersed, small-scale activities. This excludes mass tourism and gives an opportunity for the development of small family businesses that will be able to provide funds to function in their home areas without having to leave them. One of the main initiatives, if not the main one, in the field of rural tourism is the Educational Homesteads project. It has been planned in detail so that it can function in a rural environment without the risk of degradation, thus translating into the quality of the offer. Quality is also an important feature of those tourist products required by the modern tourist, which is why it is so important to analyze the assumptions that underlie the creation of this idea. The first step to the development of tourism in a sustainable way is to properly design the rules of operation. These principles have been clarified in documents that, on the one hand, limit or even eliminate the risk of undesirable phenomena appearing on the rural tourism market, harming both the environment and the local community, as well as the image of a rural region, usually perceived as a pro-ecological area. The assumptions contained in the documents are crucial for the sustainable functioning of the rural tourist environment and are the starting point for all activities, which is why it seems so important to present these elements because they shape rural tourism, indicate the potential and use of resources, and are a signpost and tool for local communities that allows them to act in a sustainable way.

5. Discussion

Sustainability is the key word for the functioning of modern tourism in rural areas [8,11–13,135,136]. It refers to many factors such as environmental protection and the economy, as well as the participation of local communities, which leads to combating social exclusion [17–19]. One of the main aspects of the sustainable approach is the protection of the resources available in the rural environment. Two types of tourist value are available, natural and cultural, complementing each other and making tourists aware that people and their culture cannot and do not function isolated from the nature that they use for their needs. It is important to demonstrate in the educational programs (the case of Poland is quite a good example) [111,112,125] how to use these resources in a sustainable way, where not only the present counts but also the future. It is not so much that we pass on resources to the next generation but rather we borrow them from future generations.

It seems that the economic aspect shapes the sustainability of rural tourism and convinces farmers to go green. The economic status of the communities that live in rural areas is very important, and the opinion of the groups running both 'Heather Land' and 'Educational Homesteads' is also reflected in the literature [133,134,137,138]. Nowadays, in the era of commodity agriculture, it is increasingly difficult to preserve smaller farms that are unable to compete in this market. Farmers leaving their businesses, their home, and their traditions are a real threat to the heritage of rural areas. Such a situation is seen in the rural areas in Poland. This is why there is an urgent need to diversify rural activities in order to prevent this threat, which is a common problem for developed countries globally [139–141]. One such tool is a sustainable approach to rural tourism, which takes care of the resources and, thus, increases the quality and attractiveness of the offer (these are the factors that the modern tourist is looking for). This fits in with the view expressed in the literature emphasizing the multi-tasking of sustainability in rural tourism [5]. If activities are supposed to be effective, they cannot be reduced to nature conservation alone. The aim should also be to preserve the culture and character of the communities that are opening up to tourism, the sustainability of the landscape and habitats, the sustainability of the rural economy, and maintaining a tourism industry that is viable in the long term rather than focused on short-term profit. Finally, the implementation of a sustainability strategy should involve organizing the local community around the goal: from developing an understanding of the need for such action to shaping leadership and vision among decision-makers so that everyone is aware of both the benefits but also the risks of relying too much on tourism

alone, and continuing to work towards a sustainable and diverse rural economy [142–144]. Such an approach, seen in the literature, appears in this article in both the case studies presented, i.e., Educational Homesteads as well as 'Heather Land'. A sustainable approach to resources is pivotal in many documents describing their activities [111,125]. In order to develop the right approach, it is important to involve many actors and virtually the whole community; although, of course, the degree of involvement varies. A key word that is important for a sustainable approach is participation [145–147]. The activities of 'Heather Land' are a good example of such bottom-up activities whose bases are constant contact with the local community and the use of the resources in a sustainable manner, which are emphasized in its strategy and other documents in many places [111,133,134]. The economic benefit of preparing a tourist offer is not the main objective but, rather, a means used to integrate the community; reduce exclusion by continuously involving these groups [4,144] in tourism and recreational activities; and reduce migration from the area by showing new kinds of economic activity, thus sparing the necessity of leaving the region. The activities of 'Heather Land' and Educational Homesteads stress the role of women in planning and realizing the tourist offer in the rural area [134], and this is part of a world trend. Many emphasize the need for engagement [148,149], pointing to the importance of support for small-scale, community-focused tourism initiatives because this offers the greatest potential for enhancing the lives of economically marginalized groups, including rural women. The offer described in this article is an excellent example of a sustainable approach to tourism based on resources of local social capital not necessarily appreciated in mass tourism, which often attracts transnational corporate tourism businesses and external labor [2].

An equally important element is to point to such directions of development that translate into care for the natural and cultural environments of the region. Appropriate education shows the local community a way of development thanks to which resources will be preserved because of their regional or supra-regional uniqueness, as well as an element thanks to which a new kind of activity enabling a visitor to stay in the region is possible [150,151]. This approach, the preservation of nature and local culture through its economic attractiveness for the local community, also responds to the demand for sustainable development. An asset that is only a tourist resource if it remains intact and is preserved for future generations fits in with the philosophy of local groups, including 'Heather Land'.

Finally, a sustainable approach to rural tourism can also be spoken of in terms of the information distributed about tourism assets and, more broadly, the tourism activities of rural operators. A correlation can be drawn between the development of tourism, including rural tourism, and the use of new technologies [152–155]. The role of this tool has been noticed and appreciated in rural environments where tourism has developed. Both 'Heather Land' as well as Educational Homesteads recognize this means of communication as the most effective way of meeting the potential recipient of their offer.

6. Conclusions

A sustainable approach to tourism development in rural areas is expressed in an appropriate approach to the resources available to the rural environment including both natural and cultural assets. For resources used in the rural environment in Poland an emphasis is placed on the protection of both types. One idea for this protection is sustainable sharing, which assumes rational use to an extent that would not affect these assets but at the same time could benefit the local community. Both assets are used in different ways; however, each time, in addition to their purely recreational value, their educational value is important. This stems from the belief that only what is known and liked is easier to protect, as it stems from an awareness of their uniqueness, fragility, and transience if they are subjected to the mass pressure that usually accompanies mass tourism. Further, it is not only about natural value. It might even be asked which type is more threatened: Is it the natural, which is now more and more strictly and formally protected, and where the

law provides clear and strong tools to stand up for it? Or is it perhaps the cultural ones? Culture being a community feature is perhaps even more difficult to defend, especially in an era of globalization and over-tourism, as it is often not protected by specific laws designed to preserve the traditions or customs of a region. Culture depends on the strength of a community that is aware of its traditions and appreciates their value, which results in a positive attitude and pride about such customs and traditions. This is the first step towards preserving and promoting this kind of asset, and this philosophy seems to be the one most often implemented nowadays for the development of tourism in rural areas in Poland.

An excellent tool in the battle to maintain and disseminate cultural resources is education. Knowledge is the first and necessary step in the struggle to preserve values. Knowledge needs to be passed on in various ways so that both host and visitor communities approach the visited environment in a sustainable manner. The local communities living in rural areas in Poland do not consider which should be cared for as they use a holistic approach (natural and cultural) to their protection in the education process. One of the most important tools in this education process is the tourist offer in the rural environment, as can be seen from the example of Educational Homesteads; this is a concept that has been present in the rural environment of Poland for at least two decades and is based on teaching to think outside the box. Instead of classrooms, there is the countryside, homesteads and meadows, and forests and lakes; instead of teachers, there are their hosts who share their skills, knowledge, and daily life; instead of a lecture, there is interaction, in which each participant feels part of the environment. The offer of Educational Homesteads is practically never only about cultural values or only natural values.

It is worth stressing the role of rural tourism in Poland in the context of its functioning, which is typical for world trends where the economy counts as much as ecology, local community participation, and sustainability. At present, in Poland, smaller-scale rural tourism is promoted, which uses environmental resources to advocate both 'get to know' and 'not to harm'. Rural tourism in Poland uses the internet. Its use, which is emphasized, is optimal for many reasons. This is a trend in which basically the whole world of contemporary information and its distribution is already globally sustainable. In conclusion, one can risk stating that the success of sustainable rural tourism development lies in the following:

- The description and proper utilization of the natural and cultural value of an area emphasizing its uniqueness;
- A local community that is aware of and actively shapes the image of tourism in its area;
- An appropriate presentation of the potential of using the latest technology and its ability to shape and modify information in real time.

It is worth adding that the whole offer based on sustainable rural tourism is a knowledge-based endeavor resulting from the appropriate education of both the local community and those using its potential. This has multi-dimensional significance for tourists, the area's inhabitants, and the natural environment, and only appropriate management of these assets can positively influence the natural resources of a tourist region.

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References

1. World Tourism Organization (UNWTO) (Ed.) *Making Tourism More Sustainable—A Guide for Policy Makers*; UNEP: Paris, France; UNWTO: Madrid, Spain, 2005; Available online: https://wedocs.unep.org/handle/20.500.11822/8741;jsessionid=EE3263195422834CF41F73C9EDEF75DE (accessed on 25 July 2023).
2. Ferrari, G.; Vargas-Vargas, M. Environmental sustainable management of small rural tourist enterprises. *Int. J. Environ. Res.* **2010**, *4*, 407–414.
3. Leco, F.; Pérez, A.; Hernández, J.; Campón, A. Rural tourists and their attitudes and motivations towards the practice of environmental activities such as agrotourism. *Int. J. Environ. Res.* **2013**, *7*, 255–264.
4. Hall, D.R.; Roberts, L.; Mitchell, M. *New Directions in Rural Tourism*; Ashgate: Aldershot, UK, 2003.
5. Lane, B. What is rural tourism? *J. Sustain. Tour.* **1994**, *2*, 7–21. [CrossRef]
6. Richards, G.; Hall, D. (Eds.) *Tourism and Sustainable Community Development*; Routledge: New York, NY, USA, 2003.
7. Sharpley, R.; Roberts, L. Rural tourism-10 years on. *Int. J. Tour. Res.* **2004**, *6*, 119–124. [CrossRef]
8. Mvula, C.D. Fair trade in tourism to protected areas—A micro case study of wildlife tourism to South Luangwa National Park, Zambia. *Int. J. Tour. Res.* **2001**, *3*, 393–405. [CrossRef]
9. Wood, M.E. *Ecotourism: Principles, Practices and Policies for Sustainability*; United Nations Environment Programme (UNEP): Paris, France, 2002.
10. Falak, S.; Chiun, L.M.; Wee, A.Y. A repositioning strategy for rural tourism in Malaysia—Community's perspective. *Procedia Soc. Behav. Sci.* **2014**, *144*, 412–415. [CrossRef]
11. Franzoni, S. Measuring the sustainability performance of the tourism sector. *Tour. Manag. Perspect.* **2015**, *16*, 22–27. [CrossRef]
12. Lee, T.H.; Hsieh, H.-P. Indicators of sustainable tourism: A case study from a Taiwan's wetland. *Ecol. Indic.* **2016**, *67*, 779–787. [CrossRef]
13. Winter, T.; Kim, S. Exploring the relationship between tourism and poverty using the capability approach. *J. Sustain. Tour.* **2020**, *29*, 1655–1673. [CrossRef]
14. Saarinen, J.; Lenao, M. Integrating tourism to rural development and planning in the developing world. *Dev. South. Afr.* **2014**, *31*, 363–372. [CrossRef]
15. Korani, Z.; Shafiei, Z. In search of traces of 'The Tourist Gaze' on locals: An ethnographic study in Garmeh village. *Iran. J. Tour. Cult. Chang.* **2021**, *19*, 549–567. [CrossRef]
16. Serra Cantallops, A.; Ramon Cardona, J.; Estades Muntaner, R. Characteristics and peculiarities of rural tourism in the Balearic Islands. *Tour. Plan. Dev.* **2015**, *12*, 125–144. [CrossRef]
17. Agenda 21: Earth Summit: The United Nations Programme of Action from Rio. Available online: https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf (accessed on 16 August 2023).
18. Agenda 2030. Available online: https://www.unic.un.org.pl/files/164/Agenda%202030_pl_2016_ostateczna.pdf (accessed on 16 August 2023).
19. Hordyjańska, B. *Droga do Zrównoważonego Rozwoju w Polsce w Świetle Założeń Agendy 2030*; Warszawa, Poland, DIFIN: Wrocław, Poland, 2021.
20. Nost, E. The power of place: Tourism development in Costa Rica. *Tour. Geogr.* **2013**, *15*, 88–106. [CrossRef]
21. Sindiga, I. Wildlife-based tourism in Kenya: Land use conflicts and government compensation policies over protected areas. *J. Tour. Stud.* **1995**, *6*, 45–55.
22. Suchet, A.; Raspaud, M. A case of local rejection of a heritage tourism policy: Tourism and dynamics of change in Abondance, French Alps. *Int. J. Herit. Stud.* **2010**, *16*, 449–463. [CrossRef]
23. Mair, H. Global restructuring and local responses: Investigating rural tourism policy in two Canadian communities. *Curr. Issues Tour.* **2006**, *9*, 1–45. [CrossRef]
24. Lekovic, K.; Tomic, S.; Maric, D.; Curcic, N. Cognitive Component of the Image of a Rural Tourism Destination as a Sustainable Development Potential. *Sustainability* **2020**, *12*, 9413. [CrossRef]
25. Briedenhann, J.; Wickens, E. Rural tourism—Meeting the challenges of the new South Africa. *Int. J. Tour. Res.* **2004**, *6*, 189–203. [CrossRef]
26. Widawski, K. (Ed.) *Turystyka Kulturowa na Dolnym Śląsku-Wybrane Aspekty*; Rozprawy Naukowe Instytut Geografii i Rozwoju Regionalnego Uniwersytetu Wrocławskiego: Wrocław, Poland, 2009; Volume 9.
27. Robinson, M.; Boniface, P. (Eds.) *Tourism and Cultural Conflicts*; CABI: Wallingford, UK, 1999.
28. Tosun, C. Challenges of sustainable tourism development: The case of Turkey. *Tour. Manag.* **2001**, *22*, 289–303. [CrossRef]
29. Available online: https://stat.gov.pl/regon-teryt/ (accessed on 27 August 2023).
30. Available online: https://stat.gov.pl/obszary-tematyczne/rolnictwo-lesnictwo/ (accessed on 27 August 2023).
31. Hampton, M.P. Heritage, local communities and economic development. *Ann. Tour. Res.* **2005**, *32*, 735–759. [CrossRef]
32. Ashley, C.; Roe, D. *Enhancing Community Involvement in Wildlife Tourism: Issues and Challenges*; Wildlife and Development Series No. 11; International Institute for Environment and Development: London, UK, 1998.
33. Berry, S.; Ladkin, A. Sustainable Tourism: A Regional Perspective. *Tour. Manag.* **1997**, *18*, 434–440. [CrossRef]
34. Huete-Alcocer, N.; Valero-Tévar, M.Á. Impact of Information Sources on Promoting Tourism in a Rural Region: The Case of the Roman Villa of Noheda. *Sustainability* **2021**, *13*, 8038. [CrossRef]

35. Garcia-Esparza, J.A. Revitalization of architectural and ethnological heritage: Recovery of vernacular building techniques in a 19th-century winery. *Int. J. Archit. Herit.* **2014**, *8*, 140–159. [CrossRef]
36. Sbarcea, M.; Tudor, M. Tradition and modernity in Danube Delta architecture contemporary intervention towards sustainable settings. *J. Environ. Prot. Ecol.* **2016**, *17*, 1194–1202.
37. Wu, J.; Font, X.; Liu, J. Tourists' Pro-environmental Behaviors: Moral Obligation or Disengagement? *J. Travel Res.* **2020**, *60*, 735–748. [CrossRef]
38. Widawski, K.; Oleśniewicz, P. Thematic Tourist Trails: Sustainability Assessment Methodology. The Case of Land Flowing with Milk and Honey. *Sustainability* **2019**, *11*, 3841. [CrossRef]
39. Jamal, T.; Higham, J. Justice and ethics: Towards a new platform for tourism and sustainability. *J. Sustain. Tour.* **2021**, *29*, 143–157. [CrossRef]
40. Erokhin, V.; Heijman, W.; Ivolga, A. Sustainable Rural Development in Russia through Diversification: The Case of the Stavropol Region. *Visegr. J. Bioecon. Sustain. Dev.* **2014**, *3*, 20–25. [CrossRef]
41. Tao, L.I.U.; Fuying, X. Research on the Driving Force of the Sustainable Development of Rural Tourism in the New Rural Construction. *J. Anhui Agric. Sci.* **2010**, *38*, 2102–2104.
42. Palacios-Florencio, B.; Santos-Roldán, L.; Berbel-Pineda, J.M.; Castillo-Canalejo, A.M. Sustainable Tourism as a Driving Force of the Tourism Industry in a Post-COVID-19 Scenario. *Soc. Indic. Res.* **2021**, *158*, 991–1011. [CrossRef]
43. Gilbert, D.; Tung, L. Public Organizations and Rural Marketing Planning in England and Wales. *Tour. Manag.* **1990**, *11*, 164–172. [CrossRef]
44. Bramwell, B.; Lane, B. Rural Tourism and Sustainable Rural Development. *J. Sustain. Tour.* **1995**, *2*, 1–129. [CrossRef]
45. Pechlaner, H.; Bialk-Wolf, A.; Zacher, D. The Role of Cultural Activities in Tourism Development: An Urban–Rural Perspective. *Tour. Cult. Commun.* **2015**, *15*, 47–58. [CrossRef]
46. Reichel, A.; Lowengart, O.; Milman, A. Rural tourism in Israel: Service quality and orientation. *Tour. Manag.* **2000**, *21*, 451–459. [CrossRef]
47. Milman, A.; Jones, F.; Bach, S. The Impact of Security Devices on Tourists' Perceived Safety: The Central Florida Example. *J. Hosp. Tour. Res.* **1999**, *23*, 371–386. [CrossRef]
48. Fleischer, A.; Felsenstein, D. Support for Rural Tourism: Does it Make a Difference? *Ann. Tour. Res.* **2000**, *27*, 1007–1024. [CrossRef]
49. Available online: https://ec.europa.eu/enrd/sites/default/files/cork-declaration_pl.pdf (accessed on 27 June 2023).
50. Anup, K.C.; Parajuli, R.B.T. Tourism and Its Impact on Livelihood in Manaslu Conservation Area, Nepal. *Environ. Dev. Sustain.* **2014**, *16*, 1053–1063.
51. Mbaiwa, J.E.; Stronza, A.L. The Effects of Tourism Development on Rural Livelihoods in the Okavango Delta, Botswana. *J. Sustain. Tour.* **2010**, *18*, 635–656. [CrossRef]
52. Yang, Q.-Z.; Xiang, Y. The Research on the Contribution of Rural Tourism to Peasants' Income—Based on the Empirical Analysis of Chengdu. *Econ. Probl.* **2012**, *9*, 125–127.
53. Mutlu Danacı, H.; Gülten, R.E. Ecotourism and Vernacular Architecture in Koprulu Canyon. *J. World Turks* **2013**, *5*, 41–46.
54. Yun, H.J. Spatial Relationships of Cultural Amenities in Rural Tourism Areas. *Tour. Plan. Dev.* **2014**, *11*, 452–462. [CrossRef]
55. Ivona, A. Sustainability of Rural Tourism and Promotion of Local Development. *Sustainability* **2021**, *13*, 8854. [CrossRef]
56. Erokhin, V. Approaches to sustainable rural development in a predominantly non-rural region. *Ekon. Poljopr.* **2014**, *61*, 291–306. [CrossRef]
57. Allen, P. *Together at the Table: Sustainability and Sustenance in the American Agrifood System*; Pennsylvania State University Press: University Park, TX, USA, 2004.
58. Cawley, M.; Gillmor, D.A. Integrated rural tourism: Concepts and practice. *Ann. Tour. Res.* **2008**, *35*, 316–337. [CrossRef]
59. Wright, W.; Middendorf, G. (Eds.) *The Fight over Food: Producers, Consumers, and Activists Challenge the Global Food System*; Pennsylvania State University Press: University Park, TX, USA, 2008.
60. Swarbrooke, J.; Horner, S. *Consumer Behavior in Tourism*; Butterworth-Heinemann: Burlington, MA, USA, 2004.
61. Mitchell, M.; Hall, D. Rural tourism as sustainable business: Key themes and issues. In *Rural Tourism and Sustainable Business*; Hall, D., Kirkpatrick, I., Mitchell, M., Eds.; Channel View Publications: Tonawanda, NY, USA, 2005; pp. 3–16.
62. Butler, R.W. Sustainable tourism: A state-of the-art review. *Tour. Geogr.* **1999**, *1*, 7–25. [CrossRef]
63. Utami, D.D.; Dhewanto, W.; Lestari, Y.D. Rural tourism entrepreneurship success factors for sustainable tourism village: Evidence from Indonesia. *Cogent Bus. Manag.* **2023**, *10*, 2180845. [CrossRef]
64. Andrei, D.R.; Sandu, M.; Gogonea, R.M.; Chiritescu, V.; Kruszlicika, M. Modeling of rural tourism towards sustainable development from the perspective of specifically organic food. *Econ. Eng. Agric. Rural. Dev.* **2012**, *12*, 7–12.
65. Štreimikienė, D.; Mikalauskienė, A.; Mikalauskas, I. Comparative Assessment of Sustainable Energy Development in the Czech Republic, Lithuania and Slovakia. *J. Compet.* **2016**, *8*, 31–41.
66. Blancas, F.; Lozano-Oyola, M.; González, M.; Guerrero, F.; Caballero, R. How to use sustainability indicators for tourism planning: The case of rural tourism in Andalusia (Spain). *Sci. Total Environ.* **2011**, *412–413*, 28–45. [CrossRef]
67. Trukhachev, A. Methodology for Evaluating the Rural Tourism Potentials: A Tool to Ensure Sustainable Development of Rural Settlements. *Sustainability* **2015**, *7*, 3052–3070. [CrossRef]
68. Available online: https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf (accessed on 20 June 2023).

69. He, W. Sustainable Rural Tourism Development and Environment Protection. *Adv. Mater. Res.* **2012**, *347–353*, 2893–2896.
70. Sharpley, R. Rural Tourism and Sustainablility—A Critique. In *New Directions in Rural Tourism*; Hall, D., Roberts, L., Mitchell, M., Eds.; Ashgate Publishing Limited: Aldershot, UK, 2003; pp. 38–53.
71. Blackstock, K. A critical look at community-based tourism. *Community Dev. J.* **2005**, *40*, 39–49. [CrossRef]
72. Croes, R.; Vanegas, M. Cointegration and causality between tourism and poverty reduction. *J. Travel Res.* **2008**, *47*, 94–103. [CrossRef]
73. Ayazlar, G.; Ayazlar, R.A. Rural Tourism: A Conceptual Approach. In *Tourism, Environment and Sustainability*; Avcikurt, C., Dinu, M., Hacioglu, N., Efe, R., Soykan, A., Eds.; St. Kliment Ohridski University Press: Sofia, Bulgaria, 2015; pp. 167–185.
74. Stetic, S. Specific features of rural tourism destinations management. *J. Settl. Spat. Plan.* **2012**, *1*, 131–137.
75. Eshliki, S.A.; Kaboudi, M. Perception of community in tourism impacts and their participation in tourism planning: Ramsar, Iran. *J. Asian Behav. Stud.* **2012**, *2*, 51–64. [CrossRef]
76. Mohammad, M.; Khalifah, Z.; Hosseini, H. Local people perceptions toward social, economic and environmental impacts of tourism in Kermanshah (Iran). *Asian Soc. Sci.* **2010**, *6*, 220–225. [CrossRef]
77. Shen, F.; Hughey KF, D.; Simmons, D.G. Connecting the sustainable livelihoods approach and tourism: A review of the literature. *J. Hosp. Tour. Manag.* **2008**, *15*, 19–31. [CrossRef]
78. Bimonte, S.; Punzo, L.F. Tourist Development and Host-Guest Interaction: An Economic Exchange Theory. *Ann. Tour. Res.* **2016**, *58*, 128–139. [CrossRef]
79. Andriotis, K.; Vaughan, D. Urban Residents' Attitudes toward Tourism Development: The Case of Crete. *J. Travel Res.* **2003**, *42*, 172–185. [CrossRef]
80. Chok, S.; Macbeth, J. Tourism as a tool for poverty alleviation: A critical analysis of 'pro-poor tourism' and implications for sustainability. *Curr. Issues Tour.* **2007**, *10*, 144–164. [CrossRef]
81. Schweinsberg, S.C.; Leslie Wearing, S.; Darcy, S. Understanding communities' views of nature in rural industry renewal: The transition from forestry to nature-based tourism in Eden, Australia. *J. Sustain. Tour.* **2012**, *20*, 195–213. [CrossRef]
82. Gabriel-Campos, E.; Werner-Masters, K.; Cordova-Buiz, F.; Paucar-Caceres, A. Community eco-tourism in rural Peru: Resilience and adaptive capacities to the COVID-19 pandemic and climate change. *J. Hosp. Tour. Manag.* **2021**, *48*, 416–427. [CrossRef]
83. Hwang, D.; Stewart, W.P.; Ko, D. Community behavior and sustainable rural tourism development. *J. Travel Res.* **2012**, *51*, 328–341. [CrossRef]
84. Merkel Arias, N.; Kieffer, M. Participatory action research for the assessment of community based rural tourism: A case study of co-construction of tourism sustainability indicators in Mexico. *Curr. Issues Tour.* **2023**, *26*, 2083–2100. [CrossRef]
85. Verbole, A. Actors, Discourses and Interfaces of Rural Tourism Development at the Local Community Level in Slovenia: Social and Political Dimensions of the Rural Tourism Development Process. *J. Sustain. Tour.* **2000**, *8*, 479–490. [CrossRef]
86. Ertuna, B.; Kirbas, G. Local Community Involvement in Rural Tourism Development: The Case of Kastamonu, Turkey. *PASOS Rev. Tur. Patrim. Cult.* **2012**, *10*, 17–24. [CrossRef]
87. Zou, T.; Huan, S.; Ding, P. Toward a Community-Driven Development Model of Rural Tourism: The Chinese Experience. *Int. J. Tour. Res.* **2014**, *16*, 261–271. [CrossRef]
88. Gannon, A. Rural Tourism as a Factor in Rural Community Economic Development for Economies in Transition. *J. Sustain. Tour.* **1994**, *2*, 51–60. [CrossRef]
89. Anderson, W. Cultural tourism and poverty alleviation in rural Kilimanjaro, Tanzania. *J. Tour. Cult. Chang.* **2015**, *13*, 208–224. [CrossRef]
90. Lee, S.; Kim, D.; Park, S.; Lee, W. A study on the strategic decision making used in the revitalization of fishing village tourism: Using A'WOT analysis. *Sustainability* **2021**, *13*, 7472. [CrossRef]
91. Mikhaylova, A.A.; Wendt, J.A.; Hvaley, D.V.; Bógdał-Brzezińska, A.; Mikhaylov, A.S. Impact of cross-border tourism on the sustainable development of rural areas in the Russian-Polish and Russian-Kazakh borderlands. *Sustainability* **2022**, *14*, 2409. [CrossRef]
92. Choi, H.C.; Sirakaya, E. Sustainability indicators for managing community tourism. *Tour. Manag.* **2006**, *27*, 1274–1289. [CrossRef]
93. Ghoddousi, S.; Pintassilgo, P.; Mendes, J.; Ghoddousi, A.; Sequeira, B. Tourism and nature conservation: A case study in Golestan National Park, Iran. *Tour. Manag. Perspect.* **2018**, *26*, 20–27. [CrossRef]
94. Chin, C.H.; Thian, S.S.-Z.; Lo, M.C. Community's experiential knowledge on the development of rural tourism competitive advantage: A study on kampung semadang–borneo heights, Sarawak. *Tour. Rev.* **2017**, *72*, 238–260. [CrossRef]
95. Lo, M.C.; Chin, C.H.; Law, F.Y. Tourists' perspectives on hard and soft services toward rural tourism destination competitiveness: Community support as a moderator. *Tour. Hosp. Res.* **2019**, *19*, 139–157. [CrossRef]
96. Ataei, P.; Karimi, H.; Ghadermarzi, H.; Norouzi, A. A conceptual model of entrepreneurial competencies and their impacts on rural youth's intention to launch SMEs. *J. Rural Stud.* **2020**, *75*, 185–195. [CrossRef]
97. Tosun, C. Expected nature of community participation in tourism development. *Tour. Manag.* **2006**, *27*, 493–504. [CrossRef]
98. Inskeep, E. *National and Regional Tourism Planning: Methodologies and Case Studies*; Routledge: London, UK; New York, NY, USA, 1994.
99. Timothy, D.J.; Tosun, C. Tourists' Perceptions of the Canada-USA Border as a Barrier to Tourism at the International Peace Garden. *Tour. Manag.* **2003**, *24*, 411–421. [CrossRef]

100. Timothy, D.J. Cross-Border Partnership in Tourism Resource Management: International Parks along the US-Canada Border. *J. Sustain. Tour.* **1999**, *7*, 182–205. [CrossRef]
101. Guo, W.; Huang, Z.F. Study on the Development of Community Power and Functions under the Background of the Development of Rural Tourism—Based on the Investigation of Two Typical Cases in Daizu Garden and Yubeng Community, Yunnan Province. *Tour. Trib.* **2011**, *26*, 83–92.
102. Jing-Ming, H.E. A Study on Rural Tourism Overseas. *Tour. Trib.* **2003**, *1*, 76–80.
103. Du, Z.B.; Su, Q. Study on the Relationship between the Community Participation of Rural Tourism, Residents' Perceived Tourism Impact and Sense of Community Involvement—A Case Study of Anji Rural Tourism Destination, Zhejiang Province. *Tour. Trib.* **2011**, *26*, 65–70.
104. Sotiriadis, M.; Zyl, C. Electronic word-of-mouth and online reviews in tourism services: The use of twitter by tourists. *Electron. Commer. Res.* **2013**, *13*, 103–124. [CrossRef]
105. Tilly, R.; Fischbach, K.; Schoder, D. Mineable or messy? Assessing the quality of macro-level tourism information derived from social media. *Electron. Mark.* **2015**, *25*, 227–241. [CrossRef]
106. Hassani, H.; Silva, E.S.; Antonakakis, N.; Filis, G.; Gupta, R. Forecasting accuracy evaluation of tourist arrivals. *Ann. Tour. Res.* **2017**, *63*, 112–127. [CrossRef]
107. Munar, A.M.; Jacobsen, J.K.S. Trust and involvement in tourism social media and web-based travel information sources. *Scand. J. Hosp. Tour.* **2013**, *13*, 1–19. [CrossRef]
108. Li, Y.; Hu, C.; Huang, C.; Duan, L. The concept of smart tourism in the context of tourism information services. *Tour. Manag.* **2017**, *58*, 293–300. [CrossRef]
109. Molina, A.; Fernández, A.C.; Gómez, M.; Aranda, E. Differences in the city branding of European capitals based on online vs. offline sources of information. *Tour. Manag.* **2017**, *58*, 28–39. [CrossRef]
110. Zadeh, P.A.; Wang, G.; Cavka, H.B.; Staub-French, S.; Pottinger, R. Information quality assessment for facility management. *Adv. Eng. Inform.* **2017**, *33*, 181–205. [CrossRef]
111. Lokalna Strategia Rozwoju na lata 2023–2027 Lokalnej Grupy Działania: Wrzosowa Kraina (Local Development Strategy for 2023–2027 of the Local Action Group: Heather Land). PDF. Available online: http://wrzosowakraina.pl (accessed on 10 July 2023).
112. Regulamin Ogólnopolskiej Sieci Zagród Edukacyjnych, CDR, Kraków. 2015. Available online: http://cdr112.e-kei.pl/zagroda2/dokumenty_2015/regulamin_zagroda%20edukacyjna_siec_2015.pdf (accessed on 12 August 2023).
113. Jani, D.; Hwang, Y.H. User-generated destination image through weblogs: A comparison of pre-and post-visit images. *Asia Pac. J. Tour. Res.* **2011**, *16*, 339–356. [CrossRef]
114. Son, A. International tourists' image of Zhangjiajie, China: Content analysis of travel blogs. *Int. J. Cult. Tour. Hosp. Res.* **2011**, *5*, 306–315. [CrossRef]
115. Ottaviani, D.; Demiröz, M.; Szemző, H.; De Luca, C. Adapting Methods and Tools for Participatory Heritage-Based Tourism Planning to Embrace the Four Pillars of Sustainability. *Sustainability* **2023**, *15*, 4741. [CrossRef]
116. El Archi, Y.; Benbba, B.; Nizamatdinova, Z.; Issakov, Y.; Vargáné, G.I.; Dávid, L.D. Systematic Literature Review Analysing Smart Tourism Destinations in Context of Sustainable Development: Current Applications and Future Directions. *Sustainability* **2023**, *15*, 5086. [CrossRef]
117. Available online: https://zagrodaedukacyjna.pl (accessed on 25 July 2023).
118. Available online: https://wrzosowakraina.pl (accessed on 25 July 2023).
119. Ohe, Y. Educational tourism in agriculture and identity of farm successors. *Tour. Econ.* **2018**, *24*, 167–184. [CrossRef]
120. Jenkins, T. Putting Postmodernity into Practice: Endogenous Development and the Role of Traditional Cultures in the Rural Development of Marginal Regions. *Ecol. Econ.* **2000**, *34*, 301–314. [CrossRef]
121. Weaver, D. Comprehensive and Minimalist Dimensions of Ecotourism. *Ann. Tour. Res.* **2005**, *32*, 439–455. [CrossRef]
122. Powierzchnia i Ludność w Przekroju Terytorialnym w 2023 r., Główny Urząd Statystyczny, PDF (Area and Population in the Territorial Profile in 2023). Available online: https://stat.gov.pl (accessed on 12 August 2023).
123. Barbic, A. Cultural identity of the Slovenian countryside: Territorial integrity and cultural diversity from the perspective of rural communities. *Agric. Hum. Values* **1998**, *15*, 253–265. [CrossRef]
124. Macleod, D.V.L.; Gillespie, S.A. *Sustainable Tourism in Rural Europe: Approaches to Development*; Routledge: Abingdon, UK, 2011.
125. Regulamin Organizacyjny Centrum Doradztwa Rolniczego (Organizational Regulations of the Agricultural Advisory Centre). Available online: https://www.cdr.gov.pl/images/BIP/Regulamin_Organizacyjny_2018.pdf (accessed on 12 August 2023).
126. Jamal, T.; Hill, S. Developing a framework for indicators of authenticity: The place and space of cultural and heritage tourism. In *Cultural and Heritage Tourism in Asia and the Pacific*; Prideaux, B., Timothy, D.J., Chon, K., Eds.; Routledge: Abingdon, UK, 2008; pp. 17–34.
127. George, E.W.; Mair, H.; Reid, D.G. *Rural Tourism Development: Localism and Cultural Change*; Channel View Publications: Bristol, UK, 2009.
128. Lee, T.H. Influence analysis of community resident support for sustainable tourism development. *Tour. Manag.* **2013**, *34*, 37–46. [CrossRef]
129. MacDonald, R.; Jolliffe, L. Cultural Rural Tourism: Evidence from Canada. *Ann. Tour. Res.* **2003**, *30*, 307–322. [CrossRef]
130. Tao, T.C.H.; Wall, G. Tourism as a sustainable livelihood strategy. *Tour. Manag.* **2009**, *30*, 90–98. [CrossRef]

131. Dz. U. nr 64 poz. 427 (Journal of Laws No. 64, item 427). Available online: https://isap.sejm.gov.pl (accessed on 12 August 2023).
132. Dz. Urz. UE L 277 (Official Journal of the European Union L 277). Available online: https://eur-lex.europa.eu (accessed on 12 August 2023).
133. Statut Fundacji 'Wrzosowa Kraina' (Statutes of the Heather land Foundation). Available online: https://wrzosowakraina.pl/wp-content/uploads/2019/06/statut_fundacji.pdf (accessed on 12 August 2023).
134. Regulamin Grupy Partnerskiej Wrzosowa Kraina. Available online: https://wrzosowakraina.pl/o-nas/grupa-partnerska/regulamin-gp/ (accessed on 12 August 2023).
135. Sanagustín Fons, M.V.; Moseñe Fierro, J.; Gómez y Patiño, M. Rural tourism: A sustainable alternative. *App. Energy* **2011**, *88*, 51–557. [CrossRef]
136. He, Y.; Wang, J.; Gao, X.; Wang, Y.; Choi, B.R. Rural Tourism: Does It Matter for sustainable Farmers' Income? *Sustainability* **2021**, *13*, 10440. [CrossRef]
137. Mathew, P.V.; Sreejesh, S. Impact of responsible tourism on destination sustainability and quality of life of community in tourism destinations. *J. Hosp. Tour. Manag.* **2017**, *31*, 83–89. [CrossRef]
138. Telfer, D.J.; Sharpley, R. *Tourism and Development in the Developing World*, 2nd ed.; Routledge (Routledge Perspectives on Development): London, UK; New York, NY, USA, 2016.
139. Brandth, B.; Haugen, M.S. Farm diversification into tourism—Implications for social identity? *J. Rural Stud.* **2011**, *27*, 35–44. [CrossRef]
140. Curcic, N.; Mirkovic Svitlica, A.; Brankov, J.; Bjeljac, Ž.; Pavlovic, S.; Jandžikovic, B. The Role of Rural Tourism in Strengthening the Sustainability of Rural Areas: The Case of Zlakusa Village. *Sustainability* **2021**, *13*, 6747. [CrossRef]
141. Zielinski, S.; Kim, S.; Botero, C.; Yane, A. Factors that facilitate and inhibit community-based tourism initiatives in developing countries. *Curr. Issiues Tour.* **2020**, *23*, 723–739. [CrossRef]
142. McNally, S. Farm diversification in England and Wales—What can we learn from the farm business survey? *J. Rural Stud.* **2001**, *17*, 247–257. [CrossRef]
143. Barbieri, C.; Mahoney, E. Why is diversification an attractive farm adjustment strategy? Insights from Texas farmers and ranchers. *J. Rural Stud.* **2009**, *25*, 58–66. [CrossRef]
144. Vik, J.; McElwee, G. Diversification and the entrepreneurial motivations of farmers in Norway. *J. Small Bus. Manag.* **2011**, *49*, 390–410. [CrossRef]
145. Dragouni, M.; Foueki, K. Drivers of community participation in heritage tourism planning: An empirical investigation. *J. Herit. Tour.* **2018**, *13*, 237–256. [CrossRef]
146. Zielinski, S.; Jeong, Y.; Milane, C.B. Factors that influence community-based tourism (CBT) in developing and developed countries. *Tour. Geogr.* **2021**, *23*, 1040–1072. [CrossRef]
147. Mayaka, M.; Glen Croy, W.; Wolfran Cox, J. Participation as motif in community-based tourism: A practice perspective. *J. Sustain. Tour.* **2018**, *26*, 416–432. [CrossRef]
148. Scheyvens, R. Promoting women's empowerment through involvement in ecotourism: Experiences form the Third World. *J. Sustain. Tour.* **2000**, *8*, 232–249. [CrossRef]
149. Tucker, H.; Boonabaana, B. A critical analysis of tourism, gender and poverty reduction. *J. Sustain. Tour.* **2012**, *20*, 437–455. [CrossRef]
150. Paulino, I.; Burgos-Tartera, C.; Aulet, S. Participatory governance of intangible heritage to develop sustainable rural tourism: The timber-raftsmen of La Pobla de Segur, Spain. *J. Herit. Tour.* **2023**, *18*, 71–729. [CrossRef]
151. Salvatore, R.; Chiodo, E.; Fantini, A. Tourism transition in peripheral rural areas: Theories, issues and strategies. *Ann. Tour. Res.* **2018**, *68*, 41–51. [CrossRef]
152. Cosma, S.; Paun, D.; Bota, M.; Fleseriu, C. Innovation—A useful tool in rural tourism in Romania. *Procedia Soc. Behav. Sci.* **2014**, *148*, 507–515. [CrossRef]
153. Zaręba, A.; Krzemińska, A.; Adynkiewicz-Piragas, M.; Widawski, K.; van der Horst, D.; Grijalva, F.; Monreal, R. Water Oriented City—A '5 Scales' System of Blue and Green Infrastructure in Sponge Cities Supporting the Retention of the Urban Fabric. *Water* **2022**, *14*, 4070. [CrossRef]
154. Zaręba, A.; Krzemińska, A.; Kozik, R.; Adynkiewicz-Piragas, M.; Kristiánová, K. Passive and Active Solar Systems in Eco-Architecture and Eco-Urban Planning. *Appl. Sci.* **2022**, *12*, 3095. [CrossRef]
155. Zaręba, A.; Krzemińska, A.; Łach, J. Energy sustainable cities. From eco villages, eco districts towards zero carbon cities. *E3S Web Conf.* **2017**, *22*, 199. [CrossRef]

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The Agritourism Value Chain: An Application to the Dehesa Areas of Extremadura

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Abstract: The serious socioeconomic problems faced by rural environments in general, and the agricultural sector in particular, in peripheral European territories since the end of the last century have led to depopulation phenomena, the abandonment of unique traditional uses, and the loss of cultural identity. The promotion of a well-understood agrotourism sector in these territories, as an income-diversifying activity that promotes a more sustainable tourism, is a measure widely applauded by the scientific community, which seeks to curb such problems and offer an opportunity to the inhabitants who are less and less dedicated to the much maltreated primary sector. However, it is crucial to know in a personalized way the value chain associated with agrotourism and in particular that linked to the Extremadura dehesa, especially when this has not traditionally been considered a tourist resource. This paper presents a recent bibliographical review regarding the potential of the Extremadura dehesa as a viable agrotourism resource. The lack of knowledge that the tourist offer has about agrotourism and the dehesa as a business niche and diversification of income, or the gap between some activities and the appropriate channels of the value chain, are some remarkable conclusions, coinciding with those of other authors and similar territories.

Keywords: agritourism; dehesa; value chain; rural environments; depopulation; Extremadura (Spain)

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1. Introduction

Rural environments face numerous socioeconomic problems in the peripheral areas of Europe. These problems increase when the productive base is centered on agricultural activity, especially when this is of an extensive nature [1]. This serious situation has caused, for decades, an almost constant loss of population as a result of emigration processes, aging, masculinization, etc. Similarly, as a result of the loss of demographic numbers, there has been a progressive abandonment of traditional uses and a loss of cultural identity. Moreover, sometimes there is a negative connotation of the rural world, when the reality can and should be different. In order to try to curb these problems, in 2017, the Spanish government launched the National Strategy against the Demographic Challenge [2], which was associated with a group of specific action measures [3] to balance the territorial and socioeconomic development of the country. Among its objectives was the creation of new opportunities in those rural areas with the greatest problems [4–7]. However, the results of applying measures to curb the problems of depopulation are not immediate because different areas have to be agreed simultaneously: improving access to essential goods and services for the population in rural areas and taking advantage of the potential of these territories to carry out diverse and viable economic activities, which at the same time protect the uniqueness of the rural environment, are some of the areas to be considered [8,9].

In the specific case of Extremadura (Spain), the regional government launched the Strategy for the Demographic and Territorial Challenge of Extremadura [10] as an adaptation to the National Strategy in order to strengthen the equal opportunities for the population

living in the region and to alleviate depopulation, among other objectives. To this end, ten strategic objectives are being pursued, among which are the promotion of conditions that attract people to rural areas, provide facilities to have a sustainable economy in all aspects of this concept, and economically diversify the rural world. Despite the fact that the Extremadura region is the autonomous community with the sixth largest number of farms in 2020 and has the highest percentage of usable agricultural area (UAA) in relation to the total area [11], it has seen its average UAA per farm decrease by more than 13.8 hectares compared to 2009 (it is the autonomous community with the fourth largest decrease in Spain), despite the European Structural Funds aid received in these years [12]. To this must be added the slight increase of 6.2% in the average income per inhabitant and household in rural areas of Extremadura between 2016 and 2020 (well below the CPI). While the inhabitants of small municipalities saw their average annual incomes grow by just 330 €/year and at the household level by 550 €/year, the inhabitants of the cities did so by just over 350 €/year and at the household level by 685 €/year (Figure 1).

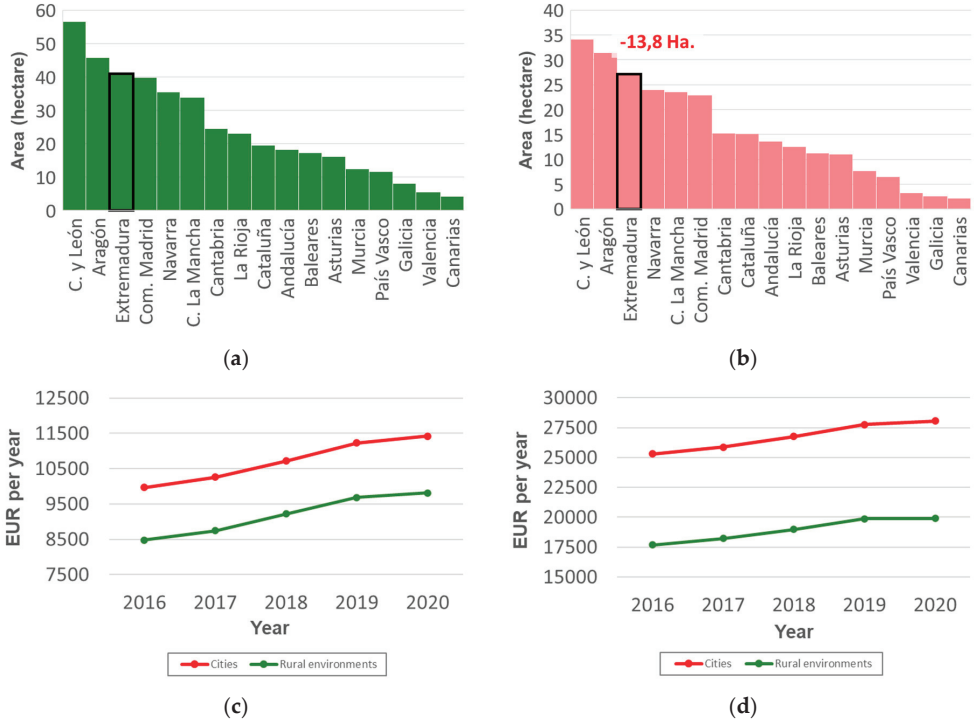

Figure 1. Comparison of average Useful Agricultural Areas (UAA) per farm and autonomous community and income levels in Extremadura by type of rurality: (**a**) average UAA (in ha) per farm in 2009; (**b**) average UAA (in ha) per farm in 2020; (**c**) average income per inhabitant (euros/year) in Extremadura between 2016 and 2020; (**d**) average income per household (euros/year) in Extremadura between 2016 and 2020.

Considering the continuous increase in the consumer price index in recent years and the lack of opportunities and basic services in many rural areas of Extremadura, along with the fact that many of the main centers of economic activity are less than an hour's drive away [13,14], there are few alternatives enabling the working-age population to remain in their rural centers of origin.

Since the 1980s, administrations of different levels have been committed to the development of tourism. In this sense, the European Union, the Spanish government, and

the different autonomous communities that make up the government are seeking to halt the processes of depopulation, aging, and the loss of natural and semi-natural ecosystems characteristic of rural environments [15]. Tourism also contributes to a more equitable territorial planning, greater territorial cohesion, and greater socioeconomic development of the population, among others. This economic activity has accounted for an average of 10.4% of the national GDP in the last decade, and in 2022 accounted for 12.1% of the total employment in Spain [16]. Rural tourism was promoted as a sustainable alternative to the overcrowded sun and beach tourism that had prevailed until then [17–20]. It is characterized by its development in a rural environment, which is perceived by tourists and tour operators as [21,22] (a) an environment characterized by an abundance of natural spaces with little transformation, interspersed with spaces dedicated to traditional agricultural activities; (b) small rural villages (especially those with fewer than 5000 inhabitants); and (c) the survival of a traditional cultural heritage and a local way of life, in many cases associated with the use of this environment, among other factors.

Although the implementation of rural tourism in depressed municipalities was initially an attractive and effective complementary activity, the fact is that the excessive growth of rural lodgings associated with this type of tourism and the enormous territorial coincidence of many of them (in Extremadura a large percentage is concentrated in the north of the province of Cáceres) has made it a less viable option from an economic point of view [23]. In this regard, the measures described by Montiel [24] and Muñoz [25] to consider in the sustainable implementation of new rural accommodation in these environments are remarkable. The inclusion of a model of equipment with a low impact on the environment, obtaining resources on a local scale, and the consideration of the tourist activity itself as complementary and not the only important one, while involving the local population in the management of the tourist activity (incorporating into the offer activities linked to knowledge of the cultural heritage, experiences, customs, etc., that promote dialogue between population and tourist), are some of the most important measures in this regard.

Within rural tourism and considering the measures of Muñoz in 2015 [25] and Shen et al. in 2022 [26], agrotourism is beginning to be seen as a feasible model with which to promote economic diversification and viability in rural environments and less-favored areas or LFAs according to the EU [27], which are characterized by population densities of less than 150 inhabitants/km^2 and the presence of outstanding agricultural activity [28], while preserving their heritage and associated landscapes [29], as in the Spanish case in Extremadura's municipalities [30–33]. This type of tourism varies widely depending on the country that legislates it and the activities that the promoter wishes to offer, but basically, it is closely related to farmers who offer on their active farms local food or outdoor recreation linked to the usual activity on that farm [34]. In the particular case of the autonomous community of Extremadura, this is related to providing lodging on farms where the tourist can enjoy the typical local cuisine and/or actively participates in some of the traditional agricultural production tasks that occur in that area [35]. Some of the benefits of this type of rural tourism are the improvement in complementary incomes to those acquired through the agricultural activity (which should continue to be the main economic activity) [31,36], the increase in local employment, and the preservation of a traditional rural landscape that would otherwise disappear [37,38]. However, in Extremadura the agrotourism phenomenon has yet to be exploited, despite the potential that this territory harbors (according to the MAPA in 2023 [1], more than 324.324000 hectares in Extremadura are under cultivation, which represents 34% of the Spanish cultivated area, and tobacco and tomatoes stand out as the crops whose percentages in Extremadura exceed 80% of the national area), and the volume of its surface are destined to the primary sector in general and to the dehesa in particular: 97.4% of the municipalities (378) and 98.5% of the population of Extremadura, according to the INE [39], have pasture land in their municipalities (representing 24.4% of the total surface area of 1,014,865 hectares). In addition, it is noteworthy that 68.3% of the dehesa in Extremadura is concentrated in municipalities with a population of fewer than 5000 inhabitants (Figure 2 and Table 1). Although there is a significant percentage of the de-

hesa in the municipal group with the largest population, there is a predominant dedication to the service sector, with a very reduced weight given to the primary sector (oriented to irrigation and the scarce agri-food transformation industry which has little to do with the dehesa). In addition, the municipalities are generally very extensive, and to this is added the fact that there is an enormous population concentration in the main centers, leaving most of the territory without demographic resources. This means that the link between the large municipalities of Extremadura and the dehesa is very residual. On the other hand, municipalities with fewer than 5000 inhabitants (considered rural environments) are much more socioeconomically dependent on the ecosystem services offered by the dehesa; they are traditionally very dependent on the primary sector, with a marked use of a traditional or less mechanized type [40]; they concentrate most of the dehesa surface area in their municipalities and, in addition, these are on average much smaller than those of the large municipalities. These are also the environments that concentrate the largest traces of cultural heritage linked to traditional uses. On the other hand, if we consider the density limit estimated by the EU to speak of the risk of depopulation (12.5 inhabitants/km^2), in Extremadura 44% of the municipalities (171) would meet this standard. Hence, rural environments are the ones chosen to evaluate the implementation of agritourism activities as a complement to their income within the use of the dehesa (Table 1).

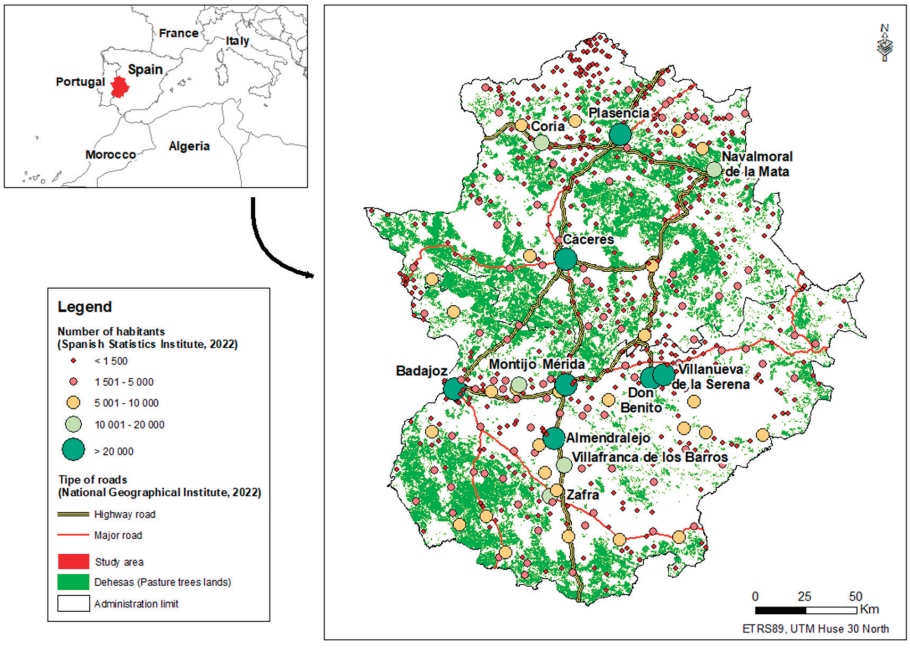

Figure 2. Study area.

Table 1. Dehesa area and population related by municipal group in 2022.

Municipal Size (Inhab.)	Inhab.	% Inhab.	Count Muni.	% Muni.	Average Surf. Muni (ha.).	Inhab./km^2 Average	Average Surf. Dehesa (ha.)	% Dehesa
≥20,000	441,025	41.8	7	1.8	73,712	121.02	128,827.96	12.68
10,000–19,999	85,482	8.1	6	1.6	16,297	127.98	27,896.99	2.74
5001–9999	137,133	13.0	21	5.4	25,547	92.47	165,038.43	16.24
<5000	375,706	35.6	344	88.7	8476	19.66	694,620.36	68.34
Total	1,039,346	98.5	378	97.4	10,757 [1]	27.30 [2]	1,016,383.75	100.00

[1–2] Average weighted by the number of municipalities included in each group.

A good way to analyze the level of implementation of this type of agritourism activity in a territory, and to identify its resources with greater tourism potential, as well as the relationships among economic actors, is to generate a value chain. This is a representation of all the promoters that offer goods or services, their resources, and the relationships among them. The purpose is to generate added value to the activity in which they interact (in this case agritourism) from an economic, social, cultural, heritage, and identity point of view [41]. In the value chain, each specific activity is evaluated within four large blocks or components (production, transformation, distribution, and marketing) to detect problems that prevent goods or a service from being economically viable and generating the value for which it was created [42,43]. The value chain has been applied to tourism for quite some time, but if we consider those recent ones that take into account the territory as a key element, the work reported in [44] is interesting. It proposes a methodology for identifying value chains associated with gastronomic tourism. In it, the authors take into account the territoriality of the components of the tourism value chain, and the sensitive and specialized demand for this type of activity, which seeks quality over quantity in non-mass tourism, and the assessment of the potential (the importance of an element to the rest of the chain according to the interest it has for the demand) and functionality concepts (whether a resource has the services considered basic by the demand for a satisfactory experience) of the resource. The methodology consists of four groups: group 1 includes all the elements extracted directly from the territory and with a very direct link and identity associated with it (they are the indispensable elements for the development of the tourism activity); group 2 is formed by elements that do not come from the territory itself but are very important for marketing; group 3 is composed of those elements that make up the tourism offer (restaurants, accommodations, activity promoters, etc.; they are not essential but contribute a lot of value to tourism); and group 4, the final group, corresponds to elements that are transversal to the rest of the groups, such as the contributions of innovation, and training in all the links of the tourism chain.

As a research problem and a recommended stage towards the implementation of these agritourism activities in a territory such as Extremadura, the aim of this work is to analyze those agritourism experiences in areas similar to the farmscape [45] of the dehesa and rural environments in Extremadura that have been collected in a bibliography, in order to subsequently identify the traditional agricultural activities and resources with sufficient tourist potential to satisfy the increasing demand for this type of unique experience linked to the Extremadura pasture and to evaluate their possibilities for implementation. To this end, we start from the premise that such agritourism activities must serve as a complement to the main traditional activity and not as a substitute model (a predominant trend in Extremadura since the end of the last century). Studies relating agritourism activities with dehesas such as this one are not very abundant in the literature (as they are mostly linked to mountain areas, pastures, vineyards, and olive groves, among others, as reported in [46,47]), despite the fact that the extensive use of these semi-natural ecosystems has been reduced in recent years due to the lack of generational replacement, among other issues, and where tourism as a complement has not been proposed as an alternative to mitigate such problems [48–50]. For this reason, and through a recent bibliographic analysis of the agritourism and its value chain in rural environments, this article pursues the following specific objectives:

1. Identify the most influential sectors in agritourism associated with the dehesa and the resources with the greatest potential for tourism;
2. Consider which relations can exist between the supply of agritourism products and livestock farming in the dehesa, considering their specific value chain;
3. Determine the possible problems to be taken into account when implementing these types of agrotourism activities in general and in those less favored European areas (LAZs) linked to the dehesa, as is the case of the autonomous community of Extremadura in particular.

2. Materials and Methods

2.1. Study Area

Extremadura is an autonomous community located in the southwest of Spain and Europe and on the border with Portugal. This autonomous community is divided into two provinces, north and south, Cáceres and Badajoz, respectively, with a total of 388 municipalities. The average population density of this region is 27 inhabitants/km^2, although the average density of the rural environments drops to 19.6 inhabitants/km^2, well below the national and European average (just over 95 inhabitants/km^2 and 109 inhabitants/km^2, respectively).

The main axes of socioeconomic development are located around the A66-Ruta de la Plata highway (north–south in the center of Extremadura) and the A5-Badajoz/Madrid highway (southwest–northeast), which concentrate eight of the nine main population centers in Extremadura (those with more than 20,000 inhabitants, listed in Figure 2).

This extensive Spanish region is home to numerous unique natural, semi-natural, and artificial ecosystems, as shown by the fact that 30.6% of its surface area is under environmental protection and there are even overlaps between them. Special Protection Areas for Birds (SPAs) and Special Areas of Conservation (SACs), both included in the Natura 2000 Network, are worth mentioning. In addition, there is also a Network of Protected Natural Spaces (ENP) made up of Natural Parks, Natural Reserves, Natural Monuments, etc. Of course, there is also a National Park, three Biosphere Reserves or Ramsar Areas, and a Geopark declared by UNESCO in 2011 [51]. Landscape diversity and biotic heterogeneity are complemented by different agro-livestock and forestry activities, which for decades have coexisted in perfect balance. One of the examples of coexistence and traditional silvopastoral and forest uses that are most respectful of the surrounding environment is the dehesa. There is quite a lot of literature dedicated to the analysis of agritourism in natural and semi-natural ecosystems of pastures, mountain areas, and mixed areas. However, there are hardly any studies that analyze the dehesa as an agritourism resource, or that describe value chains associated with this specific activity and ecosystem. The dehesa is not in itself a pastureland (such as, e.g., those existing in the vicinity of Český Krumlov in the Czech Republic), much less a mountain area (such as those found in the Alpine or Pyrenean regions). According to [52], this is defined as a multifunctional livestock and/or hunting exploitation system in which at least 50% of the surface area is occupied by pastureland with scattered adult acorn-producing trees and with a fraction of the area covered between 5 and 60%. To this definition the Extremadura law [53] adds an exploitation unit whose minimum surface area exceeds 100 hectares. These large semi-natural expanses of open pastures with holm oak (Quercus ilex) and cork oak (Quercus suber) woodland, whose origins date back to the middle of the 7th century, are found exclusively in the center–south of the Iberian Peninsula and are linked to plains or slightly undulating reliefs with little slope (the Spanish or Portuguese mid-mountain areas are already home to the Mediterranean forest from which it originates). The dehesa ecosystems are characterized by a multitude of traditional ecosystem uses closely linked to the nearby rural environment and its economy, in which the primary sector is very important. There is extensive grazing with native species of sheep, such as the Merino breed, cattle (some of them brave breeds), and pigs (highlighting the Iberian breed for its gourmet products) [54]; the complementary agricultural uses are very focused on the cultivation of cereals (mainly wheat, barley and rye) and the different seasonal forestry uses of the existing quercus trees, such as the pruning of the trees to obtain firewood, the different types of charcoal with a high caloric power and durability, and the extraction every eight to ten years of the bark of the cork oak to obtain cork. Furthermore, the fruit of these species, acorns, are used as a human food base (in bread and different sweets) and as feed for the livestock (the richness of acorns as healthy fats for livestock such as the Iberian pig is well known), as well as hunting activities itself. To this multitude of economic resources are added others of a scenic nature linked to the agricultural sector that make it unique in Europe, numerous traditional trades and associated cultural heritage which are of no less magnitude, and its

ecological functions for endangered or very vulnerable species as promoters of ecological connectivity of their habitats, which form an environment with great potential for tourism that so far has not been exploited [28,34]. All this has led to its consideration by the EU as a High Nature Value Farming and Forestry (HNV) area, which, with more surface area and one of the most valuable areas in Europe, is worthy of being protected and maintained over time with its traditional forms of exploitation [55,56]. This is the ecosystem to which this article associates the resources with the potential to implement agritourism activities in LFAs such as Extremadura, and which is so closely linked to the economic system of many of the municipalities in the region, most of them rural environments.

2.2. Methods of the Literature Review

To achieve the objectives, a bibliographic search of recent works (from January 2016 to June 2023, both included) related to agritourism and those value chains that link rural tourism with traditional agricultural use of rural environments was performed, with special emphasis on uses linked to Spanish and Portuguese dehesas or large extensions of farms in the case of foreign works.

The bibliographic selection was made on the Web of Science, Scopus, Google Scholar, and Dialnet platforms, the latter more focused on Spanish production. The keywords used in all of them as search engines were agrotourism, rural tourism, tourism and agriculture, rural tourism in dehesas, farm tourism, and farm tourism in EU. From more than 8000 initial references, 250 were selected. The criteria for selecting the references were related to the location of the studies (centered mainly in Spain, or at least in southwestern European regions), the subject matter addressed (successful experiences in implementing agritourism activities in large areas similar to the Extremadura dehesa, or analysis of problems related to rural tourism versus agriculture and/or livestock farming on a local scale).

Regarding the identification of elements that make up the value chain of agritourism in dehesas, with special emphasis on the case of Extremadura, the work of [44] is very fascinating, in which they propose a methodology to identify value chains (in this case of gastronomic tourism) considering the following:

- The territoriality of the elements of the value chain for a given tourism, distinguishing those that are key from the other essential but more ancillary elements;
- The demand for such tourism, which is very focused on experiences, sensitivity, and the quality of these, rather than quantity;
- In relation to the first concept, they evaluate the degree of importance of an element in the value chain in terms of whether it meets the requirements that make it attractive to visit from the point of view of the demand of the tourism sector analyzed; in relation to tourism functionality, the authors identify whether the elements evaluated have a series of basic minimum services so that the visitor can have a satisfactory tourism experience.

In the case of this study, the generic elements of the agritourism value chain for the Extremaduran dehesa were adapted from the literature consulted, without losing sight of the general approach proposed by [44]: territoriality, the relationship between producers/supply and demand as part of the value chain itself, and the tourism potential and functionality of the elements of the chain. This article focuses on the identification and grouping of elements that make up the dehesa value chain in Extremadura (the equivalent of Phase 1 of the related paper).

3. Results

The value chain considers the main elements related to the use of Extremadura's dehesas. It is based on the premise that tourists seeking agritourism activities seek a variety of active learning experiences. Among them, the literature includes learning and connection with the rural environment, the land uses, the agricultural and livestock use, and the direct contact with the people who live in that environment. Furthermore, the literature discusses the remarkable natural and cultural, tangible and intangible tourism potentials of

Extremadura [57]. Therefore, in the literature analyzed, a series of activities and distinctive characteristics of agritourism are highlighted. Many of them can be developed in the Extremadura dehesas, since they maintain unique traditional agricultural and livestock activities in the local environment in which they are located [23,58,59].

3.1. The Dehesa as a Tourist Resource

On this basis, the Extremadura dehesa offers a multitude of possibilities linked to traditional economic activities, with sheep and cattle grazing, cork extraction, cereal sowing, or uses derived from oak or cork oak wood (charcoal, picón and firewood), and hunting, perhaps some of the most outstanding [60,61].

Associated with the previous uses, there are a series of activities and crafts that are currently at a high risk of disappearing, such as dry stone constructions for the demarcation of farms, huts for the personnel who work the fields, the tools used by the shepherds in their daily lives (bowls, spoons, bags, etc.), or even the knowledge of medicinal plants in this environment.

A key element for the bibliography is the development of agritourism activities characterized by being active experiences. These include the observation of the natural and/or agricultural landscape, where situations or activities typical of daily primary activities are recreated and, in many cases, there is an offer of traditional products for direct sale and the hospitality of the lodging, in which both parties benefit: farmers and local population, as well as tourists [41,58]. In relation to this, some authors highlight the low predisposition of agricultural producers to collaborate in the creation of connections and associative networks to diversify their economies towards agritourism tasks from the point of view of maximizing sustainability in the sector. Structured associationism is key in a rural tourism model based largely on the private sector, such as agritourism, to promote efficient and equitable development that helps to preserve the related heritage (natural, cultural, intangible, etc.) [62]. In addition, in these cases, a lack of information, training, and skills training necessary to meet the increasing volume of tourists seeking experiences linked to agritourism in some of its varieties is detected [63]; it is also essential that entrepreneurs of agritourism activities are included in the main tourism dissemination websites, given that much of the demand chooses accommodation through this route [64].

Another activity that is highly applauded by the scientific community is the existing relationship between the rural environment in general and the agricultural and livestock farming sector in particular, with a series of typical products of the area and various types of agricultural and livestock farming activities, even at certain times of the year, depending on the farming activities that were carried out in each of them. Gastronomic tourism is another complement to the agritourism offer [44,65,66].

3.2. The Value Chain of Agritourism in the Dehesa

A very interesting study on agritourism activities with an analysis of the most influential factors affectiung the increase of income in the farms that implemented them is [67]. Its authors showed that the agritourism activities that offered the greatest opportunities for increasing incomes were those related to the tasting and direct sale of typical local products, or the offer of cultural and sports activities (active) in the environment of the farm. These two groups of alternative activities favor the preservation of the cultural and landscape heritage and the economic activity of the primary sector of the nearby local environment, while at the same time increasing the economic benefits of the business, eliminating unnecessary intermediaries and favoring the rapprochement between producers and consumers. On the other hand, it is also necessary to identify which resources are the most appropriate, or which actors and services of the value chain we have to make our offer known to in order to maximize the endogenous resources of the territory in question.

Thus, following the methodology proposed by [44] to identify the elements of the agritourism value chain, and taking into account part of the methodology proposed by [68], the value chain for agritourism in dehesas is shown below, adapted to the particularities of

these ecosystems and rural environments in Extremadura (Figures 3 and S1). While Figure 3 lists the elements and their relationships that could be involved in the implementation of agritourism, Figure S1 in the annex provides an expanded view of this chain. It identifies, among other issues, the relationship of the different elements with the territory and the transversality of research, innovation, and development resources in all areas of the value chain analyzed.

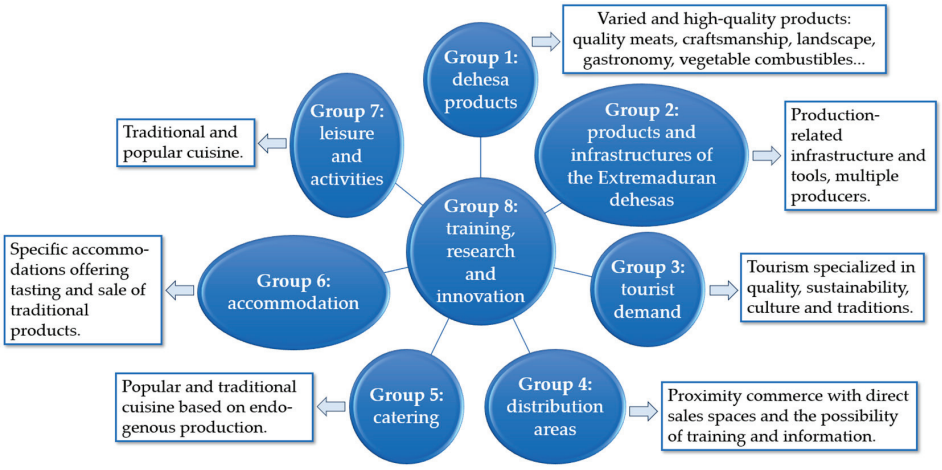

Figure 3. Simplified value chain of agritourism in the dehesa land use. Source: own elaboration based on the research works of [44,68].

As can be seen in Figure 3 and Figure S1, the first group of elements in the value chain is made up of all the products extracted from the Extremadura dehesa. This is a very heterogeneous group of elements because it is possible to find products destined for gastronomic tourism (lamb, beef, and Iberian pork with a Denominación de Origen products (DO). declaration of Extremadura, a Spanish quality label that distinguishes products for their high quality, for being of natural origin, and because their producers have elaborated them following traditional production methods and respecting the environment) [69,70], others linked to ecotourism (the dehesa landscape itself is a unique place for activities such as hiking and taking advantage of the collection of wild seasonal products), and products associated with traditional craft activities (the pruning of oak and cork oak for the use of firewood as a green fuel, the creation of charcoal, the extraction of cork, and dry stone constructions associated with the dehesa declared Intangible Cultural Heritage by UNESCO in 2018). A large number of these products of the first group are characterized by their high quality and for being the result of traditional uses and exploitation by the local community in which they are produced, which give them a great uniqueness and are part of the cultural heritage of some unique pastureland areas in Europe.

In the second group we can find different types of producers and infrastructures directly associated with the multiple uses they have been associated with for decades in the Extremadura dehesa. Thus, producers such as cattle breeders, farmers, and foresters who have taken advantage of the pastures to sow cereal, or the semi-natural forest areas to take advantage of the wood from the trees, are joined by other ancestral trades already in danger of disappearing, such as the charcoal maker (who makes charcoal from the wood of the trees in the pasture), the charcoaler (who makes charcoal as a traditional means of heating the houses), the cork cutter (who extracts cork from the cork oak, a typical tree of the dehesa), the furrier (an intermediary who bought the wool from the sheep in the dehesa to sell to textile companies), or even the shearer (who was in charge of removing the wool from the sheep in spring as a measure to relieve them of the summer heat and

at the same time to obtain a highly valued product in the textile industry), among others. Craft trades stand out as intangible cultural heritage of the local communities linked to the use of the pastures. However, the infrastructures and tools used for agricultural work are also of great interest. The typical instances and spaces of a dehesa are extremely attractive because each one of them is conceived for a very clear function (from the housing area, to the silo and store grain, water infrastructure for the workers and livestock, the network of roads and paths to move around the pasture, and the infrastructure to prevent livestock from escaping from one plot to another on the farm, among others). Furthermore, some of the tools used in the pasture are also special, such as the carlanca (a spiked collar that was put on the dogs that guarded the livestock to prevent wolves from killing them), and the celemín (an instrument used for catching and moving the grain of the harvest and also a unit of measurement that was equivalent to approximately 4.6 L). In this second group are the different uses and forms of exploitation of the pasture: grazing, browsing (consisting of the cattle eating the leaves of the branches on the ground after pruning the trees of the pasture as a further use of resources), cork extraction, hunting, and the collection of fruits such as acorns (fruit of the oak) to be used as food for livestock (Iberian pig), or even for liquors and digestives (acorn liqueur is well known).

In the third group, mention is made of the potential demand for agritourism in Extremadura's dehesas. According to the bibliography consulted, the vast majority coincides with a very clear profile of tourist: a user attracted by quality rather than quantity, who is keenly aware of the concept of sustainability (especially with its environmental protection pillar), who avoids crowded spaces and seeks active learning experiences in which he is involved with the environment to get to know the particularities and way of life of the local communities in that area (and who is exceptionally attracted, therefore, by the local culture and traditions). To these characteristics and in the case of tourists arriving in Extremadura (an autonomous community close to large Spanish cities such as Madrid and Seville, and Portuguese towns such as Castelo Branco, Evora, Beja, and even Lisbon, which is just over 2 h away from the Extremadura city of Badajoz) is added the fact that they seek in the rural environment (among which is the dehesa) a place to relax from the stress of the city (disconnect) and seek a healthier way of life.

In the fourth group are those elements of the value chain related to the distribution of products and services. In the case of the Extremadura dehesa, the distribution potential is high, given the existing road infrastructure, which allows the region to be crossed from north to south in 2.5 h, and from east to west in barely 2.15 h (despite the existing deficient railway infrastructure). This allows the producers of the Extremadura dehesa to consider a distribution of their products on a local and regional scale that, if well planned, can be successful. In the case of local commerce, producers' distribution to direct sales spaces (local stores and supermarkets, stores specializing in artisanal products, etc.) where they can make their products known, as well as attending specific distribution events (livestock fairs, multisectorial agricultural fairs, etc.), can undoubtedly help them to improve their economic income and diversify their economic activity. In this sense, social relations with different sectors of activity nearby and belonging to collectives within the value chain are key.

Groups 5, 6, and 7 are part of the commercialization of products and their supply to the final consumer. In the case of the fifth group, it is made up of catering elements where the sale of agri-food products for gastronomic tourism can take place. Thus, in addition to the large restaurants in Extremadura (this autonomous community has 26 large restaurants, which hold several Michelin Stars and Repsol Suns, among which the Atrio Restaurant in Cáceres stands out, with 3 Stars and 3 Suns), these endogenous products can be very well received in traditional and popular cuisine spaces and others specialized in hunting cuisine. Nor should we lose sight of the existing tapas culture in the autonomous community of Extremadura.

The sixth group refers to the supply of accommodation. Although Extremadura has an extensive network of rural accommodation (according to [71], in 2022 there was a network of

1056 rural accommodations, which housed 238,298 tourists, that is, 12.8% of the tourists who came to Extremadura in that year), the fact is that the amount of accommodation dedicated to agritourism is less than 0.5% of the supply. A type of agritourism accommodation in which active learning activities are offered (including outdoor and indoor recreation), with tours, opportunities to learn about the potential of the associated agricultural and natural landscape, tastings of traditional products (and the possibility of buying them directly), without losing sight of the basic and diversified production of the pasture for the maintenance of traditional spaces and uses, would be the ideal concept. This ideal business concept could perfectly fit among the people of Extremadura and on a national and international scale (this type of tourism is highly demanded by tourists from Portugal and central and northern Europe). Of course, it is essential to count on the local population to develop all the activities, from the uses that keep the dehesa alive, to the complementary activities for the agricultural economy (agritourism). It is also necessary to count on the local population and businesses compatible with the agritourism project in the dehesa in order to generate networks of mutual use in those services not offered by some but offered by others.

The seventh group of elements in the chain is related to leisure and recreational or alternative activities. In this sense, the range of activities to be developed is very diverse, going from tasting, show cooking, and tastings of endogenous garden products, meats, or cereal derivatives, to excursions and various routes (hiking, horseback riding, cycling, electric vehicles, etc.) in order to learn about the benefits of the wild products of the dehesa (asparagus, wild potato, thistles, medicinal plants, etc.) and the diversity of the landscape. Alternative activities include photographic safaris, fishing activities in the small existing lagoons, and even night-based recreation involving festivities and Extremaduran folklore (traditional songs and dances of the local community).

Finally, although its associated elements form part of the eighth group, the fact is that this group for training, research, and innovation is common to the rest of the groups and phases of the value chain (which is why it appears in the center of the relationships in Figure 3). The aim is to reflect the need for constant innovation in all areas of the chain as an added value that singles out and optimizes the resources of the agritourism business concept associated with the dehesa. Key to this is the training (among other aspects in the digital field) of employees in the agritourism activity (both in the agricultural and livestock exploitation sectors, as well as the associated tourism) through the university, by providing training courses related to the hotel and catering industry, the primary sector in general, and the environmental and landscape branch. Events to disseminate these innovations applied to the field of agritourism in dehesas are also very important, taking into account that they represent a mark of quality and distinction for this type of tourism.

In addition to the groups described in Figure 3, Figure S1 shows the hierarchies that give importance to all these resources within the value chain: the first three groups (1, 2, and 3), together with group 8 (which is found in all the groups) form part of the basic, indispensable core (Level 1) of elements that make up the chain and have much to do with the elements most closely linked to the territory and its potential. These elements refer to the products, producers, and singularities of the Extremadura pastureland area in relation to the associated agritourism proposal. Behind this basic nucleus is Level 2, which is made up of two varieties of group 4 (together with group 8 for R&D&I), which allude to the distribution areas of the products and services linked to agritourism in the dehesa. This is a complementary level to the basic Level 1, but it is equally essential to provide an outlet for products and services linked to the rural environment and the local community in general, and to the dehesa in particular. This is also the level with the most deficiencies in terms of relations between economic spheres, since currently in the majority of cases in Extremadura the relations with tourist service entities are very residual (they are closely linked to the sale of quality meats and, to a lesser extent, the use of cereals). Finally, there is Level 3, which is aimed at the marketing of agritourism products and services of the dehesa for the case of Extremadura. Here we find groups 5, 6, and 7 (along with group 8, which is common to all

levels), which are linked to catering, accommodation, leisure, and parallel activities. This level offers many possibilities, given that the infrastructure (catering, rural accommodation, hostels, and campsites) and the entities for the organization of events already exist and are of good quality. The problem lies in including in the value chains the activities related to agritourism in the dehesa and disseminating them appropriately.

3.3. Strengths and Weaknesses of Agritourism in the Extremaduran Dehesa

One of the most interesting analyses when evaluating the repercussions of agritourism in the rural environments where it is implemented is that which refers to its impacts on the economy, society, and the local environment. Despite its importance, this type of study is not abundant in the recent literature and the few studies that do exist identified two factors that greatly influence the relationship between local agro-farmers and tourism entities: the type of tourism business and, above all, its ownership [72]; and its diversification and the existence of effective social networks between the two. Thus, there is a greater probability of implementation of agritourism activities in those cases where the owner is a farmer or livestock farmer (male or female, preferably under 40 years of age, since this group is more in favor of the implementation of agritourism and training in this type of activity than older people) [68], who already has their own agricultural land, with adequate access and production infrastructures [73], and who can also supply their products and services in a quantity and at a quality that is in accordance with the needs of the existing tourist demand [74,75].

In addition, some studies confirmed that being part of the agritourism value chain gives local people more opportunities to opt for extra services (from the promotion of excursions to recreational activities, to tastings and gastronomic tourism, among others) and, therefore, to obtain more income than if they were outside these circuits. In addition, there are other benefits such as increased employment in the local environment, preservation of the local tangible and intangible heritage, and diversification of activities [76,77]. Among the most outstanding problems in the relations between local communities and the various forms of rural tourism are those related to the difference in the sufficiency and quality of production of agricultural products, where in some cases the local population cannot supply the tourist demand, neither in quantity of agricultural products, nor sometimes in quality according to what the tourist demands. Having a qualified labor force, adequate infrastructure [78], improving the exchange of information between agricultural producers and intermediary tourist entities in the supply, enforcing the applicability of minimum quality standards, taking advantage of web dissemination and digital support tools [79], together with correct interventions by the administrators is the basis for these local communities to be effectively included in the agritourism value chains in Extremadura [80–84].

4. Discussion

Perhaps one of the most relevant ideas of this study is the confirmation that the implementation of agritourism activities around the uses and exploitation of the dehesa is feasible. Moreover, the potential attractiveness of these spaces combines nature and culture in a very unique way [85]. In addition, it offers multiple benefits for the local communities where they are implemented, with an improvement to the sustainability (in its three pillars) of the rural environment and its population, the increase in employment and opportunities for socioeconomic development mainly in terms of the young population, and the opportunity to diversify economic activities in an efficient manner [86,87], maintaining the infrastructure [84] and the traditional agricultural and livestock use, while complementing them with natural spaces and bodies of water in a nearby environment [87], are some of the most outstanding benefits [85]. These statements coincide with most of the reviewed works and this study attempts to respond to the need to investigate agritourism associated with another geographic space and tourism potential [71].

In order to implement these types of agritourism activities in rural environments such as Extremadura, farmers must first consider what model of agritourism they intend

to offer [88]: following the didactic model (offering an experience based on the active observation of the tourist that shows the way of life and the activities carried out in a dehesa), or the recreational model, which is focused on lodging and leisure in a dehesa environment. The first model does preserve the natural resources and identity of the traditional way of use that rural environments have developed in nearby dehesas; the second is doomed, as Barbieri rightly points out, to transform this ecosystem into outdoor recreational macro-areas oriented to the leisure of the urbanite, thus losing its identity and its original uses.

Even if rural communities consider the implementation of the didactic model of agritourism in their dehesas (with the direct sale of local products or leisure services), the diversification of activities and increase in income are far from assured. The success of this diversification in European LFAs such as the rural environments of Extremadura (similar to those of Italy or Portugal), in addition to suffering from problems of depopulation, population aging, and abandonment of the primary sector in general (including the traditional uses of the dehesa), suffer from no less important deficiencies such as knowledge of these types of activity and their benefits, adequate training to satisfy the demanding tourist, and the efficient management of the resources derived from carrying out both activities at the same time [89]. Although the case of Extremadura is not similar to that of Sardinia studied in [89] (since in Extremadura there are only a couple of lodgings that offer agritourism activities), given the similar characteristics in both cases, similar results could be expected: the increase in income with agritourism and the fixation of the working-age agricultural population are not assured and many farmers may have problems in remunerating the work of their hired family members in accordance with the market and in coping with both activities. In order to achieve adequate income, it is key to expand the tourism offer, improve business management, have relations with tourism and leisure promoters linked to the territory, and have a good brand image.

One of the most striking features of rural environments in Extremadura in general (including those linked to the dehesa) is that there are barely three or four establishments offering some kind of low-level agritourism activity (i.e., lodging and tasting of local products). Bearing in mind that the region does have an adequate range of restaurants and leisure activities, together with an enviable cultural and natural heritage in the vicinity of these areas, it is even more incredible that agritourism has yet to be discovered (and in the case of the dehesa, there is no agritourism yet). Surely the disinformation on the part of the local community and farmers, the lack of promotion of this type of tourism in the region, and the generic regulations on rural tourism in Extremadura are the most important causes. For this reason, the authors of this study are already immersed in a process of surveying the regional rural tourism offer to identify these causes, despite the potential of this autonomous community and the fact that slightly more than half of the rural lodgings in this autonomous community is located within a radius of 3 km of pastureland [48].

According to [60], the effort of agricultural producers to develop these types of activities is high, but if they intend to offer a specialized tourism such as this they need to update their offer of activities, consider the advice of tourists, and adapt their infrastructure to the standardized requirements of tourists. These actions need institutional support so that they can be carried out, and so that the local population is educated about the meaning of these types of initiatives; furthermore, it would ensure that the competent administration is shown as an ally and not as an enemy (bureaucratic simplification and common sense in many cases are not abundant in these cases) [31,32,36].

It is also essential to have a close relationship between administrations in areas directly related to agritourism. This is the case, for example, of administrations related to tourism and the environment, where the limitations to safeguard a given natural environment can be a barrier to install a certain infrastructure that favors, for example, access to agritourism lodging. The search for an intermediate solution that favors the objectives of both administrations would be ideal to promote the development of agritourism activities linked to the dehesa and to attract a greater volume of tourists specialized in this area [58,59].

Finally, it is necessary to make the owners of these dehesa farms aware of the need to update in areas such as digital technology or to include mechanisms that optimize resources (such as the use of water for food or drink for livestock), mechanize some harvesting techniques, and adapt the facilities to the requirements of tourists for this type of activity [86].

Some of the future research proposed after the results obtained in this work are related to the need to concretely identify the potentialities and weaknesses found by the managers of the existing rural lodging offer in Extremadura, in order to propose actions to mitigate them, while increasing the degree of knowledge about agritourism and its possibilities in the environment of the Extremadura dehesa.

5. Conclusions

Following the results obtained, the following conclusions are listed below:

- The implementation of agritourism activities linked to the Extremadura dehesa is feasible and has a high potential for development, given the unique landscapes, the agricultural and livestock uses and exploitations carried out, their cultural links with the local community, and the numerous nearby rural environments and heritage associated with their activities. In addition, the socioeconomic benefits of implementing this type of initiative in rural environments (some of them with problems of depopulation and population aging) are high, with the most outstanding benefits including increases in employment, especially among the young population and the family environment; the diversification of economic activities (both agro-livestock and tourism); and the preservation of traditional trades and customs linked to the tasks of the pasture;
- The sectors that stand out as the most influential in the implementation of agritourism activities in Extremadura's dehesa are first of all those referred to in Level 1 of the value chain, that is, those linked to the territory, such as the existence of dehesa in which a diversity of agro–silvo–pastoral uses and exploitations coexist in a semi-natural space that is already attractive in itself. Economic activities such as the production of meat and cheeses with D.O. in Extremadura and its part of the transformation chain are some of the most outstanding sectors. However, agritourism activities linked to accommodation, recreation, and active visits to the pastures have great potential (although it is hardly exploited in Extremadura). Other very influential sectors for the development of agritourism activities are those linked to the commercialization of agritourism (despite being part of Level 3 of the chain), given the existence of a whole network of restaurants and tourist lodgings with dehesas in their immediate surroundings, which could consider this initiative as an alternative to rural tourism, which is so overcrowded in some areas of Extremadura;
- The relationship between agritourism and the agro-livestock activities in the dehesa is currently very scarce in Extremadura, although if the owners of the dehesas directly or in collaboration with rural lodging businessmen were to bet on it, it could be very close and productive, according to the works reviewed. The forms of agritourism related to the native gastronomy linked to the dehesa, or visits to the semi-natural environment linked to it are a small sample of the relationships that could be developed and their possibilities. In addition, the growing demand for this type of tourism and the authenticity of the offer related to the use of this pastureland system in an autonomous community such as Extremadura (one of the two European regions with the largest pastureland surface area), make this a relationship of high potential value [23]. Another very interesting relationship is the possibility of direct contact between tourists and dehesa producers. In this sense, this tourist offer provides an opportunity to learn about unique ways of life and uses that cannot be seen in other parts of Europe. The extraction of cork or charcoal, the construction of infrastructures such as plot boundaries with dry stone, and even the way in which the soil resource is used in a sustainable way and what this entails (food for livestock, sowing interspersed with rest areas, environmentally friendly tools, etc.), not to mention information and intangible

culture linked to traditions, temporal changes, festivals, songs and dances associated with certain tasks and periods of time closely linked to agriculture or livestock, etc., are some of these examples;

- As for the main problems identified that may be faced by those entrepreneurs who intend to open an agritourism business linked to the exploitation of the Extremadura dehesa, there is a need to raise awareness and train the native farmers of the Extremadura dehesa on the benefits of agritourism as a complement to their income and an alternative to ensure the survival of an exploitation that otherwise would be difficult to maintain. Another problem to consider is the fact that the local businessmen linked to the dehesa must ensure minimum standards of quality and uniformity in order to satisfy the demand for this type of tourism, and to try to include himself in the value chain to offer his products and services to a local clientele (in addition to the tourists themselves) [90]. The need to inform the local community about agritourism in the dehesa is very important, so that they feel able to identify with this economic approach and can transmit it and participate in establishing a brand image for the territory with these characteristics that is identifiable by the potential tourist demand, and this is another important current weak point. Furthermore, being included in appropriate digital marketing portals and increasing the average stay of in the accommodation provided through proper planning of the activities to be carried out [58,65] would significantly increase the socioeconomic benefits for this community. Finally, the administration should encourage and facilitate, as far as possible, that this type of initiative, which is linked to such a unique and important area as the dehesa, is carried out in the simplest possible way, avoiding obstacles and misunderstandings in the regulations and tourist typification, among other issues.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/agriculture13112078/s1, Figure S1: Global value chain of agritourism in Extremaduran dehesa land use. Source: own elaboration based on the research works of [44,68].

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References

1. Ministry of Agriculture, Fisheries and Food, MAPA. Common Agricultural Policy (CAP) and Strategic Plan. Available online: https://www.mapa.gob.es/es/pac/pac-2023-2027/subgrupo-de-trabajo-objetivo-1.aspx (accessed on 3 June 2023).
2. Ministry of Territorial Policy and Public Function, MPTFP. General Guidelines of the National Strategy against the Demographic Challenge. Government Commissioner for the Demographic Challenge. Available online: https://mpt.gob.es/portal/reto_demografico/Estrategia_Nacional.html (accessed on 20 June 2023).

3. Ministry for Ecological Transition and the Demographic Challenge, MITERD. Recovery Plan. 130 Measures Against the Demographic Challenge. Available online: https://www.miteco.gob.es/es/reto-demografico/temas/medidas-reto-demografico/ (accessed on 5 June 2023).
4. Alamá-Sabater, L.; Budí, V.; García-Álvarez-Coque, J.M.; Roig-Tierno, N.D. Using mixed research approaches to understand rural depopulation. *Agric. Econ. Nat. Resour.* **2019**, *19*, 99–120. [CrossRef]
5. Molina, I. The national strategy against the Demographic Challenge and the Spanish Government Commissioner in charge of its elaboration. *Urban Plan. Pract.* **2020**, *162*, 3.
6. Southern Sparsely Populated Areas, SSPA. Position Paper: Southern Sparsely Populated Areas Network (SSPA). Available online: http://sspa-network.eu/wp-content/uploads/DOCUMENTO-DE-POSICION_espa%C3%B1a_email.pdf (accessed on 15 May 2023).
7. Bandrés, E.; Azón, V. *La Despoblación de la España Interior*, 1st ed.; Funcas: Madrid, Spain, 2021. Available online: https://www.funcas.es/wp-content/uploads/2021/02/La-despoblacion-de-la-Espa%C3%B1a-interior.pdf (accessed on 5 June 2023).
8. Giménez-Nadal, J.I.; Molina, J.A.; Velilla, J. Commuting and self-employment in Western Europe. *J. Transp. Geogr.* **2020**, *88*, 102856. [CrossRef]
9. Leco, F.; Mateos, A.B. Protected natural areas, demographic challenge and tourism. The example of the Monfragüe Biosphere Reserve and National Park (Extremadura, Spain). *Cuad. Tur.* **2021**, *48*, 369–400. [CrossRef]
10. Regional Government of Extremadura. Strategy for the Demographic and Territorial Challenge of Extremadura. Regional Ministry of Agriculture, Rural Development, Population and Territory. Available online: https://www.juntaex.es/w/estrategia-rdt-ex-2022 (accessed on 15 June 2023).
11. National Institute of Statistics, INE. Censo Agrario. Available online: https://www.ine.es/ (accessed on 5 June 2023).
12. Soler-Vayá, F. and San-Martí, E. Impact of the Leader methodology on rural tourism. A quantitative analysis proposal. *Investig. Turísticas* **2023**, *25*, 250–271. [CrossRef]
13. Jordá, P.; Monzón, A. Explanatory variables of short distance mobility in Spain. In Proceedings of the Actas del IX Congreso de Ingeniería del Transporte, CIT 2010, Madrid, Spain, 7–9 July 2010.
14. Saco, A. Rural development and depopulation in Galicia: Scenarios and future developments. *AGER* **2010**, *9*, 11–30.
15. Nieto, A.; Ríos, N. Rural tourism as a development strategy in low-density areas: Case study in northern Extremadura (Spain). *Sustainability* **2021**, *13*, 239. [CrossRef]
16. National Institute of Statistics, INE. Satellite Account of Tourism in Spain 2021. Available online: https://www.ine.es/ (accessed on 5 June 2023).
17. Jurado-Almonte, J.M.; Pazos-García, F. Population and rural tourism in low population density territories in Spain. *BAGE* **2016**, *71*, 247–272. [CrossRef]
18. Nieto, A.; Cárdenas, G. 25 years of European policies in Extremadura: Rural tourism and Leader method. *Cuad. Tur.* **2017**, *39*, 389–416. [CrossRef]
19. Rengifo, J.I.; Sánchez, J.M. Basic concepts of tourism. Approach to the recent evolution of tourism policies in Extremadura. In *Recursos Turísticos Territorio y Sociedad en Extremadura: Catalogación, Nuevos Usos y Perspectivas*, 1st ed.; Cambero, A., Díaz, Y., Fernández, M., Sánchez-Oro, J.E., López, Eds.; Servicio de Publicaciones Universidad de Extremadura: Cáceres, Spain, 2021; pp. 17–42.
20. Nieto, C.; Cantarero, F.J.; Sayago, P.E. 30 years of Leader in Andalusia. Diversification, rural tourism and smart growth. *Investig. Geogr.* **2022**, *78*, 239–258. [CrossRef]
21. Ivars, J.A. Tourism and rural spaces: Concepts, philosophies and realities. *Investig. Geogr.* **2000**, *23*, 59–88. [CrossRef]
22. Plaza, J.I. El turismo rural en territorios periféricos (el ejemplo de algunas comarcas del oeste castellano-leonés). *Investig. Geogr.* **2002**, *27*, 83–106. [CrossRef]
23. Ferreiras, R.D.I.; Sánchez, J.M. Agriculture as a tourism product in rural areas: An open debate in the literature. *Tour. Res.* **2020**, *20*, 97–123. [CrossRef]
24. Montiel, C. Inland tourism in the socioeconomic development of the forest regions of the Valencian Community. *Investig. Geogr.* **2003**, *31*, 15–36. [CrossRef]
25. Muñoz, D. An approach to rural tourism in Spain. *Terra* **2015**, *31*, 39–54.
26. Shen, C.C.; Wang, D.; Loverio, J.P. Influence of consumer landscape on place attachment in agritourism-The case of Huatung, Taiwan. *Agriculture* **2022**, *12*, 1557. [CrossRef]
27. Council of the European Union, CEE. Regulation No. 1305/2013 of the European Parliament and of the Council of 17 December 2013, on Support for Rural Development by the European Agricultural Fund for Rural Development (EAFRD) and Repealing Council Regulation (EC) No 1698/2005. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1305 (accessed on 16 June 2023).
28. Brandth, B. Farmers framing fatherhood: Everyday life and rural change. *Agric. Hum. Values* **2019**, *36*, 49–59. [CrossRef]
29. De Montis, A.; Ledda, A.; Serra, V.; Noce, M.; Barra, M.; De Montis, S. A method for analysing and planning rural built-up landscapes: The case of Sardinia, Italy. *Land Use Policy* **2017**, *62*, 113–131. [CrossRef]
30. Haig, N. Agritourism: A window on the rural world. *Sustainability* **2006**, *76*, 40–45.
31. Juárez, J.P.; Ramírez, B.; Galindo, M.G. Rural tourism and territorial development in indigenous areas of Mexico. *Investig. Geogr.* **2010**, *48*, 189–208. [CrossRef]

32. Pérez-Olmos, K.N.; Aguilar-Rivera, N. Agrotourism and sustainable local development in Mexico: A systematic review. *Environ. Dev. Sustain.* **2021**, *23*, 17180–17200. [CrossRef]
33. Ferreiras, R.D.I.; Sánchez, J.M. O olival as an opportunity for tourism in the Tejo Internacional Natural Park. *Finisterra* **2021**, *LVI*, 55–80. [CrossRef]
34. Streifeneder, T. Agriculture first: Assessing European policies and scientific typologies to define authentic agritourism and differentiate it from countryside tourism. *Tour. Manag. Perspect.* **2016**, *20*, 251–264. [CrossRef]
35. Ferreiras, R.D.I.; Sánchez, J.M. Shedding light on agritourism in Iberian cross-border regions from a lodgings perspective. *Land* **2022**, *11*, 1857. [CrossRef]
36. Pedreira, B.C.C.G.; Fidalgo, E.C.C. Comparative study on the potential of agritourism in two Brazilian municipalities. *Investig. Geogr.* **2017**, *68*, 133–149. [CrossRef]
37. Quella, L.; Chase, L.; Conner, D.; Reynolds, T.W.; Schmidt, C. Perceived success in agritourism: Results from a study of US agritourism operators. *J. Rural. Community Dev.* **2023**, *18*, 140–158.
38. Streifeneder, T.; Dax, T. Agritourism in Europe: Enabling Factors and Current Developments of Sustainable On- Farm Tourism in Rural Areas. In *Global Opportunities and Challenges for Rural and Mountain Tourism*; Kala, D., Bagri, S.C., Eds.; IGI Global: Hershey, PA, USA, 2020; pp. 40–58. [CrossRef]
39. National Institute of Statistics, INE. Padrón Continuous Statistics. Available online: https://www.ine.es/ (accessed on 5 June 2023).
40. Gurría-Gascón, J.L.; Nieto-Masot, A.; Hernández-Carretero, A. Las rentas agrarias y rurales en Extremadura. *Geographicalia* **2011**, *59*, 151–164. [CrossRef]
41. Guadarrama, L.; Palmas, Y.; Herrera, F.; Thomé, H.G. D Can tourism help the valorization of the typical dulce de leche in Toluca, State of Mexico? Analysis through the value chain. *Tur. Soc.* **2019**, *XXIV*, 161–179. [CrossRef]
42. Maher, A.; Mahrous, T. Determining the critical factors of the tourism value chain: An importance-performance analysis. *J. Assoc. Arab. Univ. Tour. Hosp.* **2014**, *11*, 137–152. [CrossRef]
43. Rico, E.; Jiménez, A.; Moltó, E.; Romero, A.; Martí, J.; Hernández, M. Cadena de valor del turismo gastronómico en la Comunidad Valenciana. In *Geografía, Cambio Global y Sostenibilidad. XXVII Congreso de la Asociación Española de Geografía, AGE*; García, J.L., Ed.; AGE: Tenerife, Spain, 2021; pp. 1.011–1.023.
44. Jiménez-Rodríguez, A.; Rico-Cánovas, E.; Moltó-Mantero, E. Analysis of the gastronomic tourism value chain and its relationships from a territorial approach: Criteria of functionality and hierarchy. *BAGE* **2023**, *97*, 3353. [CrossRef]
45. Thompson, M.; Prideaux, B.; Mcshane, C.; Dale, A.; Turnour, J.; Atkinson, M. Tourism development in agricultural landscapes: The case of the Atherton Tablelands, Australia. *Landsc. Res.* **2016**, *41*, 730–743. [CrossRef]
46. Wanner, A.; Pröbstl-Haider, U.; Feilhammer, M. The future of Alpine pastures—Agricultural or tourism development? Experiences from the German Alps. *J. Outdoor Recreat. Tour.* **2021**, *35*, 100405. [CrossRef]
47. Chiodo, E.; Fantini, A.; Dickes, L.; Arogundade, T.; Lamie, R.D.; Assing, L.; Stewart, C.; Salvatore, R. Agritourism in mountainous regions—Insights from an international perspective. *Sustainability* **2019**, *11*, 3715. [CrossRef]
48. Sánchez-Martín, J.M.; Blas-Morato, R.; Rengifo-Gallego, J.I. The dehesas of Extremadura, Spain: A potential for socio-economic development based on agritourism activities. *Forests* **2019**, *10*, 620. [CrossRef]
49. Ferraz-de-Oliveira, M.I.; Azeda, C.; Pinto-Correia, T. Management of montados and dehesas for high nature value: An interdisciplinary pathway. *Agrofor. Syst.* **2016**, *90*, 1–6. [CrossRef]
50. Bertolozzi, D. Resilience of Extensive Sheep Farming Systems in Spain: Strategies and Policy Assessment. Doctoral Thesis, Polytechnic University of Madrid, Madrid, Spain, 2021.
51. Department for Ecological Transition and Sustainability, Regional Government of Extremadura. Nature Conservation and Protected Areas. Available online: http://extremambiente.juntaex.es/index.php?option=com_content&view=article&id=622&Itemid=398 (accessed on 20 June 2023).
52. Pulido, F.; Picardo, A. *Libro Verde de la Dehesa*, 1st ed.; Junta Castilla y León, SEO: Valladolid, Spain, 2010; pp. 1–46.
53. Official Spanish Gazette, BOE. Ley 1/1986, de 2 de Mayo, Sobre la Dehesa en Extremadura. Available online: https://www.boe.es/buscar/pdf/1986/BOE-A-1986-19748-consolidado.pdf (accessed on 16 June 2023).
54. Hotelano, L.A.; Martín, M.I.; Izquierdo, J.I. Tourism potential of the Iberian pig in Salamanca: Territorial heritage and immaterial culture. *Pasos* **2022**, *20*, 503–518. [CrossRef]
55. Council of the European Communities, CEE. Directiva 92/43/CEE del Consejo, de 21 de Mayo de 1992, Relativa a la Conservación de los Hábitats Naturales y de la Fauna y Flora Silvestres. Available online: https://www.boe.es/buscar/doc.php?id=DOUE-L-1992-81200 (accessed on 16 June 2023).
56. Sánchez-Fernández, P.; Díaz-Gaona, C.; Rodríguez-Estévez, V.; La Dehesa Ante la Nueva PAC. Repositorio de Archivos IAG, Universidad de Extremadura. Available online: https://www.unex.es/conoce-la-uex/centros/eia/archivos/iag/2018/2018-06-la-dehesa-ante-la-nueva-pac.pdf (accessed on 16 June 2023).
57. González-Romero, G.; Silva-Pérez, R.; Cánovas-García, F. A Territorialised agrifood systems and sustainability: Methodological approach on the Spanish state scale. *Sustainability* **2022**, *14*, 11900. [CrossRef]
58. Ferreiras, R.D.I.; Sánchez, J.M. Agricultural landscapes as a basis for promoting agritourism in cross-border Iberian regions. *Agriculture* **2022**, *12*, 716. [CrossRef]
59. Ferreiras, R.D.I.; Sánchez, J.M. Assessment of the tourism potential of the Tagus International Nature Reserve landscapes using methods based on the opinion of the demand. *Land* **2022**, *11*, 68. [CrossRef]

60. Barbieri, C.; Xu, S.; Gil-Arroyo, C.; Rozier, S. Agritourism, farm visit, or…? A branding assessment for recreation on farms. *J. Travel Res.* **2016**, *55*, 1094–1108. [CrossRef]
61. Martín-Delgado, L.M.; Jiménez-Barrado, V.; Sánchez-Martín, J.M. Sustainable hunting as a tourism product in dehesa areas in Extremadura (Spain). *Sustainability* **2022**, *14*, 10288. [CrossRef]
62. LaPan, C.; Barbieri, C. The role of agritourism in heritage preservation. *Curr. Issues Tour.* **2014**, *17*, 666–673. [CrossRef]
63. Carrillo-Hidalgo, I.; Casado-Montilla, J.; Pulido-Fernández, J.I. Sustainable development of olive oil tourism: An analysis of collaboration among actors. *Rev. Cienc. Soc.* **2021**, *XXVII*, 19–38.
64. Martín-Delgado, L.M.; Sánchez-Martín, J.M.; Rengifo-Gallego, J.I. An analysis of online reputation indicators by means of geostatistical techniques-The case of rural accommodation in Extremadura, Spain. *Int. J. Geo-Inf.* **2020**, *9*, 208. [CrossRef]
65. Di-Clemente, E.; Hernández-Mogollón, J.M.; López-Guzmán, T. Culinary tourism as an effective strategy for a profitable cooperation between agriculture and tourism. *Soc. Sci.* **2020**, *9*, 25. [CrossRef]
66. Dos Reis-Lopes, C.M.; Rengifo-Gallego, J.I.; Correia-Leitão, J.C. The importance of quality products for tourism promotion in Spain and Portugal. *BAGE* **2021**, *89*, 3020. [CrossRef]
67. Giaccio, V.; Giannelli, A.; Mastronardi, L. Explaining determinants of Agri-tourism income: Evidence from Italy. *Tour. Rev.* **2018**, *73*, 216–229. [CrossRef]
68. Flores-Barrera, A.; Gabriel, D.; Ríos-Elorza, S. Agro-tourism as a diversification strategy for the amaranth agro-food chain in Natívitas (Tlaxcala, Mexico). *Tour. Soc.* **2021**, *28*, 23–37.
69. Corazonex. Guide to Designations of Origin of Extremadura. Available online: https://www.corazonex.es/denominacion-de-origen-extremadura/ (accessed on 3 June 2023).
70. Ministry of Agriculture, Fisheries and Food, MAPA. Differentiated Quality. Available online: https://www.mapa.gob.es/es/alimentacion/temas/calidad-diferenciada/#:~:text=Los%20productos%20de%20de%20Denominaci%20C3%B3n%20de,la%20que%20toman%20el%20el%20nombre (accessed on 3 June 2023).
71. Tourism Observatory of Extremadura. Annual Study of the Evolution of the Main Tourism Indicators in Extremadura in 2022. Available online: https://www.turismoextremadura.com/.content/observatorio/2023/EstudiosYMemoriasAnuales/Evolucion_indicadores_2022.pdf (accessed on 20 June 2023).
72. Gil-Arroyo, C.; Barbieri, C.; Rozier-Rich, S. Defining agritourism: A comparative study of stakeholders' perceptions in Missouri and North Carolina. *Tour. Manag.* **2013**, *37*, 39–47. [CrossRef]
73. Bhatta, K.; Ohe, Y.; Ciani, A. Which human resources are important for turning agritourism potential into reality? SWOT analysis in rural Nepal. *Agriculture* **2020**, *10*, 197. [CrossRef]
74. Anderson, W. Linkages between tourism and agriculture for inclusive development in Tanzania. A value chain perspective. *J. Hosp. Tour. Insights* **2018**, *1*, 168–184. [CrossRef]
75. Evgrafova, L.V.; Ismailova, A.Z. Analysis of tourist potential for agrotourism development in the Kostroma region. *IOP Conf. Ser. Earth Environ. Sci.* **2021**, *677*, 022047. [CrossRef]
76. Evgrafova, L.V.; Ismailova, A.Z.; Kalinichev, V.L. Agrotourism as a factor of sustainable rural development. *IOP Conf. Ser. Earth Environ. Sci.* **2020**, *421*, 022058. [CrossRef]
77. C'iric', M.; Tešanovic', D.; Kalenjuk Pivarski, B.; C'iric', I.; Banjac, M.; Radivojevi'c, G.; Grubor, B.; Toši'c, P.; Simovi'c, O.; Šmugovi'c, S. An analyses of the attitudes of agricultural holdings on the development of agritourism and the impacts on the economy, society and environment of Serbia. *Sustainability* **2021**, *13*, 13729. [CrossRef]
78. Dewanti, T.Y.; Susiloningtyas, D.; Supriatna. Spatial pattern of agrotourism development areas in Bandung Barat District. *IOP Conf. Ser. Earth Environ. Sci.* **2019**, *355*, 012055. [CrossRef]
79. Zhong, Y.P.; Tang, L.R.; Li, Y. Role of digital empowerment in developing farmers' green production by agro-tourism integration in Xichong, Sichuan. *Agriculture* **2022**, *12*, 1761. [CrossRef]
80. Morales-Zamorano, L.A.; Camacho-García, A.L.; Bustamante-Valenzuela, A.C.; Cuevas-Merecías, I.; Suárez-Hernández, A.M. Value chain for agritourism products. *Open Agric.* **2020**, *5*, 768–777. [CrossRef]
81. Evgrafova, L.V. Multiplicative contribution of agricultural tourism to the sustainable development of Russia. *IOP Conf. Ser. Earth Environ. Sci.* **2021**, *677*, 022041. [CrossRef]
82. Bakhmatova, G. Development prospect of agro-tourism and positive effects of tourism activities in rural regions. *E3S Web Conf.* **2021**, *273*, 09001. [CrossRef]
83. Djuwendah, E.; Karyani, T.; Wulandari, E. Potential development strategy for attraction and community-based agrotourism in Lebakmuncang village. *E3S Web Conf.* **2021**, *249*, 01004. [CrossRef]
84. Pelegrín-Entenza, N.; Vázquez-Pérez, A.; Pelegrín-Naranjo, A. Rural agrotourism development strategies in less favored areas: The case of Hacienda Guachinango de Trinidad. *Agriculture* **2022**, *12*, 1047. [CrossRef]
85. Ciolac, R.; Iancu, T.; Brad, I.; Popescu, G.; Marin, D.; Adamov, T. Agritourism activity-A "smart chance" for mountain rural environment's sustainability. *Sustainability* **2020**, *12*, 6237. [CrossRef]
86. Arru, B.; Furesi, R.; Madau, F.A.; Pulina, P. Recreational services provision and farm diversification: A technical efficiency analysis on Italian agritourism. *Agriculture* **2019**, *9*, 9020042. [CrossRef]
87. Méndez-Quintero, J.D.; Salles-Bachi, L.M.G.; Carvalho-Ribeiro, S.M.; Nero, M.A. Use of landscape metrics to identify agrotourism activities: Case study San Bernardo del Viento, Colombia. *J. Tour. Dev.* **2022**, *39*, 375–387. [CrossRef]
88. Barbieri, C. Agritourism research: A perspective article. *Tour. Rev.* **2020**, *75*, 149–152. [CrossRef]

89. Arru, B.; Furesi, R.; Madau, F.B.; Pulina, P. Economic performance of agritourism: An analysis of farms located in a less favoured area in Italy. *Agric. Food Econ.* **2021**, *9*, 27. [CrossRef]
90. Pérez, A.; Rengifo, J.I.; Leco, F. Agrotourism: A complement for the battered economy of the dehesa. In Proceedings of the Actas del VI Jornadas de Investigación en Turismo, Sevilla, Spain, 3–4 July 2013.

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Using the RPM Model to Explore the Impact of Organic Agritourism Destination Fascination on Loyalty—The Mediating Roles of Place Attachment and Pro-Environmental Behavior

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Abstract: Maintaining the sustainable development of fascinating resources in Taiwan's Hualien and Taitung (Huatung) regions is the basis of organic agritourism. Loyalty not only represents tourists' commitment to return and recommend but also serves as a goal for destination development. The purpose of this study is to propose and examine the effect of destination fascination on loyalty through a conceptualized Reasonable Person Model (RPM), mediated by place attachment and pro-environmental behaviors. SPSS21 and the linear structure relationship model (LISREL) were used as data analysis tools in this study. A total of 500 valid online questionnaires were collected through snowballing and convenience sampling. The data analysis results revealed that destination fascination has a positive and significant impact on loyalty through place attachment and pro-environmental behavior. Another finding is that place dependence, place identity, and pro-environmental behavior all have mediating effects, with place identity being the main mediating variable. The contributions of this study are mainly reflected in examining the application of RPM in fascination and loyalty, as well as providing practical suggestions for destination fascination and place identity.

Keywords: fascination; destination; place attachment; pro-environmental behavior; reasonable person model (RPM)

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1. Introduction

Fascination is extensively employed in destination marketing, as exemplified by initiatives such as 'Fascination Taiwan' and the promotion of the Hualien and Taitung (Huatung) regions, which are frequently showcased on government tourism websites. This highlights the importance of destination fascination in tourism destination marketing. Therefore, shaping the unique destination fascination to attract tourists becomes crucial for enhancing competitiveness in the tourism market [1].

Taiwan's Huatung regions are known as Taiwan's "backyard" or "last piece of pure land", where the coast, mountains, forests, and valleys all maintain their natural integrity [2]. The region's unique fascination arises from its rich ecological resources, a long history of agricultural culture, and the simplicity and kindness of the local people, all of which combine to create a distinctive allure. The development of tourism infrastructure and activities within the area is largely dependent on harnessing its natural resources, particularly in the realm of ecotourism or nature-based tourism [3]. Rural tourism in Taiwan's Huatung regions is characterized by low density, minimal pollution, vast fields, smaller scale, and a healing environment, making it highly appealing to tourists and driving the growth of rural tourism destinations [4]. Consequently, ensuring the sustainable development of the region's fascinating resources becomes a crucial concern for organic agritourism.

When tourists perceive a destination's image as consistent with their positive experiences, it leads to a high level of satisfaction. This satisfaction, in turn, contributes to their

intention to revisit or recommend the destination [5]. This phenomenon is indicative of tourists' loyalty to the destination [6,7]. Loyalty revolves around a favorable attitude toward the destination, signifying the dedication of tourists to the intention of revisiting [8,9]. Hence, loyalty plays a pivotal role in supporting the development of a destination.

While crafting a distinctive destination image is acknowledged as an effective strategy for enhancing tourist loyalty [5], organic agritourism places a paramount emphasis on the sustainable rural landscape environment as the central component of the tourist experience [10]. This emphasis goes beyond mere superficial fascination with destination resources [11]. Organic agritourism serves a dual purpose: it fosters rural tourism while concurrently safeguarding environmental landscapes and bolstering the sustainability of the ecological environment [12,13]. This underscores the pivotal role of pro-environmental behaviors in advancing sustainable development within organic agritourism. Furthermore, this highlights the necessity of nurturing tourists' responsible awareness and actions toward the environment, building upon the foundation of existing destination fascination resources. This cultivation of awareness and responsible behavior can, in turn, foster pro-environmental behaviors within organic agritourism destinations [14].

The destination environment can establish emotional connections with tourists, thereby increasing tourists' place attachment to the destination [15–18]. When a location possesses distinct social values or resources that can support and fulfill individual needs and goals [19], it engenders a unique emotional connection, referred to as place attachment [20]. Developing an attachment to a place not only stimulates pro-environmental behaviors aimed at preserving the place [21,22] but also cultivates loyalty toward that place [18,23]. This underscores that place attachment stands as a pivotal prerequisite for tourists' pro-environmental behaviors and loyalty toward the destination.

In summary of the discussions above, place attachment could act as an intermediary in the relationship between tourists and captivating environments, potentially mediating pro-environmental behaviors and loyalty. Moreover, this accentuates how tourists develop meaningful loyalty towards the destination under the influence of this mechanism. In response to the above research motivations and gaps, the objective of this study is to integrate the Reasonable Person Model (RPM) framework to comprehend how the allure of a given destination influences effectiveness and meaningful actions in subsequent stages [24]. The RPM, rooted in environmental psychology, posits that as people's information needs are met, their behavior tends to become more rational [14,24–27].

To gain a comprehensive understanding of tourists' pro-environmental behaviors and loyalty towards the Huatung regions, this study incorporates destination fascination and place attachment into the RPM framework to establish a research model. Drawing upon a review of the literature [1,14,24–27], fascination is measured based on six factors: mystique, richness, attractiveness, uniqueness, fitness, and friendliness. Place dependence and place identity are utilized to measure the two aspects of place attachment. Hence, this model encompasses three stages: model building, being effective, and meaningful action. In this study, these three stages are conceptualized as: (1) model building: the destination fascination resource; (2) being effective: tourists' place attachment and pro-environmental behavior towards the Huatung organic agricultural region; (3) meaningful action: tourists' loyalty to the region. The research uses two sampling techniques: convenience sampling and snowball sampling. Data collection was conducted through online surveys, mainly distributed among the tourism community of the Huatung regions through platforms like Facebook and Line.

Next, the study formulates four hypotheses and utilizes SPSS 21 and the Linear Structure Relationship Model (LISREL) for analysis. Through scholarly research findings, this study strives to gain a profound insight into the advantages brought about by destination fascination and its influence on tourist behavior. Furthermore, it offers practical value for fostering the sustainable development of destination environments and interests.

2. Literature Review

2.1. Reasonable Person Model (RPM)

The Reasonable Person Model (RPM) seeks to establish connections between environmental factors and human behavior, exploring elements that fulfill information needs and considering factors that lead to more rational actions. When individuals find themselves in environments that satisfy their fundamental information needs, they tend to exhibit greater rationality, helpfulness, and willingness to collaborate [25,26]. This model aggregates a series of human information needs into three main stages to better understand their independent and mutually influencing effects. 1. Model building: People absorb information from the environment and gain feeling. When people's information needs are met, their behavior will be more rational [24]. 2. Being effective: Individuals process and manage stored information about their environment, which has the potential to empower them with skills and abilities to take action and solve problems, enhancing their self-confidence and awareness [24]. 3. Meaningful action: People believe they can make a difference by getting involved; if people think they can take some useful action, they are more likely to feel hopeful and work toward their goals [24,25]. Wang, Liu, Huang, and Chen [18] conducted a study involving tourists from national parks, forest recycling areas, and theme parks, and constructed an RPM model for their destination fascination. This study validated the positive impact of destination, subjective well-being, and destination attachment on loyalty.

Organic agricultural tourism provides tourists with information on environmental sustainability, including aspects such as organic, non-toxic, healthy living, and environmental friendliness. This helps tourists understand the importance of a healthy environment and sustainable environmental development, stimulating their recognition and attachment to the place and subsequently encouraging pro-environmental behavior [10]. Likewise, tourists will strengthen their loyalty to destinations focused on organic farming, fulfilling their desire for eco-friendliness. Therefore, this study adopts destination fascination (model building), place attachment and pro-environmental behavior (being effective), and loyalty (meaningful action) to construct an organic agriculture tourism RPM to explore the loyalty of fascinated organic agriculture tourists.

2.2. Destination Fascination

Fascination arises from involuntary attention and restores attention through the natural environment, which is an important component of attention restoration theory [28]. Kaplan [28] believed that environmental fascination refers to people's freedom to pursue their interests, explore details in the environment, and customize the meaning of the environment within their surroundings. Hence, individuals can experience a fascinating environment, with this fascination stemming from their interaction with various elements of the environment.

Consistent findings from previous studies indicate that destinations should provide tourists with a fascinating environment that allows them to experience the environment and explore themselves freely and independently, allowing the body and mind to separate from daily life and achieve effective psychological recovery [1,18,27,29]. Therefore, in studies concerning rural tourism as a destination, the Attention Restoration Theory (ART) is commonly employed as the foundational framework. Previous research has not only highlighted the significance of agritourism for individual physical and mental well-being but has also increasingly focused on issues related to the sustainable development of rural tourism environments in recent years. In the study by Zheng et al. [22] on rural tourism as a destination, destination-specific fascination and tourist delight were identified as antecedent variables influencing tourists' pro-environmental behaviors. In the research conducted by Kucukergin and Gürlek [30], aspects like environmental consciousness, self-reflection, last-chance experiences, and fascination were examined to understand tourists' intention to recommend natural destinations. Zheng et al. [31] explored energy-saving behaviors and loyalty among tourists in rural tourism through examining destination image.

Despite identifying destination fascination or image as a crucial influencing factor in rural development issues, there remains a limited comprehensive explanation of the process connecting destination fascination to tourists' pro-environmental behaviors and loyalty. Therefore, in order to better address the research objectives mentioned earlier, this study will consider "fascination destination" as a predictor variable and examine its impact on place attachment, environmental perceptions, and loyalty.

2.3. Place Attachment

Place attachment refers to an individual's emotional connection to a place [32,33]. In prior studies, place attachment was applied to destination attachment and defined as an individual's enduring reliance on the functional value of a place, along with their psychological recognition and connection to that place [16,33–35]. Despite the confirmation of emotional attachment as a precursor to tourist loyalty in the study by Zheng et al. [36], this research primarily employs fascination within the Huatung regions as the influencing factor for tourists' pro-environmental behaviors and loyalty towards organic agritourism. Therefore, place attachment is used as the influencing variable in this study.

Place dependence refers to the level of functionality associated with a particular functional place [37], in which a place offers support for a particular objective or necessary activity [33,38,39]. Place dependence refers to a profound emotional connection that decreases the inclination to utilize alternative places instead of this particular place [33,40].

Kyle and Chick [15] found that destination fascination enhances tourists' destination attachment by establishing a deep connection with the destination. The research results of Prayag and Ryan [16] and Veasna, Wu, and Huang [17] reported positive correlation between destination fascination and destination attachment. Wang, Liu, Huang, and Chen [18] believed that destination attachment is the emotional connection between tourists and the destination, and proposed that destination fascination enhanced tourists' attachment and loyalty to the destination. Kyle and Chick's [15] study demonstrated that destination fascination strengthens tourists' attachment to a destination by establishing a profound connection with it. It indicated a positive correlation between destination fascination and destination attachment. Wang, Liu, Huang, and Chen [18] stated that destination attachment represents the emotional bond between tourists and the destination, proposing that destination fascination enhances tourists' attachment and loyalty to the destination.

People tend to establish their emotional connection and sense of belonging to places in fascinating environments [41,42]. Prayag and Ryan [16] discovered in their study that destination imagery, such as cultural diversity, service levels, and exoticism in places, can influence place attachment. Liu, Wang, Huang, and Chen [1] proposed that the richness, friendliness, mystery, and uniqueness of destinations provide essential resources for activities, cater to the needs of tourists, stimulate individuals to explore and discover the potential of destinations, increase the challenge of substituting the destination, and ultimately foster connections and dependencies with it. Based on the above discussions, this study proposes the following hypothesis:

H_{1a}: *Destination fascination has a significant positive impact on place dependence*.

Place identity is defined as an individual's sense of identity through their thoughts, beliefs, feelings, values, and behavioral tendencies toward the environment [43], along with their emotional involvement in this place [33,44]. Research by Sirgy and Su [45] highlighted that place identity is the suitability of tourists' subjective establishment of destination image and self-realization, ideal and social, which will significantly affect tourists' choice of destination [46]. Stokburger-Sauer [47] pointed out that tourists' suitability for their destination enhances their identification with the place, stimulates their willingness to revisit, and sustains their long-term relationship with the destination. Therefore, this study proposes the following hypothesis:

H_{1b}: *Destination fascination has a significant positive impact on place identity*.

2.4. Pro-Environment Behavior

Environmentally friendly behavior is gaining increasing attention from scholars and practitioners in the tourism and hotel industries [22,48,49]. Encouraging pro-environmental behavior among tourists offers several benefits, including the enhancement of environmental sustainability management in destinations. Pro-environmental behavior refers to the actions taken by individuals or groups to mitigate negative environmental impacts [50,51]. People's perception and experience of the physiological and psychological benefits brought by the environment can affect their behavior and actions [38,52].

Place attachment refers to the interaction and connection with a specific place, serving as the emotional foundation for commitment, responsibility, and stewardship toward that place [53]. It intertwines social and environmental considerations and impacts individuals' willingness to safeguard meaningful locations [33,54]. Place attachment stands as a significant indicator of environmental conservation behavior [21,38,55,56]. The discussions above further support the research conclusion of Shen, Wang, and Loverio [21], indicating that place attachment refers to expressing concern for environmental preservation when people form place attachments.

Numerous studies have confirmed a strong positive relationship between place attachment and the intention of environmental behavior [57–59]. This conclusion also applies to different types of tourism, such as national forest park tourism [60] and organic agricultural tourism [10]. The degree of place dependence is determined by considerations for people's well-being, such as the level of support for people's participation in the environment and the ability to meet human needs (leisure, interests, goals). Place dependence can significantly influence personal development and happiness, so people seek ways to protect the places they rely on [61]. Halpenny [62] and Lee et al. [63] found that place dependence positively and significantly affects pro-environmental intentions; the same conclusion applies to Chow, Ma, Wong, Lam, and Cheung [57] and Uesugi and Kudo [58]. Based on the above discussion, this study proposes the following hypothesis:

H_{2a}: *Place dependence has a significant positive impact on pro-environmental behavior*.

When the potential loss or deterioration of a place poses a threat to human well-being [64,65], individuals' identification with that place creates a commitment to the environment. Previous studies have consistently shown a positive relationship between place identity and environmentally responsible behavior [33,57,63]. Building upon this premise, the current study posits that this conclusion applies to the present research context and, therefore, presents the following research hypothesis:

H_{2b}: *Place identity has a significant positive impact on pro-environmental behavior*.

2.5. Loyalty

Customer loyalty refers to the relative attitude and loyalty behavior of customers towards products, brands, services, or stores. Loyalty behavior encompasses motivation to search for relevant information, positive word-of-mouth, buybacks/revisits, and resistance to negative information [66]. In the study of tourist destination loyalty, tourists' intention to revisit the destination and their willingness to engage in word-of-mouth communication are often used to measure tourist loyalty [5,7].

A fascinating environment can easily capture tourists' attention [67]. Additionally, Um et al. [68] discovered that destination fascination is more likely to influence tourists' willingness to revisit compared to tourist satisfaction. The fascination associated with a destination is manifested in its capacity to offer tourists experiences that are not typically encountered in their daily lives. As a result, this fascination bears the capacity to influence destination loyalty [18] and intentions to revisit [69].

Wang et al. [70] found that abundant tourism resources enable tourists to enjoy various experiences, thereby stimulating their willingness to revisit. The richness of destinations is reflected in the abundance of natural and cultural resources, which not only enhances tourists' perception of the place but also maintains the competitiveness of the destination

through a strong willingness to revisit [71,72]. Liu, Wang, Huang, and Chen [1] argue that an intriguing destination possesses the capability to stimulate tourists to persist in exploring the destination's resources. Moreover, it serves as a wellspring of inspiration for diverse experiences, offering a form of fascination that aids tourists in temporarily escaping the pressures of daily life. Evidently, from the preceding discussion, it becomes evident that tourist destinations can amplify positive word-of-mouth and intentions to revisit by enriching their distinctive allure. Therefore, this study proposes the following hypothesis:

H_3: *Destination fascination has a significant positive impact on loyalty*.

Environmentally friendly behavior (PEB) is an increasingly valued tourism activity behavior [73], which is associated with individuals' beliefs, attitudes, values, environmental knowledge, and environmental awareness [74]. Social exchange theory can be used to explore the exchange relationship between destination social responsibility (DSR), PEB, and loyalty [75–77]. When tourists perceive that DSR activities contribute to society, they are more inclined to support initiatives aimed at the advancement of the destination's development [76]. This indicates that an actively engaged destination in DSR can strengthen tourists' willingness to visit [77].

Organic agricultural tourism plays an active role in realizing sustainable tourism development. To achieve this objective, it is crucial to highlight the close interrelation between destinations and tourists, as tourists' attitudes and evaluations of destinations are significantly shaped by the destination's social responsibility initiatives [78]. The research findings of Azinuddin, Hanafiah, Mior Shariffuddin, Kamarudin, and Mat Som [75] demonstrate that DSR will affect loyalty and PEB will influence loyalty through DSR. However, this study posits that PEB is an integral component of DSR and should have a direct impact on loyalty.

Previous research has discussed the relationship between the design of ecotourism availability and destination social responsibility on tourists' environmentally friendly behaviors and destination loyalty [73]. Other research has utilized protection motivation theory (PMT) to explain the emergence and implementation of pro-environmental behaviors (PEB) by small rural tourism enterprises (SRTE) [79]. Additionally, Shen, Wang, Loverio, Liu, and Wang [10] confirmed that in rural tourism studies, tourists' attachment to a place will influence their well-being through pro-environmental behaviors. Despite the growing attention to rural tourism research in recent years, it does not align with the objectives mentioned in this study. Therefore, based on a review and support from previous literature, the researchers propose the following hypothesis:

H_4: *Pro-environmental behavior has a significant positive impact on loyalty*.

3. Research Methodology

3.1. Research Site

Hualien and Taitung, located in eastern Taiwan, boast a favorable natural climate, picturesque pastoral landscapes, a leisurely and unhurried atmosphere, and distinctive customs. They embrace an organic and non-toxic agriculture, provide healthy and safe organic agricultural products, and take into account the sustainable development of the environment [80], aligning with the criteria for destination fascination. According to the official statistics, the regions receive more than 13.6 million visitors annually [81].

3.2. Measurement Development

This research takes the questionnaire survey as the primary data collection method. The survey questionnaire includes six parts: destination fascination (FAN), place dependent (PDE), place identity (PID), pro-environment behavior (PEB), loyalty (LOY), and demographic variables.

Destination fascination refers to the extent to which a destination provides tourists with the freedom to focus on their interests, delve into the destination's details, and personally define its significance [1]. This study refers to Liu, Wang, Huang, and Chen's [1]

six dimensions of destination fascination: mystique, richness, attractiveness, uniqueness, fitness, and friendliness.

Place attachment refers to the recognition and dependence of tourists on places related to organic agriculture tourism destinations. It is assessed based on two dimensions: place dependent (PDE) and place identity (PID) [21,82]. In the PDE scale, there are three items, namely: "Tourists' liking" (PDE1), "Tourists' thoughts" (PDE2), and "For the sake of environmental sustainability" (PDE3), which examine why tourists engage in organic agritourism. In the PID scale, there are four items, which are: "Identification with organic agritourism" (PID1), "Emotion" (PID2), "Environmental consciousness" (PID3), and "Understanding the importance of environmental protection" (PID4).

Pro-environmental behavior (PEB) refers to tourists actively participating in organic agriculture tourism activities, their willingness to share ideas and practices of organic agriculture environmental protection, and playing a more active role in environmental protection [10]. The PEB scale comprises four items, namely: "Participation in organic agritourism" (PEB1), "Purchase of products" (PEB2), "Sharing of environmental ideas" (PEB3), and "Taking positive actions" (PEB4).

In this study, loyalty (LOY) refers to tourists' intention to revisit the destination and their willingness to engage in word-of-mouth communication, which is often used to measure tourist loyalty [5,7]. This dimension includes individuals who enjoy organic tourism and product-related experiential activities, prefer purchasing organic agricultural products, and express a desire to engage in the rural life experience of organic agricultural tourism [10]. The LOY scale consists of four items, reflecting "Tourists' loyalty towards the organic agritourism environment" (LOY1), "Product purchase" (LOY2), "Participation in activities" (LOY3), and "Tourism" (LOY4).

Regarding the above variables, this study adopts a seven-point Likert scale, ranging from one (extremely disagree) to seven (extremely agree). Additionally, demographic variables encompass gender, marital status, age, education, occupation, place of residence, and income.

3.3. Research Design

To ensure an accurate target audience, participants are required to complete the screening questions before proceeding with the rest of the questionnaire. The screening questions are as follows: (1). Are you over 20 years old? (2). Have you ever visited the Huatung regions of Taiwan for organic agricultural tourism? (3). Are you willing to voluntarily fill out this questionnaire and grant permission for the use of its content for academic publication? In summary, during the questionnaire design phase, researchers follow the principle of simplifying questions and wording to prevent respondent fatigue.

This study employed two methods for data collection. Firstly, a convenience sampling approach was employed to select tourists who have traveled to the Huatung regions through social media platforms such as Facebook and Line communities. Secondly, a snowball sampling method was used where tourists who have visited the Huatung regions were asked to fill out a questionnaire and help identify other eligible participants within their social circles who had also filled out the survey, completing the snowball sampling process. For valid questionnaires, the researchers conduct a lottery activity (invalid questionnaires will be automatically invalidated). Each participant could only respond once per provided link. A total of 520 questionnaires were distributed, yielding 500 valid responses. Descriptive statistics in SPSS 21.0 were utilized to grasp the fundamental characteristics of tourists. Moreover, the Linear Structure Relationship Model (LISREL) was employed to validate the constructed linear structure model and assess the impact relationships between variables.

4. Statistical Results

4.1. Demographic Variables

The demographic characteristics of respondents show that there were more female participants (50.8%) than males (49.2%). The majority fall within the age range of 32–41 (53.4%),

followed by 42–51 (23.6%). Furthermore, there were more married participants (55.2%) than unmarried ones (42.0%). A significant proportion (73.2%) hold a university degree, while the remainder (13.6%) completed high school. The average monthly income of the participants is 25,001–35,000 TWD (888–1243 USD) for 25.2% of respondents, followed by incomes above 65,000 TWD (2311 USD) for 22.6%. Most participants work in the service industry (29.8%), followed by the Industry and Commerce sector (19.0%). In terms of their place of residence, the majority live in the southern region (78.4%), followed by those residing in the northern region (13.2%). For detailed demographic profiles of the participants, refer to Table 1.

Table 1. Profile of respondents.

Items	Variables	N	%	Items	Variables	N	%
Gender	Male	246	49.2	Occupation	Civil servant	52	10.4
	Female	254	50.8		Service	149	29.8
Marital status	Married	276	55.2		Business	93	18.6
					Freelance	70	14.0
	Single	210	42.0		Industry and Commerce	95	19.0
	other	14	2.8		Others	41	8.2
Age (years)	22–31	77	15.4	Place of residence	Northern region	66	13.2
	32–41	267	53.4		Central region	32	6.4
	42–51	118	23.6		Southern region	392	78.4
	52–61	32	6.4		East region	10	2.0
	Above 62	6	1.2				
Education	Elementary and middle	6	1.2	Monthly income (TWD)	≤25,000	62	12.4
					25,001–35,000	126	25.2
	High school	68	13.6		35,001–45,000	67	13.4
	College	366	73.2		45,001–55,000	84	16.8
	Graduate and above	60	12.0		55,001–65,000	48	9.6
					Above 65,000	113	22.6

In the process of collecting samples, researchers aim to align with Taiwan's actual population distribution as closely as possible. However, variations in demographic proportions may occur due to the unique characteristics of different subjects or regions. For instance, regarding the "Place of residence" variable in this study, the higher representation (78.4%) of the southern region can be attributed to two factors: 1. The Huatung regions are situated near the southern region, making travel to this area convenient and rapid for residents of the southern region. 2. In this study, the southern region comprises four major cities: Chiayi, Tainan, Kaohsiung, and Pingtung. It does not refer to the population count of a single city but collectively represents these four major cities in the southern region.

4.2. Descriptive Statistics

The results of the descriptive statistical analysis are as described below. The average fitness scores range from 4.81 to 5.49, with the item 'The atmosphere in this place is the style I like' achieving the highest mean score. For average friendliness, scores span from 5.05 to 5.53, with 'This place has hospitable and friendly local residents' obtaining the highest mean score. Average uniqueness scores range from 5.39 to 5.61, with 'This place performs a unique style' having the highest mean score. In terms of attractiveness, scores range from 5.32 to 5.70 and the item 'I can transfer my mood in this place' obtaining the highest mean score. The average mystique scores range from 5.08 to 5.37, with 'My curiosity toward the place is aroused while visiting the place' achieving the highest mean score. Regarding richness, scores range from 5.40 to 5.55 and both 'During visiting this place, I can experience different feelings' and 'This place provides various leisure activities' share the highest mean score.

Place dependence scores range from 4.85 to 5.39, with 'For the sustainable development of the environment, I like to travel more to organic agriculture' receiving the highest mean score. Place identity scores range from 5.16 to 5.68 and the item 'The experience of organic agricultural tourism makes me better understand the significance of environmental protection' achieves the highest mean score. Pro-environmental behavior scores range from 5.23 to 5.51, with 'I am willing to protect the organic agricultural environment more actively' having the highest mean score. Finally, loyalty scores range from 4.96 to 5.09 and 'I have a strong loyalty to organic produce' achieves the highest mean score.

The high average scores on these questions indicate that the eastern region of Taiwan is a favored tourist destination. This region offers a rustic atmosphere distinct from the urbanity of the western region and is rich in cultural enthusiasm. Simultaneously, it genuinely aligns with the ideal travel environment visitors have in mind for their daily lives, along with offering natural tourism resources that exude a sense of mystery. Given Taiwan's experience of food safety concerns, the people have become more conscious of the interplay between the natural environment and human health. Consequently, tourists are more inclined to visit areas associated with organic agriculture and purchase locally produced organic goods. This fosters a sense of endorsement, protection, and loyalty toward these destinations.

4.3. Structural Model

In this research, the independent variable is destination fascination (FAN); the dependent variables are place dependent (PDE), place identity (PID), pro-environment behavior (PEB), and loyalty (LOY). The Linear Structure Relationship Model (LISREL) was used to verify the constructed linear structure model and the impact relations between the variables of the proposed research hypotheses. The LISREL 8.52 software is used as the analysis tool to verify the impact relationship. Figure 1 shows the path coefficient of the structural model.

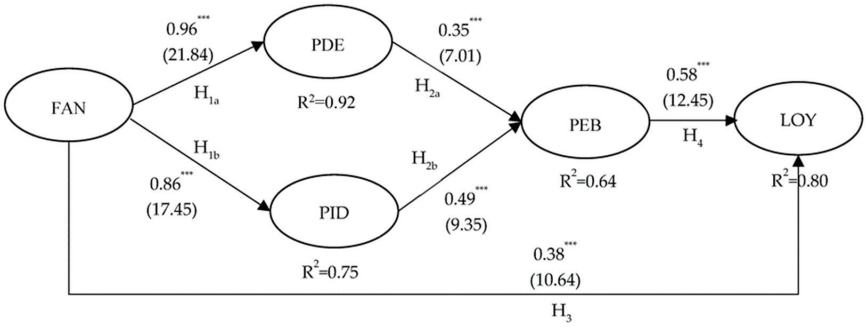

Figure 1. Path coefficients of the structural model (Note: *** $p < 0.001$).

For the goodness-of-fit index of this research model, error variation is positive. The factor loadings range from 0.81 to 0.97 and Cronbach's α ranges from 0.881 to 0.958. The composite reliability (CR) ranges from 0.919 to 0.958, which surpasses the recommended 0.7 [83]. Additionally, the average variance extracted (AVE) estimates range from 0.742 to 0.861, which exceeded the cut-off value of 0.5. These results showed that the reliability and validity of each dimension were acceptable (Table 2).

Table 2. Results of the measurement model.

Path			Factor Loadings	t-Value	SMC	Standardized Residuals	Cronbach's α	CR	AVE
FAN	→	FIT	0.81 ***	19.78	0.67	0.32	0.952	0.945	0.742
FAN	→	FRI	0.81 ***	19.95	0.67	0.33			
FAN	→	UNI	0.83 ***	20.26	0.69	0.31			
FAN	→	ATT	0.92 ***	23.88	0.84	0.16			
FAN	→	MYS	0.90 ***	23.12	0.80	0.20			
FAN	→	RIC	0.88 ***	22.33	0.78	0.22			
PDE	→	PDE1	0.89 ***	-	0.81	0.18	0.881	0.919	0.792
PDE	→	PDE2	0.77 ***	28.83	0.61	0.38			
PDE	→	PDE3	0.97 ***	18.30	0.95	0.05			
PID	→	PID1	0.86 ***	-	0.73	0.28	0.885	0.956	0.846
PID	→	PID2	0.95 ***	20.98	0.90	0.11			
PID	→	PID3	0.97 ***	19.08	0.93	0.07			
PID	→	PID4	0.93 ***	24.20	0.83	0.17			
PEB	→	PEB1	0.97 ***	-	0.94	0.06	0.917	0.958	0.850
PEB	→	PEB2	0.86 ***	22.48	0.75	0.25			
PEB	→	PEB3	0.90 ***	23.11	0.81	0.19			
PEB	→	PEB4	0.95 ***	25.76	0.90	0.10			
LOY	→	LOY1	0.87 ***	-	0.77	0.23	0.958	0.961	0.861
LOY	→	LOY2	0.91 ***	51.67	0.86	0.14			
LOY	→	LOY3	0.97 ***	34.50	0.94	0.06			
LOY	→	LOY4	0.94 ***	28.57	0.88	0.12			

Note: *** $p < 0.001$.

Concerning the goodness-of-fit index of the model, the chi-square statistic (χ^2) was 229.10 (df = 82) while the chi-square ratio (χ^2/df) was 2.79. The goodness-of-fit index (GFI) was 0.95 and the adjusted goodness-of-fit index (AGFI) was 0.85. The root means a square error of approximation (RMSEA) was 0.067, the mean square residual (RMR) was 0.028, the normalized fit index (NFI) was 0.99, the non-normalized fit index (NNFI) was 0.99, and the comparative fit index (CFI) was 1.00. All of these indices were within an acceptable range which indicated that the overall goodness-of-fit of the model was good [84], demonstrating that the model fitted well with the data.

The following table shows the discriminant validity of the constructs. As presented in Table 3, the AVE square root of each construct has a greater square root correlation with the same concept than with the other concept, showing an acceptable discriminant validity.

Table 3. Discriminant validity of the constructs.

	Mean	SD	FAN	PDE	PID	PEB	LOY
FAN	5.36	0.901	0.861				
PDE	5.10	1.093	0.856	0.890			
PID	5.49	0.991	0.840	0.851	0.920		
PEB	5.32	1.059	0.762	0.742	0.834	0.922	
LOY	5.10	1.081	0.743	0.726	0.729	0.858	0.928

Based on the analysis, the verification of the research hypothesis is presented in Table 4. The hypotheses are all accepted ($p < 0.050$).

Table 4. The results of hypotheses.

Hypotheses	β Coefficient	t Value	*p*	Result
H_{1a}	0.96 ***	21.84	$p < 0.05$	Accepted
H_{1b}	0.86 ***	17.45	$p < 0.05$	Accepted
H_{2a}	0.35 ***	7.01	$p < 0.05$	Accepted
H_{2b}	0.49 ***	9.35	$p < 0.05$	Accepted
H_3	0.38 ***	10.64	$p < 0.05$	Accepted
H_4	0.58 ***	12.45	$p < 0.05$	Accepted

Note: *** $p < 0.001$.

5. Discussion

5.1. The Discussion from Factor Loadings

Referring to Table 2, among the observed variables of FAN, ATT shows the highest factor loading (0.92), signifying that attractiveness significantly influences tourism. Organic agricultural tourism destinations offer a significant allure by elevating tourists' moods, eliciting positive emotions, and fostering the creation of lasting and remarkable experiences. Pertinent research underscores that these experiences culminate in enduring and treasured memories for tourists, constituting the foundational essence of leisure tourism [80].

Among the observed variables of PDE, PDE3 (0.97) has the highest factor loading, indicating that environmental sustainability is an important influencing factor for tourists' dependence on organic agriculture tourism. Similarly, among the observed variables of PID, PID 3 (0.97) has the highest factor loading, indicating that the organic agriculture tourism experience enhances tourists' environmental understanding and is a crucial factor in their identification with organic agriculture tourism. This aligns with previous research which suggests that the appeal of organic agricultural tourism destinations provides visitors with environmental knowledge and interpretive significance for environmental sustainability, while place attachment connects social and environmental issues, influencing individuals' willingness to protect the place [33]. Therefore, when a destination fulfills tourists' environmental needs and highlights the importance of the environment, it fosters emotional connections to the destination.

Among the observed variables in the PEB, PEB1 (0.97) has the highest factor loading, indicating that tourists enjoy participating in organic agricultural tourism experiences greatly, which plays a crucial role in fostering pro-environmental behavior within the destination. Similarly, within the LOY dimension, LOY3 (0.97) demonstrates the highest factor loading, suggesting that tourists' engagement in activities related to organic agricultural tourism is a significant influencing factor for their loyalty towards the destination. In essence, the findings indicate that tourists who actively partake in organic agricultural tourism experiences are more likely to exhibit both pro-environmental behavior and loyalty. As mentioned in the studies by Lee [85] and Shen, Wang, and Loverio [21], an increase in place dependence is associated with a rise in responsible environmental behavior among tourists, and it also manifests their concern and attention towards environmental protection.

5.2. The Discussion from the Measurement Model

In Figure 1, the impact coefficient of destination promotion on place dependence is 0.96, indicating that promoting organic agriculture can provide the necessary environmental resources to support tourist activities and foster a strong emotional attachment to the place, reducing the likelihood of substitution [33]. Furthermore, the impact coefficient of destination promotion on place identity is 0.86, suggesting that the welcoming environment created by the promotion of organic agriculture caters to tourists' desires for environmental preservation, thus amplifying their sense of place identity [47].

The impact coefficient of place dependence on pro-environmental behavior is 0.35, indicating that tourists often seek to protect the places they rely on. Organic agricultural tourism not only meets tourists' needs for health and experience but also enhances their well-being [61]. The impact coefficient of place identification on pro-environmental behav-

ior is 0.49, signifying that tourists' identification with organic agricultural tourism not only ensures a friendly environment but also boosts their confidence in safeguarding meaningful places [33].

Furthermore, the impact coefficient of destination promotion on loyalty is 0.38, indicating that a higher level of promotion of organic agricultural tourism leads to greater tourist loyalty towards the destination. Moreover, the coefficient of influence of pro-environmental behavior on loyalty is 0.58, showing a higher impact. This indicates that the higher the pro-environmental behavior of tourists, the higher their loyalty to the destination. This study confirms previous findings regarding these two variables [70,77]. Notably, it reveals a nuanced finding: among the two factors directly influencing tourist loyalty, pro-environmental behavior has a greater impact than destination promotion.

5.3. The Discussion from Mediating Variables

This study identifies two paths through which fascination influences loyalty via the mediation of place attachment. (1). The path with place dependence as the mediating variable is FAN-PDE-PEB-LOY and its path coefficient is multiplied to 0.195; (2). the path with place identity as the mediating variable is FAN-PID-PEB-LOY and its path coefficient is multiplied by 0.244. Both place identity and place dependence serve as primary intermediary variables through which fascination influences loyalty, with place identity having a more significant mediating effect. This discovery aligns with the research findings of [63].

The influence coefficients of place dependence and place identity on loyalty through pro-environmental behavior are 0.203 and 0.284, respectively, confirming that pro-environmental behavior serves as a mediating variable between place attachment and loyalty.

6. Implication

6.1. Theoretical Implication

It is the first time that Kaplan and Kaplan's [24] RPM has been integrated with destination fascination attachment, pro-environmental behavior, and loyalty theory from the perspective of environmental psychology and applied to the subject research of organic agricultural tourism behavior. Its primary theoretical contributions are as follows:

(a) It examines the triggers of organic agricultural tourism by constructing a model that validates fascination as a pivotal factor impacting tourists' environmental behavior.
(b) It verified the role of place dependency, place attachment, and pro-environmental behavior as indicators of "effectiveness".
(c) It sorts out factors influencing loyalty among tourists as meaningful behavior.
(d) It applies the RPM to academic research on organic agricultural tourism behavior, thereby expanding the application of the RPM framework.

Additionally, this study notably integrates pro-environmental behavior into the RPM and established its positive and significant impact on loyalty. This distinguishes it from previous frameworks concerning loyalty and behavioral intention [14,27]. Furthermore, the findings of this study provide strong insight into the fact that, within the realm of organic agricultural tourism, a sustainable rural landscape environment serves as the cornerstone of the tourist experience [80]. Moreover, fostering a friendly and sustainable environment emerges as a crucial objective in organic agricultural tourism.

While previous studies have recognized the significance of pro-environmental behavior and destination loyalty as crucial variables [63,75] and have explored various antecedents of both of pro-environmental behavior and destination loyalty, there has been a dearth of research concurrently exploring both pro-environmental behavior and destination loyalty [63]. This study distinguishes itself from previous loyalty research by demonstrating the significant impact of "fascination" on tourists' "place attachment." Furthermore, it enhances our understanding of how rural tourist destinations can motivate visitors to voluntarily engage in environmental protection by fostering a sense of depen-

dency, particularly through place identification. This, in turn, cultivates loyalty towards the destination.

In summary, this research underscores that emotional identification among tourists leads to a strong desire for protection and positive word-of-mouth, highlighting the importance of appealing organic agricultural environments and resources. By introducing innovative models and conducting comprehensive analyses, this study fills a gap in existing research. Consequently, the validation of these research findings and theories undoubtedly represents a breakthrough in the field of organic agricultural tourism research. The validation of these research results and theories undoubtedly represents a breakthrough in the realm of organic agricultural tourism studies. It serves as a cornerstone that prompts researchers to reconsider the relationship between humans and the environment.

6.2. Practical Implications

Considering the outcomes of the aforementioned analysis, this study presents specific recommendations in two key parts: enhancing destination fascination and reinforcing place identity.

6.2.1. Enhancing Destination Fascination

The findings of this study reveal that destination fascination significantly influences tourism behavior, a trend that aligns with prior research [18,22,27]. This underscores the pivotal role of destination landscapes as the cornerstone of tourism development [86]. Therefore, it is recommended that destinations contemplate the creation of captivating travel experiences that offer distinctive and unforgettable activities for tourists [18]. Additionally, an essential facet of Destination Management Organizations (DMOs) is their alignment with tourists' interests and their commitment to strategically accentuating the destination's distinctiveness to enhance its fascination. This approach ultimately fosters marketing differentiation, thereby attracting tourists [22].

Given the significance of destination fascination, it is recommended that its six dimensions—mystery, richness, attractiveness, uniqueness, fitness, and friendliness [1]—should be integral elements in destination development. DMOs should play a key role in facilitating tourists' experiences and captivating the essence of organic agricultural tourism destinations through the creation of experiential activities. Furthermore, DMOs can assist tourists in recognizing and forming a connection with the destination itself [21].

For instance, by utilizing organic agriculture as a distinctive theme or emphasizing the tranquility of rural slow living as a local characteristic, DMOs can design engaging experiential activities that encompass various themes, such as agricultural DIY or immersive field experiences. By curating a diverse range of leisure activities that intertwine practical engagement with contemplative elements, DMOs can harness the power of storytelling or local legends to enhance the aura of mystery surrounding the destination. Additionally, tailoring the mode of travel can further amplify the overall experience.

6.2.2. Reinforcing Place Identity

Based on the analysis of this study, it is suggested that destination construction should strengthen tourists' identification with the purpose of organic agriculture tourism, cultivate tourists' positive environmental protection awareness and attitude, and enhance tourists' pro-environmental behavior towards tourism destinations. When tourists become attached to a place and like it, they will increase their pro-environmental behavior toward the destination [10]. Moreover, when tourists realize the importance of the environment, they may pay attention to responsible tourism behavior [87]. Therefore, organic agricultural tourism should integrate environmental protection awareness into tourism activities and experiences [80], improve tourists' environmental awareness through this educational tourism experience, and establish a positive attitude towards sustainable destination landscape protection [22].

Moreover, tourists' perception of the destination's significance and their affinity for it constitutes the fundamental elements that elevate their level of attachment. Consequently, this study proposes that the principal strategy for augmenting this attachment lies in the integration of organic agricultural tourism resources and cultural elements. For example, incorporating aspects like "organic food", "organic lifestyle", "organic leisure", "organic shopping", and "organic education" can serve as effective means to enhance this connection.

Analyzing demographic variables, it is evident that a significant portion of tourists fall within the 32–41 age range, indicating a strong interest in organic agriculture among this demographic group. This group, characterized by stable employment and a thoughtful approach toward financial investments, presents an opportunity for relevant managers and government agencies to encourage investment in organic agricultural leisure projects in the eastern region.

One such initiative could be the establishment of a "farmer's market-style supermarket", a retail platform integrating leisure agricultural tourism in the region, both online and in physical stores. This initiative should be coupled with the incorporation of local agriculture and culture, fostering the growth of businesses that embody the distinctive characteristics of the Huatung regions. This approach will enable a broader audience to experience the agricultural and leisure development of the region. This not only provides a substantial source of income for residents in the eastern region but also encourages more people to invest in the "farmer's market-style supermarket". Through this interconnectedness of benefits, identification, and reciprocity, it fosters a stronger reliance on the environment. Furthermore, as individuals gradually become aware that many health issues stem from the origin and methods of food production, they are more likely to proactively safeguard this region. This virtuous cycle helps alleviate concerns about the contamination of organic agricultural products and the tourism environment in the Huatung regions.

7. Limitation and Future Research

Firstly, this study examines the impact of fascination on personal pro-environmental behavior through the lens of place attachment. It suggests that future research could delve more deeply into topics like environmental awareness or health consciousness.

Secondly, it is worth noting that this study centers on tourists who have visited the Huatung regions for organic agricultural tourism. As a result, the sample size is relatively small compared to the scope of mass tourism. Furthermore, the theme of organic agriculture tourism retains its distinctiveness. Therefore, this study recommends that future research explore mass tourism within the framework established here.

Lastly, this study surveyed all tourists without conducting a differentiation analysis based on various ethnic groups. To provide more specific and tailored recommendations, it is suggested that future researchers conduct an ANOVA analysis to assess the differences and preferences of different ethnic groups.

8. Conclusions

This study is grounded in RPM and investigates the correlation between destination fascination, place attachment, pro-environmental behavior, and loyalty through a quantitative method. These findings underscore the pivotal role of tourists' place attachment as a significant mediating variable influencing both their pro-environmental behavior and loyalty. Additionally, it emphasizes the importance of aiding and guiding tourists in cultivating both an emotional and functional attachment to the destination, illuminating how destination tourism influences tourist psychology through RPM. Furthermore, this study makes a significant contribution as the first comprehensive integration of destination fascination, tourists' place attachment, destination environmental conservation, and loyalty within the context of organic agricultural tourism. This not only supplements the current literature on organic agricultural tourism but also provides scientifically grounded recommendations for the management and development of future organic agricultural leisure tourism.

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References

1. Liu, C.-R.; Wang, Y.-C.; Huang, W.-S.; Chen, S.-P. Destination fascination: Conceptualization and scale development. *Tour. Manag.* **2017**, *63*, 255–267. [CrossRef]
2. Benlau. Taitung Tourism Bureau Raiders. Available online: http://www.ethotel365.com.tw/149663/ (accessed on 1 August 2023).
3. Ghoochani, O.M.; Ghanian, M.; Khosravipour, B.; Crotts, J.C. Sustainable tourism development performance in the wetland areas: A proposed composite index. *Tour. Rev.* **2020**, *75*, 745–764. [CrossRef]
4. Marques, C.P.; Guedes, A.; Bento, R. Rural tourism recovery between two COVID-19 waves: The case of Portugal. *Curr. Issues Tour.* **2022**, *25*, 857–863. [CrossRef]
5. Chi, C.G.-Q.; Qu, H. Examining the structural relationships of destination image, tourist satisfaction and destination loyalty: An integrated approach. *Tour. Manag.* **2008**, *29*, 624–636. [CrossRef]
6. Hutchinson, J.; Lai, F.; Wang, Y. Understanding the relationships of quality, value, equity, satisfaction, and behavioral intentions among golf travelers. *Tour. Manag.* **2009**, *30*, 298–308. [CrossRef]
7. Yoon, Y.; Uysal, M. An examination of the effects of motivation and satisfaction on destination loyalty: A structural model. *Tour. Manag.* **2005**, *26*, 45–56. [CrossRef]
8. Almeida-Santana, A.; Moreno-Gil, S. Understanding tourism loyalty: Horizontal vs. destination loyalty. *Tour. Manag.* **2018**, *65*, 245–255. [CrossRef]
9. Moore, S.A.; Rodger, K.; Taplin, R.H. Developing a better understanding of the complexities of visitor loyalty to Karijini National Park, Western Australia. *Tour. Manag.* **2017**, *62*, 20–28. [CrossRef]
10. Shen, C.-C.; Wang, D.; Loverio, J.P.; Liu, H.-L.; Wang, H.-Y. Influence of Attachment Theory on Pro-Environmental Behavior and Well-Being: A Case of Organic Agricultural Tourism in Taiwan Hualien and Taitung. *Agriculture* **2022**, *12*, 2022. [CrossRef]
11. Lv, X.; Li, C.; McCabe, S. Expanding theory of tourists' destination loyalty: The role of sensory impressions. *Tour. Manag.* **2020**, *77*, 104026. [CrossRef]
12. Chi, X.; Han, H. Emerging rural tourism in China's current tourism industry and tourist behaviors: The case of Anji County. *J. Travel Tour. Mark.* **2021**, *38*, 58–74. [CrossRef]
13. Gao, C.; Cheng, L. Tourism-driven rural spatial restructuring in the metropolitan fringe: An empirical observation. *Land Use Policy* **2020**, *95*, 104609. [CrossRef]
14. Wang, C.; Zhang, J.; Xiao, X.; Sun, F.; Xiao, M.; Shi, Q. Examining the dimensions and mechanisms of tourists' environmental behavior: A theory of planned behavior approach. *J. Clean. Prod.* **2020**, *273*, 123007. [CrossRef]
15. Kyle, G.; Chick, G. The Social Construction of a Sense of Place. *Leis. Sci.* **2007**, *29*, 209–225. [CrossRef]
16. Prayag, G.; Ryan, C. Antecedents of Tourists' Loyalty to Mauritius:The Role and Influence of Destination Image, Place Attachment, Personal Involvement, and Satisfaction. *J. Travel Res.* **2012**, *51*, 342–356. [CrossRef]
17. Veasna, S.; Wu, W.-Y.; Huang, C.-H. The impact of destination source credibility on destination satisfaction: The mediating effects of destination attachment and destination image. *Tour. Manag.* **2013**, *36*, 511–526. [CrossRef]
18. Wang, Y.-C.; Liu, C.-R.; Huang, W.-S.; Chen, S.-P. Destination Fascination and Destination Loyalty: Subjective Well-Being and Destination Attachment as Mediators. *J. Travel Res.* **2020**, *59*, 496–511. [CrossRef]
19. Pretty, G.H.; Chipuer, H.M.; Bramston, P. Sense of place amongst adolescents and adults in two rural Australian towns: The discriminating features of place attachment, sense of community and place dependence in relation to place identity. *J. Environ. Psychol.* **2003**, *23*, 273–287. [CrossRef]
20. Walker, A.J.; Ryan, R.L. Place attachment and landscape preservation in rural New England: A Maine case study. *Landsc. Urban Plan.* **2008**, *86*, 141–152. [CrossRef]
21. Shen, C.-C.; Wang, D.; Loverio, J.P. Influence of Consumer Landscape on Place Attachment in Agritourism-The Case of Huatung, Taiwan. *Agriculture* **2022**, *12*, 1557. [CrossRef]
22. Zheng, W.; Qiu, H.; Morrison, A.M.; Wei, W.; Zhang, X. Landscape and Unique Fascination: A Dual-Case Study on the Antecedents of Tourist Pro-Environmental Behavioral Intentions. *Land* **2022**, *11*, 479. [CrossRef]
23. Woosnam, K.M.; Jiang, J.; Van Winkle, C.M.; Kim, H.; Maruyama, N. Explaining Festival Impacts on a Hosting Community Through Motivations to Attend. *Event Manag.* **2016**, *20*, 11–25. [CrossRef]

24. Kaplan, S.; Kaplan, R. Creating a larger role for environmental psychology: The Reasonable Person Model as an integrative framework. *J. Environ. Psychol.* **2009**, *29*, 329–339. [CrossRef]
25. Kaplan, S. New Ways to Promote Proenvironmental Behavior: Human Nature and Environmentally Responsible Behavior. *J. Soc. Issues* **2000**, *56*, 491–508. [CrossRef]
26. Kaplan, S.; Kaplan, R. Health, Supportive Environments, and the Reasonable Person Model. *Am. J. Public Health* **2003**, *93*, 1484–1489. [CrossRef] [PubMed]
27. Lee, Y.-J. Destination fascination, well-being, and the reasonable person model of behavioural intention in heritage tourism. *Curr. Issues Tour.* **2023**, 1–17. [CrossRef]
28. Kaplan, S. The restorative benefits of nature: Toward an integrative framework. *J. Environ. Psychol.* **1995**, *15*, 169–182. [CrossRef]
29. Botti, L.; Peypoch, N.; Solonandrasana, B. Time and tourism attraction. *Tour. Manag.* **2008**, *29*, 594–596. [CrossRef]
30. Kucukergin, K.G.; Gürlek, M. 'What if this is my last chance?': Developing a last-chance tourism motivation model. *J. Destin. Mark. Manag.* **2020**, *18*, 100491. [CrossRef]
31. Zheng, W.; Qiu, H.; Morrison, A.M.; Wei, W.; Zhang, X. Rural and Urban Land Tourism and Destination Image: A Dual-Case Study Approach Examining Energy-Saving Behavior and Loyalty. *Land* **2022**, *11*, 146. [CrossRef]
32. Hidalgo, M.C.; HernÁNdez, B. Place attachment: Conceptual and empirical questions. *J. Environ. Psychol.* **2001**, *21*, 273–281. [CrossRef]
33. Junot, A.; Paquet, Y.; Fenouillet, F. Place attachment influence on human well-being and general pro-environmental behaviors. *J. Theor. Soc. Psychol.* **2018**, *2*, 49–57. [CrossRef]
34. Hinds, J.; Sparks, P. Engaging with the natural environment: The role of affective connection and identity. *J. Environ. Psychol.* **2008**, *28*, 109–120. [CrossRef]
35. Yuksel, A.; Yuksel, F.; Bilim, Y. Destination attachment: Effects on customer satisfaction and cognitive, affective and conative loyalty. *Tour. Manag.* **2010**, *31*, 274–284. [CrossRef]
36. Zheng, J.J.; Shen, H.; Chau, K.Y.; Liu, T.; Li, E.L. Factors influencing conative loyalty in anthropology museum tourism. *Tour. Manag. Stud.* **2021**, *17*, 29–40. [CrossRef]
37. Backlund, E.A.; Williams, D.R. A quantitative synthesis of place attachment research: Investigating past experience and place attachment. In Proceedings of the 2003 Northeastern Recreation Research Symposium, New York, NY, USA, 6–8 April 2003; pp. 320–325.
38. Stedman, R.C. Toward a Social Psychology of Place:Predicting Behavior from Place-Based Cognitions, Attitude, and Identity. *Environ. Behav.* **2002**, *34*, 561–581. [CrossRef]
39. Tapsuwan, S.; Leviston, Z.; Tucker, D. Community values and attitudes towards land use on the Gnangara Groundwater System: A Sense of Place study in Perth, Western Australia. *Landsc. Urban Plan.* **2011**, *100*, 24–34. [CrossRef]
40. Milligan, M.J. Interactional Past and Potential: The Social Construction of Place Attachment. *Symb. Interact.* **1998**, *21*, 1–33. [CrossRef]
41. Korpela, K.M.; Hartig, T.; Kaiser, F.G.; Fuhrer, U. Restorative Experience and Self-Regulation in Favorite Places. *Environ. Behav.* **2001**, *33*, 572–589. [CrossRef]
42. Morgan, P. Towards a developmental theory of place attachment. *J. Environ. Psychol.* **2010**, *30*, 11–22. [CrossRef]
43. Proshansky, H.M. The City and Self-Identity. *Environ. Behav.* **1978**, *10*, 147–169. [CrossRef]
44. Proshansky, H.; Fabian, A.; Kaminoff, R. Place-identity: Physical world socialization of the self. *J. Environ. Psychol.* **1983**, *3*, 57–83. [CrossRef]
45. Sirgy, M.J.; Su, C. Destination Image, Self-Congruity, and Travel Behavior: Toward an Integrative Model. *J. Travel Res.* **2000**, *38*, 340–352. [CrossRef]
46. Beerli, A.; Meneses, G.D.; Gil, S.M. Self-congruity and destination choice. *Ann. Tour. Res.* **2007**, *34*, 571–587. [CrossRef]
47. Stokburger-Sauer, N.E. The relevance of visitors' nation brand embeddedness and personality congruence for nation brand identification, visit intentions and advocacy. *Tour. Manag.* **2011**, *32*, 1282–1289. [CrossRef]
48. Chen, G.; Huang, X. From good feelings to good behavior: Exploring the impacts of positive emotions on tourist environmentally responsible behavior. *J. Hosp. Tour. Manag.* **2022**, *50*, 1–9. [CrossRef]
49. Loureiro, S.M.C.; Guerreiro, J.; Han, H. Past, present, and future of pro-environmental behavior in tourism and hospitality: A text-mining approach. *J. Sustain. Tour.* **2022**, *30*, 258–278. [CrossRef]
50. Miao, L.; Wei, W. Consumers' pro-environmental behavior and the underlying motivations: A comparison between household and hotel settings. *Int. J. Hosp. Manag.* **2013**, *32*, 102–112. [CrossRef]
51. Steg, L.; Vlek, C. Encouraging pro-environmental behaviour: An integrative review and research agenda. *J. Environ. Psychol.* **2009**, *29*, 309–317. [CrossRef]
52. Altman, I.; Low, S.M. *Place Attachment*; Springer: New York, NY, USA, 1992.
53. Tuan, Y.F. *Space and Place: The Perspective of Experience*; Arnold, E., Ed.; University of Minnesota Press: Minneapolis, MN, USA, 1977.
54. Ramkissoon, H.; Weiler, B.; Smith, L.D.G. Place attachment and pro-environmental behaviour in national parks: The development of a conceptual framework. *J. Sustain. Tour.* **2012**, *20*, 257–276. [CrossRef]
55. Dang, N.H.; Maurer, O. Place-Related Concepts and Pro-Environmental Behavior in Tourism Research: A Conceptual Framework. *Sustainability* **2021**, *13*, 11861. [CrossRef]

56. Ramkissoon, H.; Mavondo, F.; Uysal, M. Social involvement and park citizenship as moderators for quality-of-life in a national park. *J. Sustain. Tour.* **2018**, *26*, 341–361. [CrossRef]
57. Chow, A.S.Y.; Ma, A.T.H.; Wong, G.K.L.; Lam, T.W.L.; Cheung, L.T.O. The Impacts of Place Attachment on Environmentally Responsible Behavioral Intention and Satisfaction of Chinese Nature-Based Tourists. *Sustainability* **2019**, *11*, 5585. [CrossRef]
58. Uesugi, A.; Kudo, Y. The relationship between outdoor sport participants' place attachment and pro-environment behaviour in natural areas of Japan for developing sustainable outdoor sport tourism. *Eur. J. Sport Soc.* **2020**, *17*, 162–179. [CrossRef]
59. Daryanto, A.; Song, Z. A meta-analysis of the relationship between place attachment and pro-environmental behaviour. *J. Bus. Res.* **2021**, *123*, 208–219. [CrossRef]
60. Zhang, H.; Cai, L.; Bai, B.; Yang, Y.; Zhang, J. National forest park visitors' connectedness to nature and pro-environmental behavior: The effects of cultural ecosystem service, place and event attachment. *J. Outdoor Recreat. Tour.* **2023**, *42*, 100621. [CrossRef]
61. Davis, J.L.; Green, J.D.; Reed, A. Interdependence with the environment: Commitment, interconnectedness, and environmental behavior. *J. Environ. Psychol.* **2009**, *29*, 173–180. [CrossRef]
62. Halpenny, E.A. Pro-environmental behaviours and park visitors: The effect of place attachment. *J. Environ. Psychol.* **2010**, *30*, 409–421. [CrossRef]
63. Lee, Y.-K.; Pei, F.; Ryu, K.-s.; Choi, S. Why the tripartite relationship of place attachment, loyalty, and pro-environmental behaviour matter? *Asia Pac. J. Tour. Res.* **2019**, *24*, 250–267. [CrossRef]
64. Schultz, P.W. New Environmental Theories: Empathizing With Nature: The Effects of Perspective Taking on Concern for Environmental Issues. *J. Soc. Issues* **2000**, *56*, 391–406. [CrossRef]
65. Schultz, P.W.; Zelezny, L.; Dalrymple, N.J. A Multinational Perspective on the Relation between Judeo-Christian Religious Beliefs and Attitudes of Environmental Concern. *Environ. Behav.* **2000**, *32*, 576–591. [CrossRef]
66. Dick, A.S.; Basu, K. Customer loyalty: Toward an integrated conceptual framework. *J. Acad. Mark. Sci.* **1994**, *22*, 99–113. [CrossRef]
67. Berto, R.; Massaccesi, S.; Pasini, M. Do eye movements measured across high and low fascination photographs differ? Addressing Kaplan's fascination hypothesis. *J. Environ. Psychol.* **2008**, *28*, 185–191. [CrossRef]
68. Um, S.; Chon, K.; Ro, Y. Antecedents of revisit intention. *Ann. Tour. Res.* **2006**, *33*, 1141–1158. [CrossRef]
69. Girish, V.G.; Park, E.; Lee, C.-K. Testing the influence of destination source credibility, destination image, and destination fascination on the decision-making process: Case of the Cayman Islands. *Int. J. Tour. Res.* **2021**, *23*, 569–580. [CrossRef]
70. Wang, Y.-J.; Wu, C.; Yuan, J. Exploring Visitors' Experiences and Intention to Revisit a Heritage Destination: The Case for Lukang, Taiwan. *J. Qual. Assur. Hosp. Tour.* **2010**, *11*, 162–178. [CrossRef]
71. Dwyer, L.; Kim, C. Destination Competitiveness: Determinants and Indicators. *Curr. Issues Tour.* **2003**, *6*, 369–414. [CrossRef]
72. Gomezelj, D.O.; Mihalič, T. Destination competitiveness—Applying different models, the case of Slovenia. *Tour. Manag.* **2008**, *29*, 294–307. [CrossRef]
73. Esfandiar, K.; Dowling, R.; Pearce, J.; Goh, E. Personal norms and the adoption of pro-environmental binning behaviour in national parks: An integrated structural model approach. *J. Sustain. Tour.* **2020**, *28*, 10–32. [CrossRef]
74. Lee, S.; Park, H.; Kim, K.H.; Lee, C.-K. A moderator of destination social responsibility for tourists' pro-environmental behaviors in the VIP model. *J. Destin. Mark. Manag.* **2021**, *20*, 100610. [CrossRef]
75. Azinuddin, M.; Hanafiah, M.H.; Mior Shariffuddin, N.S.; Kamarudin, M.K.A.; Mat Som, A.P. An exploration of perceived ecotourism design affordance and destination social responsibility linkages to tourists' pro-environmental behaviour and destination loyalty. *J. Ecotour.* **2022**, 1–24. [CrossRef]
76. Su, L.; Gong, Q.; Huang, Y. How do destination social responsibility strategies affect tourists' intention to visit? An attribution theory perspective. *J. Retail. Consum. Serv.* **2020**, *54*, 102023. [CrossRef]
77. Su, L.; Lian, Q.; Huang, Y. How do tourists' attribution of destination social responsibility motives impact trust and intention to visit? The moderating role of destination reputation. *Tour. Manag.* **2020**, *77*, 103970. [CrossRef]
78. Su, L.; Swanson, S.R. The effect of destination social responsibility on tourist environmentally responsible behavior: Compared analysis of first-time and repeat tourists. *Tour. Manag.* **2017**, *60*, 308–321. [CrossRef]
79. Zhu, Z.; Wang, R.; Hu, J.; Jiang, Z. Can protection motivation theory predict pro-environmental behaviour of small rural tourism enterprises? An extended model including community involvement. *Asia Pac. J. Tour. Res.* **2022**, *27*, 428–442. [CrossRef]
80. Shen, C.-C.; Chang, Y.-R.; Liu, D.-J. Rural Tourism and Environmental Sustainability—A Study on a Model for Assessing the Developmental Potential of Organic Agritourism. *Sustainability* **2020**, *12*, 9642. [CrossRef]
81. 2022 Visitors to Principal Tourist Spots in Taiwan by Month. Available online: https://admin.taiwan.net.tw/english/info/FilePage?a=17911 (accessed on 30 August 2023).
82. Moore, R.L.; Graefe, A.R. Attachments to recreation settings: The case of rail-trail users. *Leis. Sci.* **1994**, *16*, 17–31. [CrossRef]
83. Wetzels, M.; Odekerken-Schröder, G.; Van Oppen, C. Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS Q.* **2009**, *33*, 177–195. [CrossRef]
84. Bentler, P.M.; Bonett, D.G. Significance tests and goodness of fit in the analysis of covariance structures. *Psychol. Bull.* **1980**, *88*, 588–606. [CrossRef]
85. Lee, T.H. How recreation involvement, place attachment and conservation commitment affect environmentally responsible behavior. *J. Sustain. Tour.* **2011**, *19*, 895–915. [CrossRef]

86. Abellán, F.C.; García Martínez, C. Landscape and Tourism as Tools for Local Development in Mid-Mountain Rural Areas in the Southeast of Spain (Castilla-La Mancha). *Land* **2021**, *10*, 221. [CrossRef]
87. Pan, S.-Y.; Gao, M.; Kim, H.; Shah, K.J.; Pei, S.-L.; Chiang, P.-C. Advances and challenges in sustainable tourism toward a green economy. *Sci. Total Environ.* **2018**, *635*, 452–469. [CrossRef] [PubMed]

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Does the Integrated Development of Agriculture and Tourism Promote Farmers' Income Growth? Evidence from Southwestern China

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Abstract: The integrated development of agriculture and tourism is an effective driving force to boost farmers' income. We utilize a quasi-natural experiment design to test how such integrated development promotes the comprehensive rural revitalization. By adopting a panel dataset of 72 counties within Guangxi province from 2005 to 2020 and a PSM-DID method, we attempt to explore the effect of the integrated development of agriculture and tourism on farmers' income growth. The empirical results support our hypothesis that the integrated development of agriculture and tourism can effectively promote farmers' income growth and its regional heterogeneity with respect to tourism resource endowment and economic development level. We further discuss the transmission mechanism of the integrated development of agriculture and tourism and reveal that the agricultural technology level and agricultural production efficiency have mediating effects on improving farmers' income growth. However, a masking effect exists between the integrated development of agriculture and tourism and the level of non-agricultural employment. The possible reason is that industrial and commercial capital investment has crowded out the welfare originally belonging to the wage income and only allowed farmers to obtain the one-time land rent income.

Keywords: integrated development; farmers' income growth; PSM-DID; masking effect

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1. Introduction

The integration of agriculture and tourism can date back to Germany's "Civic Paradise" in the 1850s. Today, the integrated development of agriculture and tourism refers to a combination of agriculture and tourism industries to form a new setting of comprehensive economic activities (Streimikiene, 2015) [1]. This integrated approach unites agricultural and tourism resources through various means like agricultural sightseeing, rural tourism, leisure agriculture, homestays, etc. This synthesis promotes resource sharing, enhances resource utilization efficiency, and stimulates the coordinated growth of related sectors, ultimately yielding economic, social, and environmental benefits for rural areas and driving farmers' income growth (Barbieri, 2013) [2]. As an important factor to promote the development of rural areas and boost regional rural economy, the integrated development of agriculture and tourism has become a fundamental measure to deepen the industrial integration in rural areas, driving more attention by the government. With respect to the regional differences, and the integration of agriculture and tourism has formed heterogeneity in industrial modes and development concepts. The integration of agricultural resources and tourism management concepts helps to enhance the market awareness and

competitiveness of agricultural products, thereby improving the added value of agricultural resources. Consequently, it always been considered as an important means to promote farmers' income (Xiao, 2017) [3]. This has led the academic community to undertake extensive research on related topics. The initial research mainly focused on the conceptual connotation of the integration of agriculture and tourism (Briedenhann and Wickens, 2004; Zhang and Chen, 2009; Phillip and Hunter, 2010; Arroyo et al., 2013) [4–7], agriculture and tourism integration modes (Zheng et al., 2022; Li and Wang, 2022; Jiang, 2021) [8–10], its development path and integration level measurement (Zhang, 2022; Ouyang and Li, 2018; Lin et al., 2022; Yang et al., 2020; Zhou et al., 2016), and other aspects [11–15].

The combination of agricultural resources and tourism management concepts can significantly enhance the added value of agricultural resources, rendering it a consistent means of augmenting farmers' income (Gu et al., 2021) [16]. Especially in recent years, with the continuous deepening of the implementation of China's rural revitalization strategy, rural infrastructure has undergone substantial enhancements, public services have grown more comprehensive, and the foundational conditions for integrating agriculture and tourism have steadily improved. As a means of raising farmers' incomes and promoting non-agriculture employment, local governments are increasingly supporting to the integrated development of agriculture and tourism (Tew and Barbieri, 2012; Suardana and Sudiarta, 2017) [17,18]. Although the integration of agriculture and tourism can improve the efficiency of resource allocation and thus increase the added value through industrial integration, there is no clear answer on whether this added value can be converted into farmers' non-agricultural income. Studies have indeed explored the potential for farmers' income growth through the integration of agriculture and tourism. However, the existing literature has yet to provide a comprehensive explanation for the specific pathways through which this income enhancement occurs.

Traditional agriculture faces constraints such as limited land resources, technology, and labor, leading to diminishing marginal returns that restrict the growth efficiency of agricultural income. In contrast, the integration of agriculture and tourism industry introduces a fresh avenue for growth (Zhang et al., 2023) [19]. In terms of augmenting farmers' income, the tourism industry, rather than non-agricultural products, offers greater potential for expansion. The improvement of non-agricultural employment often means the optimization and upgrading the structures of rural economic industries, and the improvement of non-agricultural production efficiency is an important factor to ensure the sustainable growth of farmers' income (Hu et al., 2022) [20]. However, it is worth noting that the participation of tourism industry alone does not mean the increase in local non-agricultural employment income level, primarily due to the constraints imposed by various social capital limitations in the region (Nugraha et al., 2022) [21]. Therefore, the significance of policy analysis on the mechanism of integration of agriculture and tourism on farmers' income growth based on non-agricultural employment is richer than that of traditional mechanism studies. The superior natural conditions and profound endowment of human resources in Guangxi provide high-quality cultivation soil and development conditions for the integrated development of agriculture and tourism, which is an excellent quasi-experimental sample to test how the integrated development of agriculture and tourism can promote the growth of farmers' income in southwestern China. On top of using traditional framework to confirm the promoting effect of the integrated development of agriculture and tourism on farmers' income growth, this paper conducts further research from a new perspective of employment structure by introducing non-agricultural employment variables under a PSM-DID setting, and it tries to answer the question of whether or not that the integrated development of agriculture and tourism really improves farmers' income growth with the promotion of the policy of agricultural and tourism integration in Guangxi Demonstration County from the new perspective of employment structure. Meanwhile, it tries to clarify the mechanism of the integrated development of agriculture and tourism in improving farmers' income, and it provides beneficial policy enlightenment for the comprehensive realization of a rural revitalization strategy.

2. Literature Review

The academic community has engaged in extensive discussions from various perspectives regarding the potential of agriculture and tourism integration to stimulate farmers' income growth. Differing opinions exist regarding the impact of this integration on farmers' income.

2.1. Implementation Effect of the Integrated Development of Agriculture and Tourism

Firstly, from the perspective of the effect of the integration of agriculture and tourism towards the regional economic development, Privitera (2009) suggests that the integration of agriculture and tourism can create employment and increase economic benefits [22]. It plays an important role in delaying the reduction in the rural population, stimulating employment, increasing non-agricultural farmers' income, narrowing the income gap between urban and rural areas, etc. (Hwang and Lee, 2015; Lupi et al., 2017; Hu and Wang, 2017; Liu et al., 2017) [23–26]. Moreover, it contributes to regional sustainability and environmentally friendly growth (Liu et al., 2023; Wang et al., 2022) [27,28]. Secondly, the research relating to its poverty alleviation effect has revealed that eliminating poverty by solely relying on agricultural production has natural shortcomings. Since agriculture and tourism are naturally complementary industries, multi-industry coordinated development plays an important role in poverty reduction (Shan et al., 2017) [29]. Because the integration of agriculture and tourism has realized the transformation from the single-industry to the multi-industry integrated development, it can increase consumers of agricultural products, create rural employment opportunities, and improve the living standards in low-income areas (Tew and Barbieri, 2012; Suardana and Sudiarta, 2017) [17,18]. Due to its strong penetration characteristics, tourism has the advantages of deep integration with other industries, and its multiplier effect also plays a positive role in poverty reduction (Mitchell and Phucl, 2007) [30]. Thirdly, in terms of the agricultural production efficiency, it is no doubt that agricultural innovation is a potential way to promote rural revitalization and reduce agricultural pollution (Liu et al., 2021) [31]. The integration of agriculture and tourism improves agricultural production efficiency through the accumulation of agricultural technology capital, and it plays a positive role in promoting sustainable agricultural development (Hu and Zhong, 2019; Xu et al., 2023; Zhuang et al., 2021) [32–34]. Although the integrated development mode of agriculture and tourism has injected vitality into rural supply-side reform, the integrated development of agriculture and tourism is characterized by heterogeneity due to different production technology levels and resource endowments (Tao, 2019) [35]. Fourthly, regarding to its impact on rural industrial structure optimization, the integration of agriculture and tourism plays a positive role in the transformation and upgrading of the primary and tertiary industries (Ning, 2014; Xu, 2013) [36,37]. Zhong et al. (2020) suggests that such integration can promote the optimization and upgrading of rural industrial structure by guiding consumption and increasing capital accumulation [38]. Furthermore, the integration of agriculture and tourism fosters social capital and community engagement, enabling communities to effectively respond to large-scale crises like epidemics and maintain its sustainable development (Prayitno et al., 2022) [39]. Although recent research perspectives primarily focus on the effects of the integration of agriculture and tourism on regional economic growth, agricultural labor efficiency, green poverty reduction and industrial structure optimization, there is a notable gap in discussing the promotion of this integration on macroeconomic development and micro labor production efficiency. In addition, few studies delve into the mechanism analysis and verification of the income growth effect resulting from the integrated development of agriculture and tourism.

2.2. Impact of Integration of Agriculture and Tourism on Farmers' Income

There is still controversy about whether the integrated development of agriculture and tourism can promote the farmers' income growth. From the perspective of mechanism, one view holds that the integration of agriculture and tourism can increase farmers' income

by creating more employment opportunities, improving agricultural labor production efficiency, promoting sales of local agricultural products, optimizing rural industrial structure, etc. (Li et al., 2018; Everett and Slocum, 2013; Kline et al., 2016; Cunha et al., 2020; Zhong and Tang, 2020) [40–44]; The other view is that the integrated development of agriculture and tourism will destroy the rural ecological environment and damage farmers' long-term interests. Moreover, the instability of the rural tourism market, limited rural tourism resources, and insufficient investment in the integrated development of agriculture and tourism will cause farmers' lack of confidence, thus affecting their participation in such practices. Consequently, the potential income-boosting effect of this integration may not fully materialize (Mastronardi et al., 2015; Islam and Carlsen, 2016; Barbieri, 2020; Hochuli et al., 2021) [45–48]. In terms of macro research, Kyu-Sok (2006) verified the income-increasing effect of the integration of agriculture and tourism on non-agricultural income by using secondary EU government data [49]. Xiao (2014) used China's provincial data to test the promoting effect of the integration of agriculture and tourism on the increase in farmers' income through the Spatial Durbin Model [50]. However, Manuel et al. (2015) believed that the integrated development of agriculture and tourism would bring about negative impacts such as environmental damage and price rise, which had a restraining effect on farmers' income growth [51]. There are also contradictory conclusions in the study of the income growth effect of the integrated development of agriculture and tourism through the micro-survey data. Yang (2012) conducted a correspondence analysis based on a survey of 1850 farmers in Chengdu, revealing that income derived from integrated agricultural and tourism facilities, like agritainment, significantly contributes to farmers' income growth [52]. Yao et al. (2016) conducted a study involving 605 farmers in Sichuan, Zhejiang, and Hunan provinces. Their research indicated that annual income for those not involved in rural tourism was 70,000 RMB lower compared to those who participated in such activities [53]. In contrast, Alex et al. (2014) used survey data from 74 rural tourism businesses across 19 villages in Greece's Corinth Mountain region. Their findings highlighted economic losses associated with the development of leisure agriculture in the region. This was primarily due to the dominance of foreign operators in services like bed and breakfast establishments, limiting local farmers' ability to leverage these opportunities for poverty alleviation and income growth [54]. Furthermore, despite the introduction of rural tourism in the case of Pujon Kidul Tourism Village in Indonesia, it resulted in increased employment opportunities but still yielded low economic income. This limitation is attributed to factors related to social capital, particularly the level of education (Nugraha et al., 2021) [55].

The disparities in the conclusions drawn from the aforementioned literature primarily stem from differences in research samples and limitations in research methods. In terms of research samples, the integrated development of agriculture and tourism maybe different in different regions and cultural backgrounds. Most studies adopted provincial level data and ignore regional heterogeneity factors. In terms of research methods, Huang et al. (2022) pointed out that most studies are based on macro data, use farmers' per capita income as the explained variable, and directly regress with the integrated development of agriculture and tourism. Without excluding other driving factors affecting farmers' income growth, the net effect of the integrated development of agriculture and tourism on farmers' income could not be accurately identified [56]. Moreover, the existing studies often neglect other crucial assessment indicators required for the selection of demonstrative counties, such as regional economic development and tourism resources. This oversight introduces a "self-selection" problem during sample selection, which can lead to biased regression results.

Guangxi's integrated development of agriculture and tourism is driving towards the direction of industrialization and specialization (Meng et al., 2021) [57]. However, there are still questions on its impact assessments, such as whether there is an income growth effect, and how to adopt supportive measures with respect to local conditions. Therefore, this paper utilize a county-level panel data and the PSM-DID method to deal with the potential sample self-selection problem and endogenous issue caused by missing variables,

and try to find answers to the above questions by revealing the impacts of the integrated development of agriculture and tourism on farmers' income growth and accounting for its action mechanism.

3. Theoretical Analysis and Research Hypotheses

From the perspective of growth pole theory, the integration of agriculture and tourism can be defined as an economic growth pole centered on a specific scale rural area (Rothbarth, 1941) [58]. By attracting the input of external tourists and resources, the integration mode of agriculture and tourism promotes the development and upgrading of local agriculture, forming a new economic growth pole, which can form a strong driving factor and radiation effect, bring more employment opportunities to rural areas, and help farmers achieve income increase. At the same time, according to the Petty–Clark theorem, with economic development, people tend to shift from the primary industry (agriculture) to the secondary industry (manufacturing industry) and the tertiary industry (service industry) (Clarkcg, 1957) [59]. Thus, as far as rural areas are concerned, creating the integration form of agriculture and tourism can promote the development of local tourism and service industries, provide more employment opportunities, and create more economic income. Furthermore, with the development of tourism, the agricultural and tourism integration practices can provide a platform for local farmers to sell agricultural products and other sideline products, and improve their income level. Moreover, according to the Petty–Clark theorem, the higher the proportion of the workforce employed in high-paying industries, the higher the per capita income obtained (Perroux, 1950) [60]. Therefore, the integration of agriculture and tourism can increase the proportion of local farmers engaged in the secondary and tertiary industries, promote the development of local economy, and promote the improvement of rural living standards. Based on the above analysis, Hypothesis 1 is proposed.

Hypothesis 1 (H1). *Agriculture and tourism integrated development can promote farmers' income growth.*

3.1. The Transmission Mechanism of the Integrated Development of Agriculture and Tourism on Farmers' Income Growth

3.1.1. Increase Rural Employment Opportunities and Farmers' Income

Studies have shown that the integrated development of agriculture and tourism is conducive to promoting the transfer of rural surplus labor to non-agricultural employment (Liu et al., 2017) [26]. On the one hand, the integration of agriculture and tourism helps to promote the development of rural tertiary industry, create more local jobs, and increase the employment opportunities of rural surplus labor force (Richard, 2013) [61]; on the other hand, the integrated development of agriculture and tourism accelerates the process of sending industrial and commercial capital to the rural areas, promotes the multi-sectoral allocation of rural labor resources, and improves the allocation of rural employment structure (Su et al., 2019) [62]. In the reality that non-agricultural wages are constantly higher than agricultural productive wages, multi-sector employment of rural household labor is more conducive to maximizing household income (Schultz, 1964) [63], which leads to a large number of rural labor migrating to cities, resulting in serious problems of rural hollowing and aging. Agriculture and tourism integrated development practices can solve the problem of non-agricultural employment demand of rural labor and its time and space mismatching, which is conducive to attracting talents to return to the rural area. At the same time, due to the return of talents and land rent advantages, in recent years, the integration of agriculture and tourism has created many innovative business models such as "village scenic spots" and "enterprises + farmers", which has broadened the rural employment horizon and entrepreneurial options (Wang and Fan, 2006) [64]. Accordingly, Hypothesis 2 is proposed.

Hypothesis 2 (H2). *Agriculture and tourism integrated development can create more rural employment opportunities and farmers' income by strengthening rural non-agricultural employment levels*.

3.1.2. Promote Farmers Transformation and Improve Their Skills

Land scaling management is the foundation for the high-quality development of the integration of agriculture and tourism (Wang et al., 2016) [65]. Before adopting the integrated development of agriculture and tourism, the formation of rural areas was a single, unplanned, and spontaneous behavior. Rural areas and farmland were still maintained in a self-sufficient and fragmented production mode by farmers. However, farmers' income structure began to diversify after introducing those practices. When the tourism service income was greater than the agriculture production income, some rural talents began to carry out a unified land transfer for small farmers in pursuit of greater economic effects, realized large-scale land management by adopting joint management and enterprise management, converted traditional fragmented farmland into a large-scale land setting, provided a better environment for agricultural machinery usage, and improved the mechanization level of agricultural production (Woods, 2009) [66]. As the main body of promoting agricultural science and technology, the government will also strongly support the integrated development of rural areas and create conditions for the production of agricultural science and technology (Barrett and Carter, 2010) [67]. The reason is that the capital accumulation brought by simple agricultural labor cannot meet the conditions for farmers to use advanced agricultural technology and equipment, which blocks the progress of agricultural technology. However, the integrated development of agriculture and tourism can improve farmers' capital income and reduce the capital constraint of agricultural production. Especially for households with a labor shortage, mechanical input can be increased to make up for the insufficient input of labor factors. It not only promoted the progress of agricultural science and technology, but also increased the farmers' income (Gao and Wu, 2017) [68]. Meanwhile, investors' management concept and quality brought by the agriculture and tourism integrated development practices are higher, which can spread advanced production and management knowledge to the rural areas, improve the overall quality of rural agriculture and tourism practitioners, and promote the improvement of labor productivity. Therefore, Hypotheses 3 is proposed.

Hypothesis 3 (H3). *The agriculture and tourism integrated development can promote farmers' income growth by improving the use of agricultural technology and agricultural production efficiency*.

3.2. The Moderating Mechanism of the Integrated Development of Agriculture and Tourism on Farmers' Income Growth

The integrated development of agriculture and tourism can promote the level of non-agricultural employment and agricultural production efficiency in rural areas, and it can help to improve farmers' income level. However, those practices must be based on the existing rural tourism resource endowment, and the level of regional economic development is also an important factor affecting the income growth. Rural tourism resources are mainly divided into three types: natural scenery, folk culture, and characteristic products. Different types of resources will have different impacts on the agricultural and tourism integrated development practices. In addition, even with enriched rural tourism resources, rural tourism is still difficult to develop without fully equipped infrastructure and complete public services (Mwesiumo et al., 2022) [69]. As "suburban rural tour" has become the preferred way for the public to hang out during the weekend, rural tourism spots around big cities are more favored (Chen et al., 2009) [70]. Due to the insufficient consumption demand in less developed areas, the income growth effect of agriculture and tourism integrated development practices are still difficult to be fully played (Liu et al., 2020) [71]. Thus, this paper further proposes the following Hypotheses 4 and 5.

Hypothesis 4 (H4). *The level of economic development positively regulates the promotion effect of the agriculture and tourism integrated development on farmers' income growth.*

Hypothesis 5 (H5). *The rural tourism resources endowment positively adjusts the promotion effect of the agriculture and tourism integrated development on farmers' income growth.*

Our research framework is constructed in Figure 1:

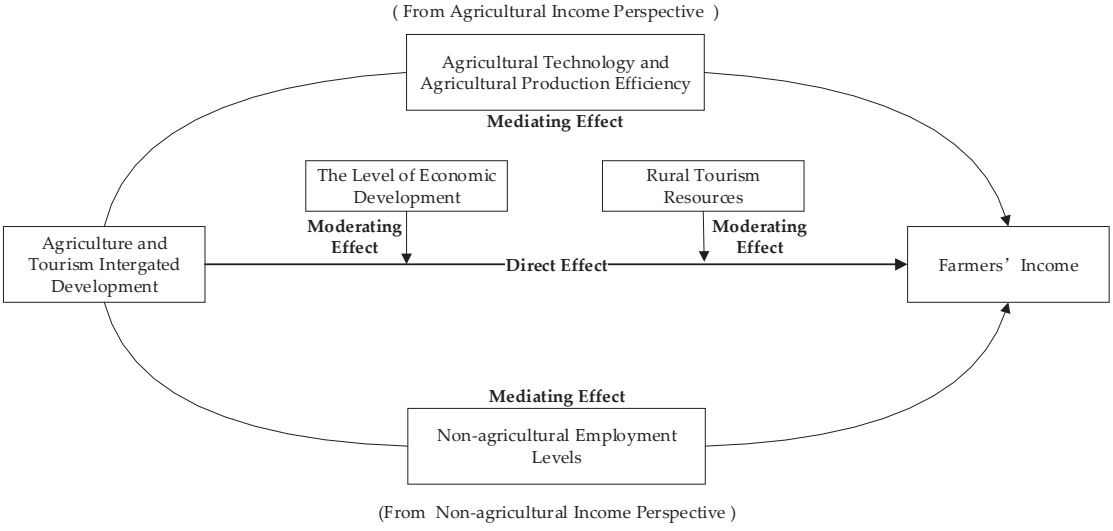

Figure 1. The mechanism framework of agriculture and tourism integrated development on farmers' income growth.

4. Data and Methods

4.1. Data Source and Study Area Selection

4.1.1. Data Source

We used regional county-level data of Guangxi province in this study. Considering the differences in resident composition between urban districts and counties, we first excluded all urban districts and obtained a sample that contains 72 counties within Guangxi. Concerning national leisure agriculture and rural tourism, demonstrative counties were selected from 2010 to 2017; the statistical caliber for the farmers' per capita disposable income has changed since 2005, and with the interference of COVID-19, we then bound the time interval of our dataset from 2005 to 2020. After adopting a PSM method to match control groups for demonstrative counties in the common support area, our final dataset contains 13 counties in the treatment group and 59 counties in the control group, The spatial layout of these research sample is shown in Figure 2. Except for the policy data of demonstrative counties disclosed by the Ministry of Agriculture and Rural Affairs of China, the data of control variables, mediating variables, moderating variables, and covariates were all derived from the Guangxi Statistical Yearbook, Guangxi County Statistical Bulletin, and the CSMAR county economy database. A multiple fitting value method is used to deal with a small number of missing values. In order to eliminate the influence of extreme values, we winsorized the data at 1% level.

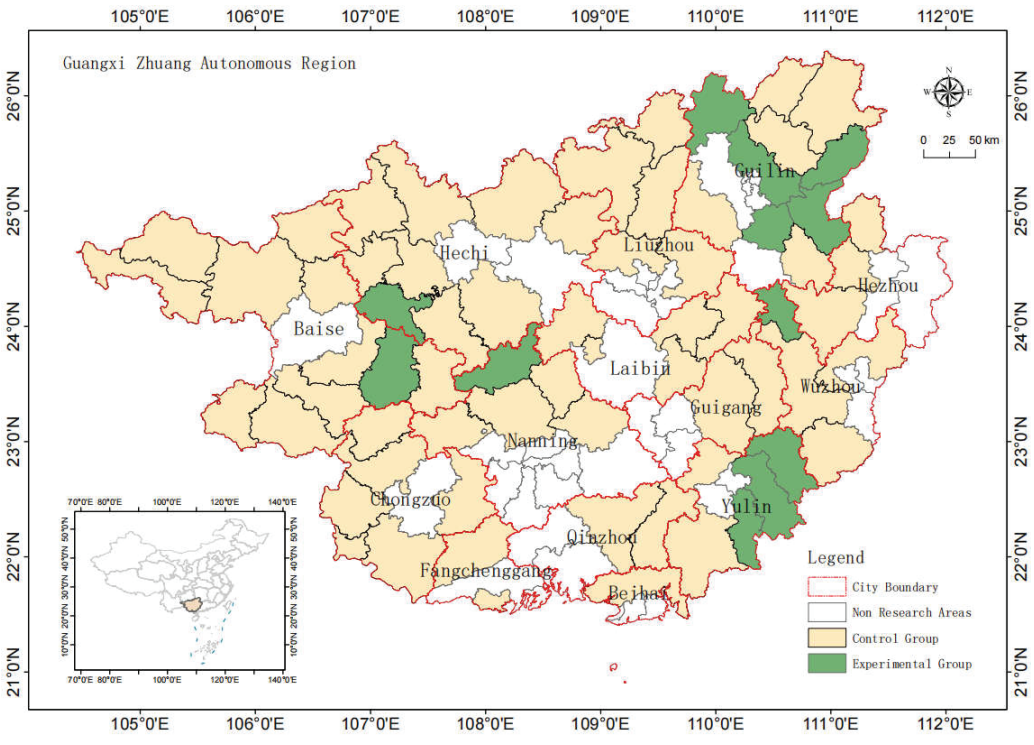

Figure 2. Map of the study area. Source: This map is based on the standard map GS(2022)4305 [72] downloaded from the website of the standard map service system of the Ministry of Natural Resources, and the base map is not modified. The following figures are the same.

4.1.2. Study Area Selection

Guangxi is located in southwestern China and enriched in natural scenery and tourism resources, such as karst landscapes, which offers unique advantages for the integrated development agriculture and tourism. Figure 3 shows the rural per capita income and tourist attractions spatial distribution map. With its abundant natural and cultural resources, favorable geographical locations, and strong poverty alleviation policies support to improve rural infrastructure, Guangxi's tourism has played an important role in boosting rural income in recent years through the integrated development of agriculture and tourism practices, which provides a good foundation for testing such integrated development impact on farmers' income growth. However, in the process of rural economic development in Guangxi, there are still drawbacks in terms of the overall level of integrated development of agriculture and tourism, and the efficiency of natural and human resources utilization (Qiao and Wu, 2020) [73]. Compared with the eastern provinces, Guangxi's rural per capita income is still significantly lower. Therefore, studying the effect of Guangxi's integrated development of agriculture and tourism on farmers' income growth and its mechanism can help us to depict a better picture for optimizing the industrial policy effects and promoting the rural revitalization in southwestern China.

4.1.3. Defining the Integrated Development of Agriculture and Tourism

In China, to facilitate the integrated development of agriculture and tourism, the Ministry of Agriculture and the National Tourism Administration have jointly carried out the establishment of National Leisure Agriculture and Rural Tourism Demonstrative Counties and introduced a series of supporting policies since 2010. Under the support of

these policies, the integrated development of agriculture and tourism has triggered the development of related rural industries in China. A selected county must possess specific characteristics such as the necessary resource endowment, strategic location, industrial characteristics, and cultural history, and take leisure agriculture and rural tourism as the leading industries for its economic development (Zhu, 2022) [74]. Since the demonstrative counties serve as quintessential distinctive examples of China's the integrated development of agriculture and tourism, offering insights into the context of rural revitalization (Hu and Zhong, 2019) [32]. Therefore, we chose it to reveal the main interest of this study.

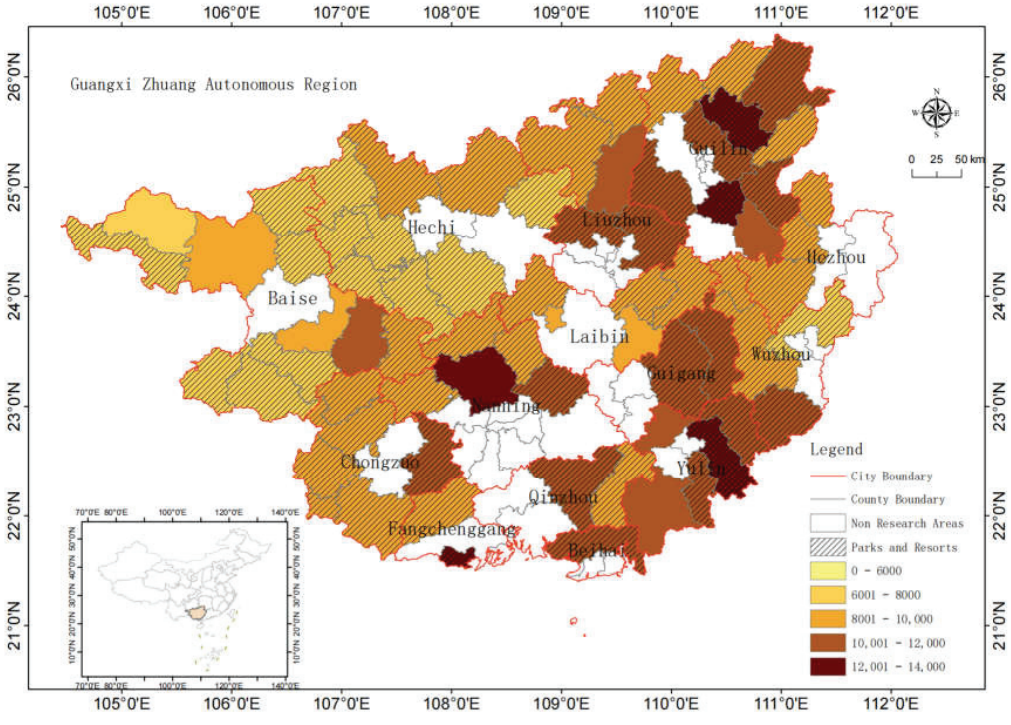

Figure 3. Map of rural per capita income and tourist attractions in Guangxi.

4.2. Model Specification

This paper takes the integrated development of agriculture and tourism as a "quasi-experiment" and uses the multi-stage DID method to estimate its effect on farmers' income growth. Since we use the selection of National Leisure Agriculture and Rural Tourism Demonstrative Counties as approximate replacement for the implementation of integrated development of agriculture and tourism, one cannot avoid a selection bias problem if simply using non-selected counties as the control group due to demonstrative county selection not being a random selection process. Therefore, we first use PSM method to match the treatment group with similar control group and then selected the successfully matched samples as the regression sample interval, and we adopted the multi-stage DID method to test the net effect of the integrated development of agriculture and tourism on farmers' income.

4.2.1. PSM Modeling

The propensity score matching method (PSM) was first proposed by Heckman. Under the counterfactual framework, the PSM model creates a random simulation experiment, introducing covariates with the same characteristics of the treatment group and the control

group. As long as the propensity score is the same, the treatment group and the control group can be matched. The tendency index can be expressed as the probability of whether the treatment group is processed or not. Direct matching may cause the "dimensional curse" problem, if there are fewer covariates, it may lead to the matching of unsuitable control group, but if there are too many covariates, high-dimension matching will lead to the data sparsity problem. By referring to Rosenbaum (1983) and Imbens (2014) [75,76], we use the caliper nearest neighbor matching method to determine the matching covariates X_i. The logit model for estimating propensity score is set as follows:

$$\ln(p_i/1-p_i) = \alpha_0 + \alpha_1 \text{Base} + u_i \quad (1)$$

$$P(X_i) = \Pr[G_i = 1|X_i] = \exp(X_i\beta)/1 + \exp(X_i\beta) \quad (2)$$

Equation (1) represents the propensity score of each county, and "Base" stands for covariates. The specific process is as follows: we first introduce the control variables into the propensity score estimation equation, and then we bring in the application package of the demonstrative counties covariates to the equation successively to test the likelihood statistic with the benchmark equation and obtain the log-likelihood statistic. Comparing the maximum log-likelihood statistic with the specified threshold, if the statistic is greater than the threshold value, the corresponding covariates is added to the equation, and the above process is repeated. Through matching, samples within the common support domain are selected for the subsequent model test, and samples outside the common support domain are eliminated.

4.2.2. Benchmark Regression

As mentioned above, the selection process for National Leisure Agriculture and Rural Tourism Demonstrative Counties is carried out in stages and batches. Due to variations in the establishment time for different demonstrative counties, and the nature of "quasi-experiment", which provides a testable foundation to allow us to capture the differences simultaneously at both the time and regional levels by adopting the "Difference-in-Difference, DID" approach. Additionally, considering the potential for selection bias, we follow the Zhu (2022) [74] and Ge (2023) [77] methods to employ the PSM-DID estimation to assess the net effect of the integrated development of agriculture and tourism on farmers' income growth. The benchmark regression is defined as Equation (3):

$$Y_{it} = \alpha + \beta DID_{it} + \delta control_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (3)$$

where Y_{it} is farmers' income of county i in time t; DID_{it} is the core explanatory variable, which is composed of the interaction term between the county dummy variable and the time dummy variable; $control_{it}$ includes all control variables and covariates; and λ_i, μ_t, and ε_{it} represent the individual fixed effect, year fixed effect, and random error terms, respectively.

4.2.3. Transmission Mechanism Modeling

According to the transmission mechanism discussion above, the integrated development of agriculture and tourism practices can create more rural employment opportunities and increase farmers' income by strengthening rural non-agricultural employment levels and promoting farmers' income growth by improving the use of agricultural technology and agricultural production efficiency. In order to verify Hypothesis H2 and H3, we use the stepwise regression method by referring to Baron and Kenny (1986) and Judd and Kenny (1981) [78,79] to test the mediating effect, and the model is constructed as follows:

$$Y_{it} = \alpha + \omega_1 DID_{it} + \delta control_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (4)$$

$$M_{it} = \alpha + \alpha_1 DID_{it} + \delta control_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (5)$$

$$Y_{it} = \alpha + \beta_1 DID_{it} + \sigma_1 M_{it} + \delta control_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (6)$$

where M_{it} is the mediating variable which represents the level of agricultural technology adoption (tech), non-agricultural employment level (n.ag_emp), and agricultural labor productivity (ag_labor), respectively. The total effect of the integrated development of agriculture and tourism is ω_1, the direct effect is β_1, and the indirect effect is α_1*σ1. If part of the effect of the integrated development of agriculture and tourism is indeed generated by the mediating variable M_{it}, the following two conditions must be met simultaneously:

a. α_1 has a significant positive influence on the mediating variable M_{it};
b. In Equation (6), the mediating variable M_{it} has a significant positive impact on farmers' income, and the regression coefficient of DID_{it} decreases after adding the mediating variable; that is, $\beta_1 < \omega_1$.

4.3. Variable Selection

4.3.1. The Explained Variable and Explanatory Variable

In order to analyze the impact of agriculture and tourism integrated development on farmers' income, we follow Yang et al. (2022) and Peng et al. (2022) to use the per capita disposable income of rural households as the explained variable [80,81]. The core explanatory variable is the integrated development of agriculture and tourism, which reflects the integration of agriculture and tourism to achieve the goal of coordinated development from economic, ecological, and social aspects.

The selection of National Leisure Agriculture and Rural Tourism Demonstrative Counties is a nationwide supportive policy from the Ministry of Agriculture and Rural Affairs that aims to expand the multiple functions of agriculture and promote high-quality development of rural industries; the policy implements the rural leisure tourism promotion plan, develops multiple functions of agriculture, taps the multiple values of rural areas, and promotes the moderate concentration of resources. The selection criteria also emphasizes the coordination and integration of agriculture and tourism in terms of economy, ecological environment, tourism infrastructure, tourism products and agricultural production conditions, which can better represent the integration level of agriculture and tourism. We utilize this to set up a quasi-natural experiment following Ren et al. (2022) and Huang et al. (2022) [56,82], and we define the integrated development of agriculture and tourism as a dummy variable. If the sample county is selected as a rural tourism demonstrative county, the value is equal to 1, and otherwise it is 0. We then define the period dummy variable and set the year after the sample county is selected as the experiment period and give it a value of 1, and we define the year prior to selection as the control period, with a value of 0. By multiplying the selection and year dummies, the interaction term (did) is obtained, which is the core variable that we concerned with and which indicates the real effect of the experimental group after vigorously promoting the implementation of the integrated development of agriculture and tourism practices. With this setting, the net effect of the integrated development of agriculture and tourism on farmers' income can be better captured.

4.3.2. Mediating Variables and Moderating Variables

The mediating variables and moderating variables we selected for this study are the level of agricultural technology adoption (tech), non-agricultural employment level (n.ag_emp), agricultural labor productivity (ag_labor), economic development level (gdp), and tourism resources (tour), respectively. Among them, the non-agricultural employment level is based on the measurement method given by Andaleeb and Sumit (2020), and Luan et al. (2017) [83,84], using the total number of rural employment and subtracting the rural employment of agriculture, forestry, husbandry, and fishery. The level of agricultural technology adoption refers to Wang et al. (2017) and Zhao et al. (2022) [85,86], taking the ratio of the mechanized cultivation land area over the total cultivated land area as

the standard measurement. In empirical studies, per capita output value is often used to measure labor productivity. We follow Xin and Qin (2020) and use the ratio of the added value of the primary industry at the county level over the number of employees in agriculture, forestry, animal husbandry, and fishery to measure it with the consideration of the county level data availability [87]. The moderating variables economic development level and tourism resources are measured by gross domestic product and whether or not the county has national 4A-level tourist attractions, respectively (Huang et al., 2022) [56].

4.3.3. Control Variables and Covariates

In order to exclude other influences on farmers' income, based on the practices of scholars Ren et al. (2022) and Huang et al. (2022) and the availability of data, we include agriculture development level (ag_level), industrial structure (ind), fiscal expenditure (fiscal_ex), finance development level (fin), fixed asset investment (invest), education input level (edu), communication infrastructure situation (comm), and mechanization level (mech) into the model as control variables set. For covariates set, we first include all control variables as the base covariates set [56,82]. Through the application package of demonstrative counties, we found that agricultural population and tourism development level are included as indicators for application. Therefore, we also select rural agriculture employed population (r_ag.pop) rural employed population (rural_pop) and total number of tourists received (tour_reci.) into our covariates set. The descriptive statistical characteristics and the data source of the variables are shown in Table 1.

Table 1. The descriptive statistical characteristics and the data source of the variables.

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max	Data Source
Y	farmers' income	1152	0.7131	0.4200	0.1407	2.1173	Guangxi Statistical Yearbook
did	interaction term	1152	0.0755	0.2643	0	1	Ministry of Ag. and Rural Affairs
tech	ag. tech adoption	1152	0.3010	0.1963	0.0055	0.9812	Guangxi Statistical Yearbook
n.ag_emp	non-ag. employment	1152	9.1944	9.0531	0.4800	51.3375	CSMAR county economy database
ag_labor	ag labor productivity	1152	1.3393	0.8444	0.1955	6.6900	CSMAR county economy database
gdp	economic dev. level	1152	82.5900	69.5779	4.8330	372.8099	Guangxi Statistical Yearbook
tour	tour resources dummy	1152	0.3897	0.4879	0	1	Guangxi County Statistical Bulletin
ag_level	agriculture dev. level	1152	0.2795	0.0885	0.0652	0.5168	CSMAR county economy database
ind	industrial structure	1152	0.3361	0.0982	0.1384	0.6946	Guangxi Statistical Yearbook
fiscal_ex	fiscal expenditure	1152	0.2758	0.1794	0.0591	1.2646	Guangxi Statistical Yearbook
fin	finance dev. level	1152	0.5499	0.2926	0.1087	3.0529	Guangxi Statistical Yearbook
invest	fixed asset invested	1152	0.9012	0.4639	0.0370	4.5767	Guangxi Statistical Yearbook
edu	education input level	1152	0.1410	0.0361	0.0264	0.3523	Guangxi Statistical Yearbook
comm	comm. infrastructure	1152	0.5989	0.4103	0.0364	3.0031	Guangxi Statistical Yearbook
mech	mechanization level	1152	31.4210	19.2885	4.0000	129.0000	Guangxi Statistical Yearbook
r_ag.pop	rural ag. employed pop	1152	1.6258	1.0231	0.2920	5.3908	Guangxi Statistical Yearbook
rural_pop	rural employed pop.	1152	2.5452	1.8837	0.4610	10.5245	Guangxi Statistical Yearbook
tour_reci.	tourists received (in mil)	1152	25.7739	28.0781	1.5258	152.0974	Guangxi Statistical Yearbook

5. Empirical Result Discussion

5.1. Average Effect of the Integrated Development of Agriculture and Tourism on Farmers' Income Growth

Since it is impossible to observe the difference in farmer's income between sample counties, this paper first selected rural agriculture employed population (r_ag.pop), rural employed population (rural_pop), total number of tourists received (tour_reci.), and control variables to perform a matching process. The adjacent matching method in PSM matched the data according to a 1:2 matching, with a maximum distance of 0.05 between the test group and the matching group. The difference in differences (DID) estimation for the matched sample was then calculated with a common trend assumption. As seen in Figure 4, the kernel density curves of the treatment group and the control group differed notably before PSM matching. After matching, the kernel density curves of the two groups of samples coincided, proving that the characteristic variables of the sample county areas in the two sample groups were relatively similar.

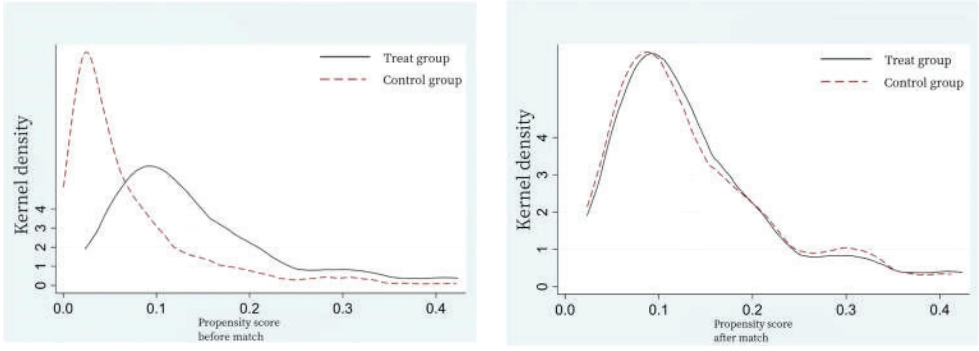

Figure 4. Comparison of propensity scores between the treatment group and control group pre- and post-PSM matching.

The matching balance test results of the scores of each covariate are shown in Table 2. The absolute values of standard deviations of all variables show a downward trend, and the t-test results were not significant. It indicates that there is no significant difference between the matching treatment group and the control group, and the PSM balance test is satisfied.

Table 2. PSM balance test result.

Variable		Mean		% Bias	*t*-Test	
		Treatment	Control		t	P > t
ag_level	Unmatched	0.2434	0.2825	−48.4	−3.99	0.000
	Matched	0.2434	0.2333	12.5	0.81	0.422
ind	Unmatched	0.3890	0.3319	60.3	5.28	0.000
	Matched	0.3827	0.3841	−1.5	−0.09	0.928
fiscal_ex	Unmatched	0.2705	0.2762	−3.6	−0.29	0.772
	Matched	0.2687	0.2892	−12.9	−0.99	0.326
fin	Unmatched	0.7052	0.5373	63.3	5.20	0.000
	Matched	0.6977	0.7466	−18.4	−1.16	0.247
invest	Unmatched	1.0577	0.8885	41.6	3.28	0.001
	Matched	1.0546	1.0414	3.2	0.21	0.831
edu	Unmatched	0.1385	0.1413	−7.1	−0.67	0.501
	Matched	0.1391	0.1371	5.3	0.35	0.724
comm	Unmatched	0.8677	0.5770	77.0	6.46	0.000
	Matched	0.8564	0.8839	−7.3	−0.48	0.635
mech	Unmatched	36.5290	31.0040	31.4	2.58	0.010
	Matched	36.5300	34.0060	14.4	0.88	0.383
r_ag.pop	Unmatched	220.0000	260.0000	−19.6	−1.62	0.106
	Matched	220.0000	210.0000	7.0	0.53	0.600
rural_pop	Unmatched	140.7300	164.3600	−26.1	−2.07	0.038
	Matched	142.0800	133.7200	9.2	0.69	0.490
tour_reci.	Unmatched	6066.8000	2292.3000	118.8	12.89	0.000
	Matched	5687.3000	5453.7000	7.4	0.40	0.689

5.2. Benchmark Regression Result Discussion

Table 3 presents the estimated results of DID under different methods. The interaction term shows a positive correlation at 1% level of significance in all models, indicating that the demonstrative counties focusing on the integrated development of agriculture and tourism have a promotion effect on farmers' income growth in comparing with non-demonstrative counties, which is consistent with Ren et al.'s (2022) conclusion [82]. Thus, Hypothesis 1 is confirmed. Compared with models (1) and (2), when the individual fixed effect and the time fixed effect were not added, farmers' income in the treatment group increased

by 1660 RMB on average, when compared with the control group, while farmers' income growth dropped to 373 RMB after the individual fixed effect and the time fixed effect were considered. After PSM matching, the approximate random matching group is more similar to the quasi-natural experiment, and farmers' income growth increased to 439 RMB (model 3), indicating that with the continuous robustness of the model design, the net promotion effect of the integrated development of agriculture and tourism on farmers' income growth is also increasing, which is consistent with the dynamic regression results shown in Table 4.

Table 3. Benchmark regression result.

Variable	Y		
	OLS (1)	FE (2)	PSM-DID (3)
did	0.1660 ***	0.0373 ***	0.0439 ***
	(3.3334)	(4.0238)	(4.4151)
Control	YES	YES	YES
Individual fixed	NO	YES	YES
Time fixed	NO	YES	YES
N	1152	1152	981
Adj. R^2	0.8160	0.9812	0.9804

Note: *** $p < 0.01$. The value in parentheses below the coefficient is the standard error.

Table 4. Parallel trend test result.

Variable	Y
	Parallel Trend Test
pre4	−0.0217
	(−0.86)
pre3	−0.0117
	(−0.46)
pre2	−0.00371
	(−0.15)
pre1	0.0184
	(0.72)
current	0.0357
	(1.45)
post1	0.0361
	(1.47)
post2	0.0506 **
	(2.05)
post3	0.0570 **
	(2.32)
post4	0.0504 *
	(1.73)
_cons	0.775 ***
	(261.30)
Individual fixed	YES
Time fixed	YES
N	981
Adj. R^2	0.9624

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The value in parentheses below the coefficient is the standard error.

5.3. Robustness Checks

5.3.1. Parallel Trend Test

The primary premise of multi-stage DID is that the treatment and control groups need to maintain a common trend before the experiment occurs. Therefore, this paper uses Beck's (2010) processing method to test the parallel trend, and it multiplies the year dummy

variable before the demonstrative county is selected by the county dummy variable as the explanatory variable [88]. The specific setting is as follows:

$$Y_{it} = \partial_0 + \sum_{d=-4}^{-1} \beta_d pre_d + \beta_0 current + \sum_{s=1}^{4} \beta_s post_s + \lambda_i + \mu_t + \varepsilon_{it} \quad (7)$$

The significance of pre_d and $post_s$ is the main focus of parallel trend test, which reflects the difference in time trend between the treatment group and the control group. pre_d represents the 1 to 4 years before the integrated development of agriculture and tourism practices, current represents the year that implementing integrated development of agriculture and tourism practices, and $post_s$ focuses on the next 4 years after the integrated development of agriculture and tourism practices. For any time period longer than 4 years, we assign either d = 4 (if before), or s = 4 (if after), respectively, and current is set as the base year. Table 3 shows the estimated results of Equation (4). One can clearly see that in the first 4 years before the integrated development of agriculture and tourism practices, all estimated coefficients are not significant, but after the practices are implemented, except for the first year, other variables were positively significant with farmers' income, and the income growth effect coefficient showed an increasing trend. The results indicate that the benchmark regression model meets the parallel trend hypothesis, and the integrated development of agriculture and tourism helps farmers on gaining more income.

5.3.2. Replace Explained Variables

In the benchmark regression, the explained variable uses the nominal income data directly provided by the Guangxi Statistical Yearbook without taking into account the impact of price and inflation factors. Thus, we replaced farmers' income data to real income Y_2 (2005 as the base period) eliminating the impact of price factors caused by economic fluctuations. The re-estimated results are shown in models (4)–(6) in Table 5. The interaction term is still significantly positive in all three models, which indicates that the empirical results showing that the integrated development of agriculture and tourism effectively improves farmers' income growth was robust.

Table 5. Robustness check results.

Variable	Y_2			Y
	OLS (4)	FE (5)	PSM-DID (6)	PSM-DID (7)
did	1.0727 ***	0.2488 ***	0.2791 ***	0.0205 *
	(3.3394)	(4.2091)	(4.3887)	(1.9559)
Control	YES	YES	YES	YES
Individual fixed	NO	YES	YES	YES
Time fixed	NO	YES	YES	YES
N	1152	1152	981	826
Adj. R^2	0.8176	0.9807	0.9794	0.9803

Note: *** $p < 0.01$; * $p < 0.1$. The value in parentheses below the coefficient is the standard error.

5.3.3. Matching Method Switch

The caliper nearest neighbor matching method is used in propensity score matching process. In order to reduce the impact of limitations of matching methods on empirical results, we introduced the kernel matching method (Bockerman and Ilmakunnas, 2021) and re-performed a matching process [89]. The regression results after matching are shown in model (7) in Table 5. Although the number of the observations decreased to 826, the estimated the coefficient of the interaction term still showed a positive correlation at a 10% significance level, and the control variables were tended to be consistent with previous regression results. Thus, the conclusion was not affected by changing the propensity score matching method.

5.3.4. Placebo Test

According to the existing literature, there are various factors affecting the effect of farmers' income growth on the integrated development of agriculture and tourism. Although we mentioned, tested, and verified the assumptions of the PSM-DID in above analysis, there may still be pseudo-regression results caused by non-observed missing variables. Therefore, we followed Heckman and Ichimura (1998) to execute a placebo test [90]. The detail process is as follows: first, 13 counties were randomly selected from 72 counties according to the year, and these counties were set as the "pseudo-experimental group", and the remaining samples were used as the control group; next, an experiment time was randomly generated for each newly generated "pseudo-experimental group"; finally, we regressed the interaction terms of "pseudo-experimental group" and "pseudo-experimental time" to obtain the estimated coefficient of the simulation. In theory, since the interaction terms are randomly generated, there is no significant effect on the explained variables. Therefore, the expected coefficient of the interaction term is 0, and the *p*-value is not significant. We repeated the above random process 500 times, and the results are shown in Figure 5. One can see from the figure that most of the blue dots are distributed above the red virtual horizontal line, indicating that the *p*-value of most of the DID regression coefficients is not significant, and the mean value is close to 0. Meanwhile, the actual estimated coefficient of the red virtual vertical line in the figure is 0.0439, which is obviously an outlier in the random distribution, with only one point on its right side. Therefore, the placebo test verified the benchmark regression results and proved that there was no obvious missing variable bias in the empirical results. The empirical results were robust.

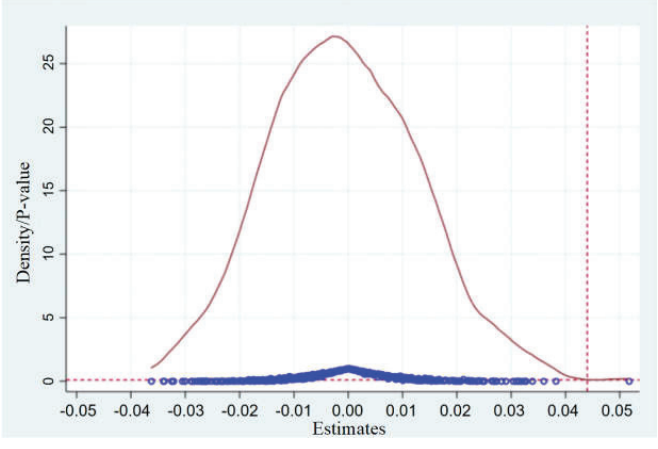

Figure 5. The placebo test result. Note: the X-axis represents the DID coefficient estimated based on 500 random selection of 13 counties as the pseudo-experimental group and randomly assigned policy implementation time; the Y-axis represents its corresponding *p*-value and density; the blue dots are the *p*-values of DID after each random matching; the red curve represents the kernel density curve; the red virtual horizontal line is y = 0.1; and the red virtual vertical line is x = 0.0439. The placebo test was programmed using Stata15.1 software.

5.4. Mechanism Test Result Discussion

The integrated development of agriculture and tourism is an important support to promote rural revitalization and achieve common prosperity. The regression results of the benchmark model show that the integrated development of agriculture and tourism has significantly promoted farmers' income growth in Guangxi. However, what is the underlying mechanism of the integrated development of agriculture and tourism on farmers' income growth? Recalling the previous sections, the integrated development of agriculture and tourism may promote farmers' income growth through three ways: enhancing rural non-

agricultural employment level to promote rural employment structure change, improving the level of agricultural production technology, and strengthening agricultural production efficiency. Meanwhile, due to the heterogeneity of regional resource endowment and the non-balanced economic development, tourism resource endowments and economic development level may moderate the promoting effect of integrated development of agriculture and tourism on farmers' income growth. Thus, this paper also tested the mechanism, and the results are discussed as follows:

5.4.1. Mediating Effect Test

Table 6 shows the results of the test on the rural non-agricultural employment level. Among them, model (8) is the baseline regression result, and model (9) shows the direct effect of the integrated development of agriculture and tourism on the level of non-agricultural employment. However, the model result is contrary to the assumed expectation, and the demonstrative counties focusing on the integrated development of agriculture and tourism significantly inhibit the non-agricultural employment level. When simultaneously including the interaction term and "n.ag_emp" into the regression equation, the result (model 10) is consistent with our expectations. The increase in non-agricultural employment level positively promotes the farmers' income growth, and the estimated coefficient of the interaction term also increases, which indicates that there is a masking effect between the integrated development of agriculture and tourism and the non-agricultural employment level. The specific explanation is that the integrated development of agricultural and tourism inhibits the non-agricultural employment level, and the non-agricultural employment level has a positive impact on farmers' income growth. This is the opposite of Hypothesis 2.

Table 6. Mediating effect test results for enhancing rural non-agricultural employment level to promote rural employment structure change.

Variable	(8) Y	(9) n.ag_emp	(10) Y	(11) r_ag.pop	(12) Y
n.ag_emp			0.0137 *** (12.04)		
r_ag.pop					−0.0120 *** (−10.46)
did	0.1280 *** (6.22)	−2.0790 *** (−3.54)	0.1560 *** (6.49)	−29.9100 *** (−4.92)	0.1200 *** (6.05)
Control	YES	YES	YES	YES	YES
N	981	981	981	981	981
Adj. R^2	0.9128	0.6888	0.8140	0.7315	0.8079

Note: *** $p < 0.01$. The value in parentheses below the coefficient is the standard error.

The mediating effect test results for improving the level of agricultural production technology and strengthening agricultural production efficiency are shown in Table 7. Models (13) and (14) represent the direct effect and indirect effect of the level of agricultural production technology. The results of model (13) show that the integrated development of agriculture and tourism has a significant promotion effect on the adoption of agricultural machinery technology, and when the interaction term and agricultural production technology level are added to model (14) at the same time, both significantly promote the farmers' income growth, with an estimated coefficient of interaction term decrease. The results show that the level of agricultural production technology is served as an intermediary mechanism of the integrated development of agriculture and tourism to promote the farmers' income growth. Similarly, the results of model (15) and (16) also prove that the improvement of agricultural production efficiency is another important intermediary mechanism. Therefore, the above evidence proves that the integrated development of agriculture and tourism can promote farmers' income growth through improving the level of agricultural production technology and agricultural production efficiency, and thus, Hypothesis 3 is verified.

Table 7. Mediating effect test results for improving the level of agricultural production technology and strengthening agricultural production efficiency.

Variable	(8) Y	(13) tech	(14) Y	(15) ag_labor	(16) Y
ag_labor					0.2230 ***
					(22.53)
tech			0.2960 ***		
			(7.48)		
did	0.1280 ***	0.1350 ***	0.0880 ***	0.1730 ***	0.0890 ***
	(6.22)	(8.00)	(4.26)	(3.13)	(5.40)
Control	YES	YES	YES	YES	YES
N	981	981	981	981	981
Adj. R^2	0.9128	0.7335	0.9126	0.8557	0.9442

Note: *** $p < 0.01$. The value in parentheses below the coefficient is the standard error. The following tables are the same.

Specifically, the integrated development of agriculture and tourism will lead to the large-scale development of local land, which provides a good foundation for the large-scale operation of agricultural technology, and the large-scale adoption of agricultural technology promotes the efficiency of agriculture and increases farmers' agricultural productive income. At the same time, the large-scale adoption of agricultural technology reduces the cost of agricultural production and human capital input, promotes the large-scale operation of agriculture, improves the efficiency of agricultural production, and increases farmers' income.

5.4.2. Moderating Effect Test

In order to test the moderating mechanism of tourism resource endowment on the income growth effect of the integrated development of agriculture and tourism, we selected national 4A-level tourist attractions as dummy variables to represent tourism resource endowment. In this study, we divided the full sample into two groups according to whether each county has national 4A-level scenic attractions for a hierarchical regression (shown in Table 8). According to the regression results of model (17) and (18), although the interaction term in both models significantly promoted the farmers' income growth, one can see that the integrated development of agriculture and tourism had significantly different impacts on farmers' income in regions with different tourism resource endowments. The income growth effect in tourist areas with a 4A level or above rating is twice that of non-4A-level scenic attractions. Therefore, H4 is verified, such that the more rural tourism resources there are, the more significant the income growth effect of the integrated development of agriculture and tourism will be. This may be explained by the fact the relatively good infrastructure conditions and large tourist source market of 4A-level tourist attractions, which play a strong driving role in the integration and development of agriculture and tourism practices (Grunwell and Ha, 2020) [91].

Table 8. Moderating effect test results.

Variable	Tour = 1 Y (17)	Tour = 0 Y (18)	High GDP Y (19)	Low GDP Y (20)
did	0.0400 ***	0.0240 *	0.0360 ***	0.0230
	(2.84)	(1.77)	(3.24)	(1.48)
Control	YES	YES	YES	YES
Individual fixed	YES	YES	YES	YES
Time fixed	YES	YES	YES	YES
N	405	566	362	604
Adj. R^2	0.9834	0.9879	0.9908	0.9708

Note: *** $p < 0.01$; * $p < 0.1$. The value in parentheses below the coefficient is the standard error.

From a practical point of view, even if rural tourism resources are very rich, it is difficult for leisure agriculture and rural tourism to develop without perfect infrastructure and public services, and the state of infrastructure and public service level depend on the level of local economic development to a large extent. Therefore, we divided the full sample into high and low groups according to the average mean of the GDP variables of each county for testing. The regression results are shown in model (19) and (20) in Table 8. We found that there are significant differences in the impact of the integrated development of agriculture and tourism on farmers' income growth in regions with different economic development levels. The income growth effect of the integrated development of agriculture and tourism can be exerted to a greater extent in the regions with a higher economic level, while it is not significant in the regions with a lower economic level. This verifies H5, such that the higher the level of economic development, the more significant the income growth effect of the integrated development of agriculture and tourism.

6. Further Discussion

The above results on the mediating effect of non-agricultural employment show that the integrated development of agriculture and tourism inhibits the level of non-agricultural employment, which is contrary to Hypothesis 2. In order to explain this phenomenon, we recalled the existing scholarly works and adopted a reverse indicator, "the total number of employees in agricultural, forestry, animal husbandry and fishery industries" (Zhang, 2019), to measure the non-agricultural employment level as a replacement [92]. The logic behind this is that since there are fewer industrial enterprises in rural areas, it can be approximately ignored. The decrease in the number of rural workers in agricultural, forestry, animal husbandry, and fishery industries means that the rural employment structure is shifting to non-agricultural employment, thereby improving the level of non-agricultural employment. The results of model (11) and model (12) also show that the integrated development of agricultural and tourism promotes the outflow of rural agricultural employment, and the rural agricultural employment level significantly inhibits the effect of farmers' income growth. By comparing the two mediating effect models in Table 6, we can see that the integrated development of agriculture and tourism does squeeze out some agricultural employees, but these agricultural employees who are squeezed out may not join the non-agricultural sector to obtain higher wage income, resulting in the model (9) result.

Specifically, the reasons for this phenomenon may be concluded in the following three aspects: First, due to regional heterogeneity, the Guangxi's economic development level has fallen relatively behind, especially the economic status of rural areas in the lower reaches of the countrywide. Although Guangxi has advantages in natural tourism resources in rural areas, the investment in the integrated development of agriculture and tourism project is a heavy-asset investment, including the establishment of infrastructure of scenic spots, the construction of sightseeing roads, and the later maintenance costs. Therefore, the rural talents or township governments cannot afford to support such investment alone, but they rely on the external industrial and commercial capitals attracted by the rural revitalization strategy, such as "Jiahua Ecological Orchard", invested in by Malaysia Jiahua Group; "China Eastern Airlines Guangxi Agriculture and Tourism Integration Industrial Base", jointly invested in by China Eastern Airlines and Guangxi Zhuang Autonomous Region Government; "Maite Smart Agriculture Demonstration Park", invested in by Maite precision Machinery (Guangxi) Co., Ltd. (Nanning, China); and other projects. At the same time, the intervention of external industrial and commercial capitals have enhanced the rural land transfer process to meet the needs of project implementation through village community organizations (Zhou, 2015) [93]. In this process, most farmers with fragmented land will choose to transfer their land to gain a one-time land rent capital income (far higher than their productive income). After losing land usage rights, some farmers are not able to join the tourism industry chain to obtain non-agricultural wage income (due to lack of employment skills matching rural tourism) and forced to leave the rural employment environment for other working options. Second, in order to pursue better employment

opportunities, educational resources, medical facilities, and income levels in the cities, some farmers sell their land to investors for the integrated development of agricultural and tourism project to accumulate capital and migrate to the city. Third, since there are no data of rural non-agricultural employees in the statistical yearbook, in our study, the number of rural non-agricultural employees is obtained by subtracting the number of agricultural, forestry, animal husbandry, and fishery employees from a total employed population to approximate the number of rural non-agricultural employees, which does not include part-time farmers and some mobile traders who cannot be included in the statistical standard. It may also lead to a pseudo-regression problem.

However, some scholars have verified the intermediary path mechanism whereby the integrated development of agriculture and tourism can promote the level of non-agricultural employment and thus increase farmers' income by using national demonstrative counties samples. In order to verify whether the regional heterogeneity in southwestern China leads to the contrary results in our study, we added samples from Yunnan and Guizhou province to examine the mediating effect of non-agricultural employment level (shown in Table 9).

Table 9. Parallel mediating effect test results for Yunan and Guizhou.

Variable	Yunan Province			Guizhou Province		
	Y (21)	n.ag_emp (22)	Y (23)	(24)	n.ag_emp (25)	Y (26)
did	1.4930 ***	−11.8400 **	1.6520 ***	0.1720	31.1500 ***	0.0010
	(4.98)	(−2.32)	(4.64)	(0.59)	(4.16)	(0.00)
n.ag_emp			0.0040 **			0.0060 ***
			(2.15)			(4.86)
Control	YES	YES	YES	YES	YES	YES
N	1792	1792	1792	1152	1152	1152
Adj. R^2	0.5194	0.2369	0.5204	0.6855	0.3645	0.6940

Note: *** $p < 0.01$; ** $p < 0.05$. The value in parentheses below the coefficient is the standard error.

Models (21)–(23) and (24)–(26) represent the total, direct, and indirect effects, respectively, of non-agricultural employment level in Yunnan and Guizhou. In terms of results, the sample of Yunnan Province supports the above analysis results. There is also a masking effect between the integrated development of agriculture and tourism and the level of non-agricultural employment, which shows that the development of the integrated project of agriculture and tourism inhibits the level of non-agricultural employment, and the level of non-agricultural employment has a positive impact on the increase in farmers' income. It is further proved that the inhibitory effect of the integrated development of agriculture and tourism on the level of non-agricultural employment may be caused by regional differences. However, according to the case of Guizhou, the effect of the integrated development of agriculture and tourism is not significant. Combined with the analysis of the moderating effect, the economic development level of Guizhou province is the lowest in western China except Tibet. As a result, the development of agricultural and tourism integration projects is restricted by the level of local economic development, and it cannot form a strong driving force. In terms of tourism resources, the level of tourism resources in Yunnan Province is at the forefront, which can bring a stable tourist market to support the integrated development of agriculture and tourism, while most of the demonstrative counties in Guangxi are located in and around the national tourism destinations, which can also rely on the local unique landscape and scenery to promote the rapid development of agriculture and tourism integration, so as to promote farmers' income growth.

7. Conclusions

To investigate the relationship between the integrated development of agriculture and tourism and farmers' income growth in southwestern China, this study conducted a series of empirical analyses using a PSM-DID method with a panel dataset of 72 counties

within Guangxi province from 2005 to 2020. Our findings reveal a significant positive effect of integrated agriculture and tourism development on farmer's income growth, showing a consistent upward trend over time. The mechanism analysis highlights that improvements in agricultural production technology and agricultural production efficiency serves as crucial drivers for increasing farmer's income. Interestingly, we uncovered a masking effect associated with the integrated development of agriculture and tourism and the level of non-agricultural employment in southwestern China. The possible implication is that external industrial and commercial capital investment has displaced income and non-agricultural employment opportunities that farmers initially derived from agricultural work by compensating them with the one-time land rent capital income, which forces them to seek for jobs outside the rural environment. Furthermore, the results from the moderating effect analysis emphasize the importance of considering regional variations in tourism resource endowment and economic development levels when planning and implementing integrated agriculture and tourism development strategies.

This study has identified significant potential in the development of the integration of agriculture and tourism for enhancing farmers' income in southwestern China. However, there are noteworthy suggestions for improvement. Firstly, to effectively promote income growth through the integrated development of agriculture and tourism, government authorities at all levels should judiciously employ policy tools and allocate resources, taking into consideration the local realities. In regions with a robust economic base and abundant tourism resources, governments should leverage financial and resource advantages to establish distinctive local models of integrated agriculture and tourism. Additionally, policymakers should enhance training and provide guidance to rural tourism practitioners, elevating service quality to ensure tourist satisfaction and generating greater benefits for farmers. Simultaneously, governments must actively facilitate the dissemination of agricultural technology, harness the advantages of scale in agricultural production, enhance the quality of agricultural products, and diversify income opportunities for farmers beyond agricultural activities. Secondly, policymakers may focus on to a potential structure change in rural employment when implementing the integrated of agriculture and tourism practices. This should involve empowering farmers to switch between agricultural and non-agricultural sectors. The government should actively carry out agricultural and non-agricultural training programs to help farmers to foster new skills such as rural e-commerce to further enable farmers' capability of boosting their income. Lastly, the sustainability of interests for all stakeholders should be the cornerstone of the successful integration of agriculture and tourism practices.

The results of this study provide a continuous assessment of how the integration of agriculture and tourism can stimulate the growth of farmers' income and bolster rural economic development. Furthermore, it presents a new perspective for evaluating the impact of the integrated development of agriculture and tourism toward the rural revitalization in China. Nonetheless, a masking effect exists between the integrated development of agriculture and tourism and non-agricultural employment level in southwestern China, which inhibits non-agricultural employment opportunities. Therefore, the lesson we learned is that we have to maintain a sustainable course in the process of the integrated development of agriculture and tourism. How to ensure all stakeholders have a fair right to share the benefits and development opportunities, and further promote the sustainable development of agriculture and tourism integration practices, is the direction that is worth more attention in the future.

Although this study examines the impact and mechanism of the integrated development of agriculture and tourism on farmers' income growth, further research is needed on how such integrated development adjusts the rural employment structure.

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References

1. Streimikiene, D.; Bilan, Y. Review of Rural Tourism Development Theories. *Transform. Bus. Econ.* **2015**, *14*, 21–34.
2. Barbieri, C. Assessing the sustainability of agritourism in the US: A comparison between agritourism and other farm entrepreneurial ventures. *J. Sustain. Tour.* **2013**, *21*, 252–270. [CrossRef]
3. Xiao, X. How to build, maintain and develop regional brand of agricultural products. *People's Trib.* **2017**, *18*, 86–87.
4. Briedenhann, J.; Wickens, E. Tourism routes as a tool for the economic development of rural areas-vibrant hope or impossible dream? *Tour. Manag.* **2004**, *25*, 71–79. [CrossRef]
5. Zhang, W.; Chen, L. New Meanings and Form of Agricultural Tourism under the Framework of Industrial Convergence. *Tour. Forum* **2009**, *2*, 704–708+716.
6. Phillip, S.C.; Hunter; Blackstock, K.A. Typology for Defining Agritourism. *Tour. Manag.* **2010**, *31*, 754–758. [CrossRef]
7. Arroyo, C.G.; Barbieri, C.; Rich, S.R. Defining agritourism: A comparative study of stakeholders' perceptions in Missouri and North Carolina. *Tour. Manag.* **2013**, *37*, 39–47. [CrossRef]
8. Zheng, G.; Chen, S.; Zhang, K. Integrated development of rural industry: Effect, dilemma and countermeasure. *Agric. Econ.* **2022**, *422*, 9–11.
9. Li, M.; Wang, X. The Model and Path Optimization of Integrated Development of Agriculture and Tourism Under the Background of Rural Revitalization: Reflections on the Integrated Development of Rural Industries. *Guizhou Soc. Sci.* **2022**, *387*, 153–159.
10. Jiang, Z. Re-exploration of the Integration and Development of Primary, Secondary and Tertiary Industries in Rural Areas. *Issues Agric. Econ.* **2021**, *6*, 8–18.
11. Zhang, X.; Du, Y. Collective Economy Leads the Practice Pattern, Experience Perspective and Innovation Path of Rural Common Prosperity--Based on the Experience of "Common Prosperity in 100 Villages Practice" in Jiangsu Province. *Economist* **2022**, *6*, 88–97.
12. Ouyang, L.; Li, D. Research on the Integrated Development Path of Rural Agriculture and Tourism. *Jiangsu Agric. Sci.* **2018**, *46*, 324–329.
13. Lin, Z.; Huang, Y.; Lin, M.; Zhuang, C. Analysis on interactive relationship and integrated development countermeasures of agriculture and tourism in Guilin: Based on VAR model and Granger causality test. *J. Guilin Univ. Technol.* **2022**, *42*, 507–514.
14. Yang, G.; Zhou, C.; Yang, G. Analysis on the Relationship Between Agricultural and Tourism Industry Integration and Rural Poverty Alleviation. *Stat. Decis.* **2020**, *36*, 81–86.
15. Zhou, L.; Duan, L.; Wang, C. Coupling Mechanism of Integrated Development of Agriculture and Tourism Industry: A Case Study of Sichuan Province. *Rural Econ.* **2016**, *10*, 40–45.
16. Gu, J.; Chai, H.; Ge, P. A Study on the Quality of Agricultural and Tourism Integration in China's Yellow River Basin: An Empirical Analysis Based on DEA Cross Efficiency and Provincial Panel Data. *Econ. Probl.* **2021**, *12*, 97–103.
17. Tew, C.; Barbieri, C. The perceived benefits of agritourism: The provider's perspective. *Tour Manag.* **2012**, *33*, 215–224. [CrossRef]
18. Suardana, I.W.; Sudiarta, I.N. Impact of Tourism to Poverty in Tourism Destination: Pro-Poor Tourism Management Approach. *J. Bus. Hosp. Tour.* **2017**, *2*, 65–75. [CrossRef]
19. Zhang, W.; Zhang, H.; Ning, M. Study on the Impact of Resettlements on Rural Households' Income—Using the Sample Data from Resettlement of Hydropower Project in Alpine Forest Area of Western Sichuan. *For. Econ.* **2023**, *45*, 5–20.
20. Hu, Y.; Yang, X.; Gao, M. The Logic of Farmers' Off-farm Employment Increasing Income under Factor Market Reform. *J. Agrotech. Econ.* **2022**, *7*, 78–95.
21. Nugraha, A.T.; Auliah, A.; Prayitno, G. Farmers' social capital in supporting sustainable agriculture: The case of Pujon Kidul Tourism village, Indonesia. *Civ. Environ. Sci. J.* **2022**, *5*, 235–249. [CrossRef]

22. Privitera, D. Factors of Development of Competitiveness: The Case of Organic-agritourism. In Proceedings of the European Association of Agricultural Economists (EAAE), Belgrade, Serbia, 9–11 December 2009.
23. Hwang, J.H.; Lee, S.W. The Effect of The Rural Tourism Policy on Non-farm Income in South Korea. *Tour. Manag.* **2015**, *46*, 501–513. [CrossRef]
24. Lupi, C.; Giaccio, V.; Mastronardi, L.; Giannelli, A.; Scardera, A. Exploring the features of agritourism and its contribution to rural development in Italy. *Land. Use Policy* **2017**, *64*, 383–390. [CrossRef]
25. Hu, A.; Wang, W. Rural Tourism: A Leap from Agriculture to Service Industry. *Theor. Explor.* **2017**, *4*, 21–27+34.
26. Liu, J.; Nijkamp, P.; Lin, D. Urban-rural Imbalance and Tourism-led Growth in China. *Ann. Tour. Res.* **2017**, *64*, 24–36. [CrossRef]
27. Liu, Y.; Zhang, M.; Cao, Q.; Wang, E.; Zou, B. Can Integration of Agriculture and Tourism Promote Rural Green Development?—Empirical Evidence from 152 Cities in China. *Agriculture* **2023**, *13*, 405. [CrossRef]
28. Wang, J.; Zhou, F.; Xie, A.; Shi, J. Impacts of the integral development of agriculture and tourism on agricultural eco-efciency: A case study of two river basins in China. *Environ. Dev. Sustain.* **2022**. [CrossRef]
29. Shan, D.P.; Ying, W.; Zheng, C.D. Specialization, related variety and dynamic heterogeneous poverty reduction efect of industry structure. *China Popul. Resour. Environ.* **2017**, *27*, 157–168.
30. Mitchell, J.; Phucl, C. *Final Report on Participatory Tourism Value Chain Analysis in Da Nang, Central Vietnam*; Overseas Development Institute (ODI): London, UK, 2007.
31. Liu, P.; Qi, S.; Li, D. Promoting agricultural innovation as a means of improving China's rural environment. *J. Environ. Manag.* **2021**, *280*, 111675. [CrossRef]
32. Hu, P.; Zhong, Y. The Mechanism of Improving Agricultural Eco-efficiency by the Integration of Agriculture and Tourism Supported by the Government: Taking the National Leisure Agriculture and Rural Tourism Demonstration Counties as an Example. *Chin. Rural. Econ.* **2019**, *12*, 85–104.
33. Xu, Z.; Zhang, C.; Liu, Z. How Agricultural Technology is Reshaping the Countryside-A Three-Dimensional Investigation Based on Individual, Family and Village. *Rural Econ.* **2023**, *3*, 108–117.
34. Zhuang, X.; Li, Z.; Zheng, R.; Na, S.; Zhou, Y. Research on the Efficiency and Improvement of Rural Development in China: Based on Two-Stage Network SBM Model. *Sustainability* **2021**, *13*, 2914. [CrossRef]
35. Tao, C. Development Efficiency of Leisure Agriculture Based on DEA Model in the Background of Rural Revitalization. *Rev. Cercet. Interv. Soc.* **2019**, *67*, 169–187. [CrossRef]
36. Ning, Z. The Development and Reflection of China's Tourism. *Chin. Leis. Res. Acad. Rep.* **2013**, *2014*, 56–65.
37. Xu, Z. Dynamic Effects and Development Tendency of Coupling between Rural Tourism Industry and Big Agriculture. *Tour. Trib.* **2013**, *28*, 80–88.
38. Zhong, Y.; Tang, L.; Hu, P. The Mechanism and Empirical Analysis of the Integration of Agriculture and Tourism to Promote the Optimization and Upgrading of Rural Industrial Structure: A Case Study of National Demonstration Counties of Leisure Agriculture and Rural Tourism. *Chin. Rural Econ.* **2020**, *7*, 80–98.
39. Prayitno, G.; Hayat, A.; Efendi, A.; Auliah, A.; Dinanti, D. Structural Model of Community Social Capital for Enhancing Rural Communities Adaptation against the COVID-19 Pandemic: Empirical Evidence from Pujon Kidul Tourism Village, Malang Regency, Indonesia. *Sustainability* **2022**, *14*, 12949. [CrossRef]
40. Li, W.; Wang, Z.; Wang, M. Land Registration and Certification, ProductionFactor Allocation and Agricultural ProductionEfficiency: An Analysis Based on China Labor-force Dynamics Survey. *Chin. Rural. Econ.* **2018**, *21*, 64–82.
41. Everett, S.; Slocum, S.L. Food and tourism: An effective partnership? A UKbased review. *Sustain Tour.* **2013**, *21*, 789–809. [CrossRef]
42. Kline, C.; Barbieri, C.; Lapan, C. The Influence of Agritourism on Niche Meats Loyalty and Purchasing. *J. Travel Res.* **2016**, *55*, 643–658. [CrossRef]
43. Cunha, C.; Kastenholz, E.; Carneiro, M.J. Entrepreneurs in rural tourism: Do lifestyle motivations contribute to management practices that enhance sustainable entrepreneurial ecosystems? *J. Hosp. Tour. Manag.* **2020**, *44*, 215–226. [CrossRef]
44. Zhong, Y.; Tang, L. Mechanism and Empirical Research on the Integration of Agriculture and Tourism in Alleviating Rural Poverty. *J. Huazhong Agric. Univ.* **2020**, *147*, 43–52+170–171.
45. Mastronardi, L.; Giaccio, V.; Giannelli, A. Is Agritourism Eco-friendly? A Comparison Between Agritourisms and Other Farms in Italy Using Farm Accountancy Data Network Dataset. *Springer Plus* **2015**, *4*, 590. [CrossRef]
46. Islam, F.; Carlsen, J. Indigenous Communities, Tourism Development and Extreme Poverty Alleviation in Rural Bangladesh. *Tour. Econ.* **2016**, *22*, 645–654. [CrossRef]
47. Barbieri, C. Agritourism research: A perspective article. *Tour. Rev.* **2020**, *75*, 149–152. [CrossRef]
48. Hochuli, A.; Hochuli, J.; Schmid, D. Competitiveness of diversification strategies in agricultural dairy farms: Empirical findings for rural regions in Switzerland. *J. Rural Stud.* **2021**, *82*, 98–106. [CrossRef]
49. Kyu-Sok, A. Study of the Importance of Rural Tourism as Non-farm Income. *J. Bus. Res.* **2006**, *21*, 87–116.
50. Xiao, H. The Impact of Rural Tourism Development on Farmers' Income: A Spatial Econometric Analysis Based on Provincial Panel Data. *Dev. Res.* **2014**, *11*, 75–81.
51. Manuel, V.; William, G.; Benjamin, S. Tourism and Poverty Reduction: An Economic Sector Analysis for Costa Rica and Nicaragua. *Tour. Econ.* **2015**, *21*, 159–182.

52. Yang, Q.; Xiang, Y. The Research on the Contribution of Rural Tourism to Peasants' Income-Based on the empirical analysis of Chengdu. *Econ. Probl.* **2012**, *9*, 123–125.
53. Yao, H.; Peng, W.; Huang, Z. Influence Mechanism and Effect of Family-Based Rural Tourism Development on Farm Household Income-Evidence from Zhejiang, Sichuan and Hunan. *Econ. Geogr.* **2016**, *36*, 169–176.
54. Alex, K.; Isabella, G.; Foteini, G. The Phantom of (Agri)Tourism and Agriculture Symbiosis? A Greek Case Study. *Tour. Manag. Perspect.* **2014**, *12*, 94–103.
55. Nugraha, A.; Prayitno, G.; Hasyim, A.; Roziqin, F. Social Capital, Collective Action, and the Development of Agritourism for Sustainable Agriculture in Rural Indonesia. *Evergreen* **2021**, *8*, 1–12. [CrossRef]
56. Huang, Z.; Song, W.; Cheng, W. Has the Development of Leisure Agriculture and Rural Tourism Promoted the Increase of Farmers' Income: An Evidence from Quasi-natural Experiment. *Econ. Geogr.* **2022**, *42*, 213–222.
57. Meng, Y.; Feng, Y.; Zhao, Y. Coupling and coordinating development of agriculture-tourism industry in underdeveloped regions based on rural revitalization strategy: Take Guangxi for example. *J. Guilin Univ. Technol.* **2021**, *41*, 426–433.
58. Rothbarth, E. The Conditions of Economic Progress. *Econ. J.* **1941**, *51*, 120–124. [CrossRef]
59. Clarkcg. *Condition of Economic Progress*; Macmillan: New York, NY, USA, 1957; pp. 818–828.
60. Perroux, F. Economic Space: Theory and Applications. *Q. J. Econ.* **1950**, *64*, 89–104. [CrossRef]
61. Richard, T. Engaging the Rural Communities of Sri Lanka in Sustainable Tourism. *Worldw. Hosp. Tour. Themes* **2013**, *5*, 464–476.
62. Su, M.; Geoffrey, W.; Wang, Y.; Jin, M. Livelihood Sustainability in a Rural Tourism Destination-Hetu Town, Anhui Province, China. *Tour. Manag.* **2019**, *71*, 272–281. [CrossRef]
63. Schultz, T. Transforming Traditional Agriculture. *Science* **1964**, *144*, 688–689.
64. Wang, W.; Fan, C. Success or Failure: Selectivity and Reasons of Return Migration in Sichuan and Anhui, China. *Environ. Plan. A* **2006**, *38*, 939–958. [CrossRef]
65. Wang, X.; Yamauchi, F.; Huang, J. Rising Wages, Mechanization, and the Substitution between Capital and Labor: Evidence from Small Scale Farm System in China. *Agric. Econ.* **2016**, *47*, 309–317. [CrossRef]
66. Woods, M. Rural Geography: Blurring Boundaries and Making Connections. *Prog. Hum. Geogr.* **2009**, *33*, 849–858. [CrossRef]
67. Barrett, C.; Carter, M.; Timmer, C. A Century-Long Perspective on Agricultural Development. *Am. J. Agric. Econ.* **2010**, *92*, 447–468. [CrossRef]
68. Gao, J.; Wu, H. Revitalizing Traditional Villages through Rural Tourism: A Case Study of Yuanjia Village, Shaanxi Province, China. *Tour. Manag.* **2017**, *63*, 223–233. [CrossRef]
69. Mwesiumo, D.; Halfdanarson, J.; Shlopak, M. Navigating the early stages of a large sustainability oriented rural tourism development project: Lessons from Trena, Norway. *Tour. Manag.* **2022**, *89*, 104456. [CrossRef]
70. Chen, T.; Li, M. Study on development strategy for country parks in Shanghai. China. *Landsc. Archit.* **2009**, *25*, 10–13.
71. Liu, R.; Mao, Y.; Kang, Y. Deregulation, Market Vitality and Tourism Economy Development: Evidence from Chinese Cultural System Reform. *Econ. Res. J.* **2020**, *55*, 115–131.
72. The standard map No. GS(2022)4305, the Standard Map Service System of the Ministry of Natural Resources. Available online: http://bzdt.ch.mnr.gov.cn/browse.html?picId=%224o28b0625501ad13015501ad2bfc0700%22 (accessed on 1 August 2023).
73. Qiao, Y.; Wu, J. Spatial Agglomeration and Development Potential Evaluation of Agricultural Eco-Tourism Spots in Guangxi. *J. China Agric. Resour. Reg. Plan.* **2020**, *41*, 261–266.
74. Zhu, Z. Agri-tourism Integration, Factor Allocation and Agricultural Labor Productivity. *J. Manag.* **2022**, *35*, 29–43.
75. Rosenbaum, P.; Rubin, B. The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika* **1983**, *70*, 41–55. [CrossRef]
76. Imbens, G. Matching Methods in Practice: Three Examples. *Soc. Sci. Electron. Publ.* **2014**, *50*, 373–419.
77. Ge, D.; Kang, X.; Liang, X.; Xie, F. The Impact of Rural Households' Part-Time Farming on Grain Output: Promotion or Inhibition? *Agriculture* **2023**, *13*, 671. [CrossRef]
78. Baron, M.; Kenny, A. The Moderator-Mediator Variable Distinction and Statistical Considerations. *J. Personal. Soc. Psychol.* **1986**, *51*, 1173–1182. [CrossRef]
79. Judd, M.; Kenny, A. Process Analysis: Estimating Mediation in Treatment Evaluations. *Eval. Rev.* **1981**, *5*, 602–619. [CrossRef]
80. Yang, W.; Xu, C.; Kong, F. Does Non-Food Cultivation of Cropland Increase Farmers' Income? *Int. J. Environ. Res. Public Health* **2022**, *19*, 7329. [CrossRef]
81. Peng, J.; Zhao, H.; Liu, N. Impact of Agricultural Mechanization on Agricultural Production, Income, and Mechanism: Evidence from Hubei Province, China. *Front. Environ. Sci.* **2022**, *10*, 133–153. [CrossRef]
82. Ren, H.; Qiu, S.; Xia, F. Income Increasing Effect of the Integrated Development of Agriculture and Tourism in the Western Poverty-stricken Areas-Quasi Natural Experiment Based on Leisure Agriculture and Rural Tourism Demonstration County. *Resour. Dev. Mark.* **2020**, *38*, 1256–1263.
83. Andaleeb, R.; Sumit, M. Does Non-farm Income Affect Food Security? Evidence from India. *J. Dev. Stud.* **2020**, *56*, 1190–1209.
84. Luan, J.; Chen, J.; He, Z.; Li, Q.; Qiu, H. The Education Treatment Effect on the Non-Farm Income of Chinese Western Rural Labors. *China Agric. Econ. Rev.* **2015**, *7*, 122–142. [CrossRef]
85. Wang, X.; Chen, Y.; Sui, P. Preliminary Analysis on Economic and Environmental Consequences of Grain Production on Different Farm Sizes in North China Plain. *Agric. Syst.* **2017**, *153*, 181–189. [CrossRef]

86. Zhao, D.; Zhou, H.; Gu, J. Agricultural Production Agglomeration: Can It Promote Cultivated Land Use Efficiency?-Re-inspection Based on a Panel Threshold Model. *Agric. Technol. Econ.* **2022**, *323*, 49–60.
87. Xin, F.; Qin, F. Decomposition of Agricultural Labor Productivity Growth and its Regional Disparity in China. *China Agric. Econ. Rev.* **2011**, *3*, 92–100. [CrossRef]
88. Beck, A.; Eldar, Y. Structured Total Maximum Likelihood: An Alternative to Structured Total Least Squares. *SIAM J. Matrix Anal. Appl.* **2010**, *31*, 2623–2649. [CrossRef]
89. Bockerman, P.; Ilmakunnas, P. Unemployment and Self-Assessed Health: Evidence from Panel Data. *Health Econ.* **2009**, *18*, 161–179. [CrossRef]
90. Heckman, J.; Ichimura, H.; Todd, P. Matching as an Econometric Evaluation Estimator. *Rev. Econ. Stud.* **1998**, *65*, 261–294. [CrossRef]
91. Grunwell, S.; Ha, I. How to Revitalize a Small Rural Town? An Empirical Study of Factors for Success University-Community Collaboration with a Small Historic Rural Tourism Town. *J. Rural Community Dev.* **2014**, *9*, 32–50.
92. Zhang, X.; Yue, Q. Does Land Scale Management Promote Agricultural Productive Investment? Based on Panel Data of Thirty-one Provinces (Cities) Across the Country. *Audit Econ. Res.* **2019**, *34*, 87–93.
93. Zhou, M.; Lei, G.; Li, J. Capital Inflow in Village, Property Evolution and Farmland Transfer Conflict. *China Land Sci.* **2015**, *29*, 55–62.

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Does the Development of Digital Inclusive Finance Promote the Construction of Digital Villages?—An Empirical Study Based on the Chinese Experience

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Abstract: The degree of the effect of digital inclusive finance on the construction of China's digital villages and the mechanism of action is investigated in this study by matching the digital inclusive finance index in accordance with a data sample of China's provincial digital villages from 2013 to 2020. As indicated by the result of this study, first, the development of digital inclusive finance positively expedites the development of digital villages. Second, geographical and dimensional differences exist when digital inclusive finance boosts the construction of digital villages. Third, digital inclusive finance is capable of facilitating the construction of digital villages by deepening technological innovation and communication infrastructure construction and further enhancing the digital literacy of residents. Fourth, a positive moderating effect of internal conditions of rural residents' consumption and external conditions of financial regulation is reported when digital inclusive finance promotes digital rural development. Based on the above-mentioned findings, the following policy recommendations are presented to advance digital countryside construction in depth. First, following the goal of building Chinese modernization, differentiated policies, with regional resource endowments, social conditions, and rural characteristics considered, should be implemented in accordance with local conditions. Second, the digitalization process in rural areas should be vigorously boosted, and it is imperative to optimize and upgrade mobile communication infrastructure, with the aim of injecting new momentum into China's digital countryside construction. Third, investment in scientific and technological research and development funds and high-level innovative talents should be increased to endow digital technology with better independent innovation capacity and facilitate the level of innovation. Fourth, investment in education should be increased to enhance the digital literacy of urban and rural residents.

Keywords: digital inclusive finance; digital village; technological innovation; digital facilities; digital literacy

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1. Introduction

The deep integration of a novel generation of digital technologies (typically big data, artificial intelligence, and cloud computing) with the real economy has formed a new dynamic energy over the past few years for boosting economic and social transformation and expediting industrial structure transformation and high-quality economic growth, which has been extensively discussed worldwide (2023) [1]. The Chinese government stresses the application of digital technology in rural construction and has released the ambitious goal of building China's high-quality digital countryside. Indeed, 2018 Central Government Document No. 1 proposed the implementation of the "Digital Countryside Strategy" for the first time while launching the national digital countryside pilot construction in 2020. Moreover, policy documents (e.g., the Outline of the Digital Countryside Development Strategy and the Action Plan for Digital Countryside Development (2022–2025) [2,3]) have been released. As of June 2022, the number of Internet users in China's rural areas had reached

293 million, and the rural Internet penetration rate was reported as 58.8%. Furthermore, over 800,000 5G base stations have been opened, such that "5G in counties and broadband in villages" can be achieved. Moreover, digital technology has been extensively used in agricultural production and rural governance, such that a rural digitalization solution can be provided to achieve Chinese modernization. However, some practical obstacles remain that adversely affect the construction of digital villages. On the one hand, under the effects of income and education levels, rural residents in a wide variety of regions have different perceptions and enthusiasm for the digital village, and a significant digital divide has been reported. On the other hand, a wide range of research institutions and technology enterprises have not invested sufficiently in the research and development of digital facilities and equipment, and few interconnected devices have been developed for intelligent collaborative work and automatic digital collection and analysis to provide quality products for the countryside. Accordingly, the introduction of financial capital to facilitate the construction of a digital village, to narrow the "digital divide" among residents, and to expedite enterprises to serve villagers, has attracted widespread attention from society. China urgently needs to explore mechanisms and pathways for digital inclusive finance to boost the construction of digital villages. Under such circumstances, this study has strong practical significance and policy guidance value.

This paper attempts to conduct an in-depth study from two perspectives. First, this paper explores the impact of digital financial inclusion on digital village construction. Secondly, we explore the paths, heterogeneity, and role played by special factors that digital inclusive finance will produce in the process of influencing the construction of digital villages. Thus, the marginal contributions of this study are elucidated as follows. First, the driving effect of digital inclusive finance on the digital countryside and the path mechanisms underlying the existence of technological innovation, communication infrastructure, and residents' education level is explained theoretically and systematically, and a digital countryside development degree index is built following the panel data on 30 Chinese provinces and cities from 2013 to 2020. Second, a panel model is used to verify that digital inclusive finance has a positive and significant impact on the digital countryside. Again, a mediating effects model is used to test the hypotheses derived from the theoretical analysis. Lastly, a moderating effect model is used to analyze the moderating effect of the intrinsic basis of consumption of rural residents and the external conditions of financial regulation on the existence of digital inclusive finance affecting the digital countryside.

The remainder of this paper is organized as follows: Section 2 presents a literature review and the research hypotheses. Section 3 presents the data sources and the main methodology. Section 4 presents the empirical results. Section 5 presents the conclusions and recommendations.

2. Literature Review and Research Hypothesis

2.1. Literature Review

Scholars have focused on the concept and measurement of digital inclusive finance to facilitate the development of the "three rural areas" and to expedite the construction of a digital village, among other perspectives. First, the concept and measurement of digital inclusive finance was first introduced by the United Nations in 2005, with the aim of preventing the emergence of financial exclusion. Inclusive finance aims at offering comprehensive and accessible financial services to a wide variety of groups in society (1993) [4] and is more universal and accessible than conventional finance. Most of the existing research regarding inclusive finance has been analyzed for the utilization rate, accessibility, and development of inclusive finance (2011) [5]. Nevertheless, in the process of development, some financial institutions do not support the sustainable development of inclusive finance programs due to high transaction costs and high risks. With the development of technologies (e.g., big data, artificial intelligence, and 5G), inclusive finance and digital technology have been integrated with each other, the development of inclusive finance has entered the stage of information technology, and digital inclusive finance has

come into being. In accordance with the G20 Advanced Principles for Digital Inclusive Finance released by the People's Bank of China in 2016, digital inclusive finance refers to inclusive finance achieved by relying on digital technology, thus making financial services more accessible. Digital inclusive finance refers to a multi-dimensional concept; therefore, when researching digital inclusive finance, the relevant indexes of finance and digital technology should be considered to accurately indicate its degree and level of development. The Digital Inclusive Finance Index (2011–2020) (2020) [6] report released by a group of Peking University's Digital Finance Research Centre is representative of a considerable number of research results. Its indexes were selected to consider three dimensions of digital inclusive finance, i.e., breadth of coverage, depth of use, and degree of digital support services. To be specific, a total of 33 sub-indexes were selected for portrayal, and data samples from China's provinces, cities, and counties from 2011 to 2020 were measured to determine the credible indexes for the level of development of digital inclusive finance. Although digital inclusive finance has existed for a short period, it has become a focal issue for scholars, especially the issue regarding the degree of development of digital inclusive finance. Although there are some differences in perspectives among studies, there is agreement on the construction of the specific measurement system and the selection of indexes, that is, digital inclusive finance is multi-dimensional and dynamic in nature.

Second, research has focused on using digital inclusive finance to expedite the development of the "three rural areas". To facilitate the development of the "three rural areas", scholars have mostly conducted research from two perspectives: macro and micro. On the one hand, from a macro perspective, scholars have investigated how to use digital inclusive finance to boost the revitalization of China's rural areas. At the new stage of consolidating and expanding the achievements of poverty eradication, scholars suggested that digital inclusive finance will conform to the laws of rural industrial development, provide effective digital financial support for rural revitalization while ultimately ensuring that the rural revitalization strategy is implemented effectively (2022) [7]. Some scholars suggested that the weakness of the rural financial system is the main obstacle to the development of rural industries, and the development of digital inclusive finance has notably compensated and facilitated the exclusion phenomenon of rural finance, promoted the gradual advancement of rural industries, and consolidated the achievements of rural revitalization (2022) [8]. From the perspective of empirical evidence, scholars suggested that digital inclusive finance is capable of exerting a mechanized universal effect, entrepreneurial incentive effect, and income growth effect to facilitate the development of rural revitalization (2023) [9]. On the other hand, the micro perspective explores how digital inclusive finance can be used to expedite the development of the agricultural industry, residents' income and consumption, and residents' innovation and entrepreneurship. Most scholars have a positive view on the use of digital inclusive finance for facilitating the integration of rural industries (2021; 2023; 2023) [10–12], suggesting that digital inclusive finance is capable of addressing the financing constraints of farmers, expanding the convenience and accessibility of financial services for rural residents, and positively expediting agricultural industrialization. Scholars argued that deep theoretical logic is required for digital inclusive finance to help farmers increase their incomes, such that incomes can be generated by increasing farmers' wages, business, transfer, and property incomes to achieve the goal of common prosperity (2022) [13]. It has also been suggested that enhancing rural consumption has a significant positive effect on boosting the rural economy, and digital inclusive finance can rely on digital information redemption to innovate financial services and enhance financial accessibility, thus stimulating rural consumption growth (2021) [14]. Scholars have different views on the capability of digital inclusive finance to facilitate innovation and enhance entrepreneurship among farmers. It was argued that digital inclusive finance development can not only increase the availability of credit for farmers to access entrepreneurial finance (2021) [15] but also reduce transaction costs and enhance financial capability by promoting the use of electronic payments and the use of internet media, thereby promoting their entrepreneurship. Although digital inclusive finance promotes farmers' investment in production and business,

the effect of digital inclusive finance on farmers' investment in agricultural production and business is not significant. It only promotes farmers' investment in industrial and commercial production and business (2023) [16].

Lastly, there are aspects of research on the use of digital inclusive finance to facilitate the digital countryside. The construction of a digital countryside is a strategic direction and an important method for rural revitalization, and thus it is an important element in building digital China (2019) [17]. Digital inclusive finance is capable of promoting data integration, enhancing residents' digital financial literacy, creating novel financial scenarios, and reducing financial transaction costs. Thus, it is conducive to consolidating the information technology infrastructure and promoting the digital countryside as a rural solution for Chinese-style modernization (2022) [18].

However, it is noted that the earlier literature placed a greater focus on the effect of digital inclusive finance on industrial structure, residents' income and consumption, and the digital countryside itself. Few studies considered the two as an organic whole and investigated the effect of digital inclusive finance on the construction of the digital countryside and the possible driving mechanisms. Thus, in this study, the theoretical role of digital inclusive finance in driving the digital countryside and the existence of path mechanisms underlying technological innovation, communication infrastructure, and residents' education level are first systematically explained, and then a digital countryside development degree index is set using panel data on 30 Chinese provinces and cities from 2013 to 2020. The hypotheses derived from the theoretical analysis are tested using a mediating effects model with the aim of further exploring possible regional and dimensional variability. Compared with the existing research, the above research components constitute possible marginal contributions.

2.2. Research Hypothesis

From a theoretical point of view, the use of digital inclusive finance to solve social development problems is an important frontier direction for financial development theory in development economics, which was initially designed to solve the problem of financial exclusion, and gradually developed to financial inclusion and even financial equity. As early as the 1960s, scholars at the structuralist school (1955) [19] proposed that the practice of focusing on capital formation and resource allocation in developing countries would lead to backwardness in the financial structure and would constrain the realization of financial inclusion, with the variety and number of financial institutions and financial instruments stagnating at a low level. During the 1980s and 1990s, the emergence of the new Keynesian and endogenous growth theories (2012) [20] illustrated that restricting banking access and direct financing could exclude financial service objects and service agents, and the inclusive behavior of financial services was limited by policy orientation. From the end of the twentieth century to the present day, neo-liberalism and new institutional economics (1991; 2000) [21,22] reconsidered financial inclusion, arguing that poor countries and poor communities cannot afford to cover the costs of financial system formation, and thus financial exclusion remains. Therefore, government subsidies are needed to reduce the costs of financial inclusion and to protect the population in disadvantaged areas.

From a practical point of view, digital financial inclusion is a new concept arising at the intersection of the fields of finance and technology. At its core, digital financial inclusion uses technology as the first element to drive the financial industry to expand innovative service tools, which, as a supplement to traditional finance, can expand the coverage of financial services and provide more residents and enterprises with the financial products they need. The comprehensive rise of digital inclusive finance has expedited the financialization of the ecological map of the technology industry, revolutionized the development pattern in the conventional financial industry, broadened the technological path of financial services for the three rural areas, and provided novel ideas for farmers to increase their income while boosting enterprise development and rural construction (2021) [23]. First, digital inclusive finance has expanded the reach and coverage of financial services using advanced

digital technologies (e.g., cloud computing and big data). With a novel Internet platform built and the threshold of financial business availability lowered, financial services have been offered to more rural long-tail people, thus circumventing the financial discrimination that exists in conventional institutions. Digital inclusive finance has allowed rural residents to obtain the funds required for production and living at low cost, thus improving their quality of life, broadening their business undertakings, and fundamentally enhancing the demand for digital village construction. Second, digital inclusive finance can be leveraged with innovative technologies (e.g., interactive artificial intelligence and complex spectrum blockchain) to integrate internet data for agriculture-associated enterprises and MSMEs instead of conventional technical paths, thus enhancing the digitalization of enterprises, ensuring the healthy development of agriculture-associated enterprises and MSMEs with the cooperation and support of considerable capital, and boosting the growth of enterprises and the construction of villages simultaneously. Lastly, complemented by the central government's inclusive finance policy for the "three rural areas", digital inclusive finance can cooperate with township governments in rural construction and provide targeted financial services. With the support of policies and funds, resources (e.g., population, technology, land, and other digital rural construction elements) will rapidly converge to facilitate the digitalization of townships for further breakthroughs in information infrastructure, rural government governance, intelligent agricultural production, and other aspects such that a comprehensive digital rural construction can be achieved.

Based on the above logical analysis, research Hypothesis 1 is proposed in this study.

H1. *Advances in digital inclusion can positively contribute to building a digital village.*

In the process of exploring digital inclusion to facilitate the construction of digital villages, scholars have found that there are important pathways that influence the correlation between the two, as shown in Figure 1. Technological innovation, infrastructure, and digital literacy are the key directions that scholars have focused on.

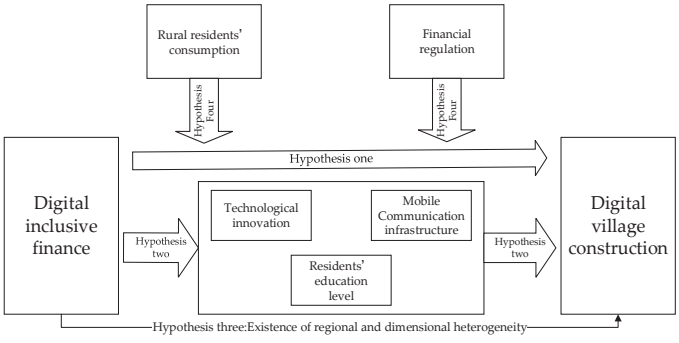

Figure 1. The mechanism underlying the mediating effects of digital inclusive finance on promoting digital village building.

The exploration and development path of technological innovation cannot be achieved without the fundamental role played by finance (2003) [24]. With the advances in digital inclusive finance, diverse digital financing channels have become a novel option for firms. As revealed by existing research, access to funds for technological innovation can be constrained by information asymmetry (2017) [25]. A central point of boosting regional development refers to facilitating a smooth and efficient flow of innovation funds to innovative technology firms (2007) [26] so that firms are enabled to create more social wealth. Digital inclusive finance can process big data information at low cost and low risk (2018) [27] while reducing the information asymmetry problem between credit parties using digital technology tools, activating the matching between resource elements and rural construction projects, enhancing the activity of enterprises' technological innovation

activities, and addressing the financial difficulties of enterprises' technological innovation. To access the rural market and maximize their profits, enterprises with sufficient funds will further enhance their technological development to improve their production efficiency and provide digital products that are more relevant to the rural market. As a result, digital governance products based on innovative technologies (e.g., industrial big data, interactive artificial intelligence, and regional digital twins) have emerged. Innovative enterprises can technically support the construction of digital villages, and their cooperation model with grassroots governments has forged a novel map for constructing regional digital villages.

The breadth of mobile communication infrastructure coverage markedly affects the progress of digital inclusive finance (2007) [28]. Driven by profit, financial commercial institutions are inclined to use the technical advantages of modern information (e.g., the Internet and big data), with the aim of addressing the limitations of financial services in time and space, expanding the rural user profile, widening the scope of user services, and achieving profit growth. Financial and commercial institutions have joined with enterprises and local governments to further invest in the construction of mobile communication infrastructure following the guidance of the rural inclusive finance policy, with the planned construction of long-distance fiber optic cable lines, microwave base stations, data processing centers, and other hardware conditions in vast rural areas. Moreover, the construction of mobile communication infrastructure will drive the development of digital industries in rural areas, stimulate the rapid emergence of rural e-commerce industries, achieve a win-win situation in terms of increasing farmers' income and improving the appearance of the countryside, and provide hardware guarantees for the construction of digital villages.

An improvement in residents' digital literacy is significantly correlated with the development of regional digital finance, and the emergence of digitally inclusive finance will further bridge the digital divide, with the aim of enhancing the digital literacy of urban and rural residents. Scholars suggested that digital inclusive finance is capable of addressing the problem of financial cost inversion with accurate publicity, credit, services, and risk identification, thus facilitating the equalization of financial services for urban and rural residents and enhancing the digital literacy of residents to bridge the digital divide. A higher digital literacy of residents has a catalytic effect on the construction of the digital countryside, such that the conventional agricultural production and living model will be broken, and new industries and models for agricultural production, agricultural product processing and circulation, and agricultural leisure tourism with regional characteristics will be created under the e-commerce platform, a live streaming platform and tourism platform, and a new ecology of the rural digital economy will be built.

Based on the above logical analysis, this study proposes research Hypothesis 2.

H2. *Digital inclusion can be promoted in the digital village by enhancing technological innovation, communication infrastructure development, and digital literacy of the population.*

Given the differences in the degree of development of digital inclusive finance that arise from the economic and regional rural development gap in the eastern, central, and western areas of China, a differentiation analysis should be conducted. First, the geographical differences should be analyzed. Significant regional differences exist in the total economic development and regional rural construction in China. In particular, the total economic share decreases in the eastern, central, and western areas, in that order, whereas the scale of rural areas increases in the eastern, central, and western areas, in that order (2022) [29]. There is also a regional concentration of financial resources (2016) [30], with eastern cities ranking first for the excessive concentration of financial resources, while western cities rank at the bottom for the level of financial resource aggregation (2016) [31]. Financial exclusion is more serious in remote areas of central and western China. Second, the dimensional differences should be analyzed. In this study, digital financial inclusion indexes are selected to cover three first-level indexes, i.e., breadth of coverage, depth of use, and degree of digital support services (2020) [32]. To be specific, the breadth of coverage

uses the number of card-tied users, the number of accounts, and the proportion of card-tied users of Alipay as the secondary indexes to show the degree of account coverage; the depth of use uses credit, payment, and credit business as secondary indexes to indicate the effect of digital inclusive finance development; the degree of digital support services uses mobile, affordable, and convenience as secondary indexes to indicate the maturity of Internet technology.

Based on the above logical analysis, Hypothesis 3 is proposed.

H3. *Geographical variability and dimensional differences exist in the process of digital inclusive finance for the digital village (Figure 1).*

The idea that the growth in consumption of rural residents will stimulate the further development of digital inclusive finance, give rise to the diversity of financial derivatives, increase the activity of capital in rural areas, and be the driving force behind the intrinsic development of inclusive finance is well recognized by scholars (2022) [33]. However, the extent to which this growth in consumption will affect the development of digital inclusive finance to promote the development of the digital countryside is an important issue that we need to discuss at present. Similarly, previous research on financial regulation in digital inclusive finance to promote the development of digital villages has led to the publication of valuable views by scholars. They believe that (2019) [34] strengthening financial regulation can effectively reduce liquidity risk and the emergence of illegal arbitrage problems, thus regulating the financial market so that those who have a real need can enjoy the power of development through the channels of digital inclusive finance.

H4. *In the process of using digital inclusive finance to promote the construction of digital villages, residents' consumption, and financial regulation play a moderating role.*

3. Research Design

3.1. Selection and Description of Variables

3.1.1. Explanatory Variables

Digital village (DR). In order to measure the level of digital village construction more comprehensively, systematically, and objectively, this paper uses the digital village evaluation system constructed by scholars in previous studies (2023) [35] to analyze the system. This involves a total of four dimensions: financial investment, infrastructure, agricultural production, and living services, and uses the entropy weighting method to measure the degree of digital village development in each province and city, with index results ranging from 0 to 1. A scatter plot showing the relationship between digital inclusive finance and the digital village development index is shown in Figure 2.

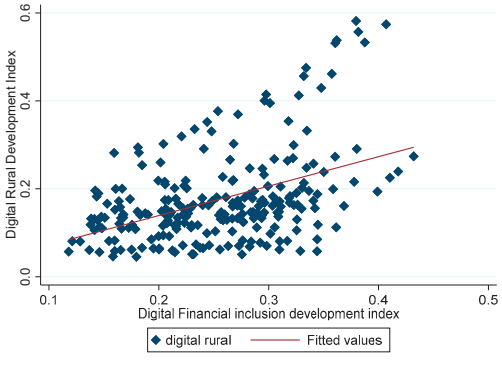

Figure 2. A Scatterplot Showing the Relationship between Digital Inclusive Finance and the Digital Village Development Index.

3.1.2. Core Variables

Digital inclusive finance (DIF). Digital inclusive finance is measured using the China Digital Finance Development Index published by Peking University's Digital Finance Research Centre. This index system covers three dimensions: breadth of digital finance coverage (DIF1), depth of use (DIF2), and degree of digitalization (DIF 3), and this study spans the period 2013–2020. This index is also widely used in current practice to examine the level of development of digital financial inclusion. The distribution of the digital financial inclusion index is modeled using the Epanechnikov kernel function and is shown in Figure 3.

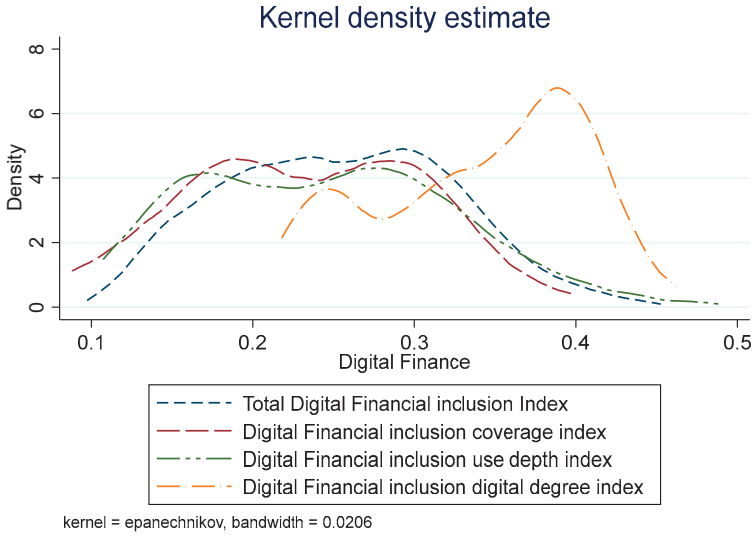

Figure 3. Digital Inclusive Finance Kernel Density Distribution Map.

3.1.3. Mediated Transmission Variables

The degree of science and technology innovation (TI) [36]. Science and technology innovation is an important driving force for the construction of digital villages, which can effectively improve the landscape of villages. The number of patent applications granted is an important index for the degree of science and technology innovation. Accordingly, we use the number of patent applications granted in a respective province to represent the level of science and technology innovation in that province.

Mobile communication infrastructure (MCI) [37]. Mobile communication infrastructure is an important aspect in the development of digital inclusion finance, and the level of its construction has a profound impact on the degree of digital inclusion coverage. Thus, we use mobile phone exchange capacity to examine the level of mobile communication infrastructure construction in a respective province.

Digital literacy of residents (DL) [38]. Residents can improve their digital literacy by receiving external digital training, and higher digital literacy will promote digital financial inclusion. Therefore, we use the number of full-time information and digitalization teachers in general higher education institutions to measure the education level of residents in a respective province, with a higher number representing a higher emphasis on the improvement of residents' digital literacy in that region.

3.1.4. Control Variables

Level of economic development (EDI) [39]. The level of economic development can positively contribute to the construction of digital villages, which is measured in this study using the per capita gross regional product of the respective province.

Industrial structure status (IS) [40]. The optimization of industrial structures will directly affect the allocation of resources, and the optimization of industrial structures will facilitate the construction of digital villages. In this study, we use the value added of the secondary industry as a proportion of the tertiary industry to express industrial structure status.

Socio-population density (SPD) [41,42]. The greater the population density of a region, the greater the demand for digital village construction. In this study, we use the resident population of a region as a proportion of land area to examine the level of population density.

Financial activity of residents (FAR) [43]. The level of resident financial activity is positively related to the acceptance of digital inclusive finance, implying that a region is more capable of attracting capital, which can alleviate the funding problem of digital village construction. In this study, the sum of resident savings and loans is expressed as a proportion of GDP.

Digital infrastructure level (DIL) [44]. The promotion of digital infrastructure creates a fundamental development environment for the construction of digital villages and is an important part of the effect of digital construction. In this study, the digital infrastructure level is represented by the length of fiber optic cable lines.

3.2. Model Setting

3.2.1. Baseline Model

$$Y_{it} = a_0 + a_1 DIF_{it} + a_2 control_{it} + \xi_i + \phi_i + \varepsilon_{it} \quad (1)$$

where the explanatory variable Y_{it} denotes digital village construction, the core explanatory variable, FT_{it} is digital financial inclusion, and $control_{it}$ is the control variable. ξ_i represents the area fixed effects, ϕ_i is a time fixed effect, and ε_{it} is the error term.

3.2.2. Mediating Effects Model

The mediating effects model proposed by Baron (1986) [45] and other scholars was used to study the mechanism underlying the effect of digital inclusive finance on the digital village. When measuring the effect of the independent variable X on the dependent variable Y, if X, by influencing the variable M, has an effect on Y, it is called a mediating variable.

$$Y = cX + e_1 \quad (2)$$

$$M = aX + e_2 \quad (3)$$

$$Y = c'X + bM + e_3 \quad (4)$$

$$c = c' + ab \quad (5)$$

The above regression equation is used to describe the correlation between the variables. The coefficient of Equation (2) c is the total effect of the independent variable X on the dependent variable Y, the total effect of the dependent variable. The coefficient of Equation (3) a is the total effect of the independent variable X on the mediating variable M of the dependent variable. The coefficient of Equation (4) b denotes the effect of the independent variable on the mediating variable after controlling for the effect of the mediating variable M on the dependent variable Y. The coefficient c' is the effect of the mediating variable on the dependent variable after controlling for the effect of the mediating variable M. After controlling for the effect of the mediating variable, the direct effect of the independent variable X on the dependent variable Y is determined. e_1, e_2, and e_3 represent the regression residuals.

3.2.3. Coordinated Effects Model

To further examine the effect of other factors on the contribution of digital inclusive finance to the development of the digital village, interaction terms are introduced to investigate the effects of the moderating variables, as written in the following:

$$Y_{it} = \beta_1 + \beta_2 DIF_{it} + \beta_3 ADJUSTER_{it} + \beta_4 DIF_{it} \times ADJUSTER_{it} + \beta_5 control_{it} + \epsilon_{it} \quad (6)$$

where Y_{it} denotes the construction of digital villages in province i in year t; DIF_{it} represents the development of digital inclusive finance in province i in year t; and $ADJUSTER_{it}$ expresses the condition of the moderating variable in province i in year t. The interaction term $DIF_{it} \times ADJUSTER_{it}$ represents the effect of the moderating variable on the effect of digital inclusive finance on digital villages. $control_{it}$ is the control variable of the model, β_{1-5} represents the constant term, and ϵ_{it} expresses the random error term.

3.3. Data Sources and Descriptive Statistics of Variables

In this paper, the research sample is provincial digital financial inclusion and digital village panel data with a data retrieval date of April 2023. StataMP17 (64-bit) software is used to measure and analyze the panel data. The digital financial inclusion index is from the Digital Financial Inclusion Index compiled by the Centre for Digital Finance at Peking University, and the digital countryside measures and other macro variables are from the China Statistical Yearbook, China Rural Statistical Yearbook, China Urban Statistical Yearbook, and the Ministry of Agriculture and Rural Development of the People's Republic of China, etc. This study spans the period from 2013 to 2020. Furthermore, for data processing, variables (e.g., the Digital Inclusive Finance Index) are determined by dividing the original value by 100, and several missing values for indexes are estimated using interpolation. Table 1 lists the descriptive statistics for the specific variables.

Table 1. Descriptive statistics of variables.

Variable Category	Variable Name	Variable Symbol	Average Value	Standard Deviation	Maximum Value	Minimum Value
Explained variables	Digital village	DR	0.149	0.103	0.582	0.045
Explanatory variables	Digital inclusive finance	DIF	0.256	0.069	0.432	0.118
	Digital inclusive finance—breadth of coverage	DIF1	0.233	0.072	0.397	0.088
	Digital inclusive finance—depth of use	DIF2	0.247	0.079	0.489	0.107
	Digital inclusive finance—the degree of digitization	DIF3	0.354	0.064	0.462	0.218
Intermediate variables	Science and technology innovation	TI	3.336	9.530	70.972	0.050
	Infrastructure	MCI	6.499	4.953	23.804	0.927
	Education level	DL	4.705	3.012	13.340	0.380
Control variables	Level of economic development	EDI	4.946	2.761	16.416	2.209
	Regional industrial structure	IS	4.538	15.626	98.863	0.944
	Population density	SPD	2.929	7.151	39.492	0.079
	Resident financial activity	FAR	3.169	1.148	8.131	1.664
	Digital infrastructure level	DIL	0.912	0.827	3.990	0.074

4. Empirical Study

4.1. Correlation Analysis

Table 2 lists the results of the variable correlation tests. As indicated by the preliminary results, digital villages develop a strong positive correlation with digital inclusive finance (DIF) and the economic development level (EDL), regional industrial structure (IS), population density (PD), and level of transmission infrastructure (LOC), whereas the effect on the financial activity of the population (FA) does not take on any significance. The

sign and significance of the regression coefficients vary with the control of the variables, suggesting that the preliminary analysis still requires in-depth validation using regression. As indicated by the additional VIF test results, the value of the VIF variance inflation factor among the variables is 7.57, and being less than 10, this suggests that the multicollinearity among the variables in this study's empirical model is relatively poor and can be subjected to the next step of regression analysis.

Table 2. Correlation analysis.

Variables	DR	DIF	EDL	IS	PD	FA	LOC
DR	1.000						
DIF	0.444 ***	1.000					
EDL	0.437 ***	0.653 ***	1.000				
IS	0.093 ***	0.323 ***	0.764 ***	1.000			
PD	0.201 ***	0.288 ***	0.713 ***	0.948 ***	1.000		
FA	−0.039	0.391 ***	0.583 ***	0.636 ***	0.517 ***	1.000	
LOC	0.842 ***	0.515 ***	0.227 ***	−0.159 **	−0.047	−0.179 **	1.000

"***" and "**" indicate significance at the 1% and 5% levels of significance.

4.2. Baseline Regression Results

Since the data used are continuous variables, an OLS model was used to carry out the regression estimation of the effect of digital inclusive finance on digital village construction. The *p*-value of Hausman's test was less than 0.01, and the original hypothesis was rejected, thus a two-way fixed effects model was used. Table 3 lists the test results for the effect of digital inclusive finance on digital village construction from model (1). In the baseline regression, this study uses a progressive regression strategy, with column (1) adding time and individual fixed utility but not any control variables. This method shows that the coefficient of digital inclusion finance passes the significance test at 1%. Columns (2)–(6) progressively add control variables, and the coefficient for digital inclusion decreases over the course of adding further variables but remains positively significant at 1%. With model (6) as the benchmark regression result, in an economic sense, for every 1% increase in the digital inclusive finance index, the construction of digital villages will be increased by 1.037, i.e., digital inclusive finance is capable of notably boosting the construction of digital villages, and a significant positive correlation is reported between the two. Thus, Hypothesis 1 holds.

Regarding the control variables, the level of economic development has a significant positive effect on the digital countryside, thanks to China's long-term rapid economic growth and rising GDP per inhabitant, which has driven the development of the countryside. Changes in the industrial structure have a significant negative impact on the construction of the digital countryside. The core of the development of the digital countryside still needs to focus on agricultural production and raising the income level of farmers to drive the development of the countryside. The prosperity of the secondary industry has less impact on the construction of the countryside, so this may be one of the important reasons why changes in the industrial development structure have a significant negative impact on the construction of the digital countryside. Furthermore, population density exerts a significantly positive effect on the construction of the digital countryside. Areas exhibiting high population density raise a more prominent demand for the construction of the digital countryside, and the new generation of rural residents yearns to cut away from the conventional countryside scene at the levels of production and operation, education and healthcare, and cultural exchange, and look forward to integrating into the new modern, informative, and digital life. There is a positive contribution of residents' financial activity to the construction of the digital countryside. The higher the level of residents' financial activity, the higher the residents' living standard will be indicated laterally, and the higher the residents' expectations for the construction of the digital countryside will be. Digital infrastructure construction can significantly promote the construction of China's digital

countryside. Over the years, China's construction of digital facilities has directly contributed to the development of the countryside while indirectly increasing the productivity of the primary industry.

Table 3. Results from the empirical test of the efficiency of digital inclusive finance on financial support for digital village construction.

Variables	(1) DR	(2) DR	(3) DR	(4) DR	(5) DR	(6) DR
DIF	2.607 ***	2.051 ***	1.896 ***	1.110 ***	1.197 ***	1.037 ***
	(0.314)	(0.387)	(0.360)	(0.291)	(0.282)	(0.242)
EDI		0.012 **	0.037 ***	0.028 ***	0.033 ***	0.030 ***
		(0.005)	(0.006)	(0.005)	(0.005)	(0.004)
IS			−0.005 ***	−0.005 ***	−0.006 ***	−0.004 ***
			(0.001)	(0.001)	(0.001)	(0.001)
SPD				0.220 ***	0.238 ***	0.190 ***
				(0.019)	(0.019)	(0.018)
FAR					0.022 ***	0.022 ***
					(0.006)	(0.005)
DIL						0.048 ***
						(0.006)
CONSTANT	−0.422 ***	−0.438 ***	−0.277 ***	−8.568 ***	−9.429 ***	−7.623 ***
	(0.072)	(0.071)	(0.072)	(0.734)	(0.747)	(0.676)
Fixed time	Yes	Yes	Yes	Yes	Yes	Yes
Fixed area	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.926	0.928	0.939	0.962	0.965	0.9744

"***" and "**" indicate significance at the 1% and 5% levels of significance.

4.3. Stability Test and Endogeneity Treatment

To ensure the reliability of this paper's conclusions, this section tests for possible endogeneity and stability issues, the results of which are listed in the Table 4.

Table 4. Robustness test results.

Variables	DR (Excluding Geographical Panel Data) (1)	DR (Excluding Time Panel Data) (2)	DR (Replaces Core Variables) (3)
FT	0.738 ***	1.383 ***	
	(0.253)	(0.396)	
FTI			0.597 ***
			(0.70)
Control	Yes	Yes	Yes
Constant	−7.735 ***	−7.571 ***	−4.434 ***
	(0.836)	(1.191)	(0.727)
Fixed time	Yes	Yes	Yes
Fixed area	Yes	Yes	Yes
R2	0.975	0.983	0.980

"***" indicates significance at the 1% level of significance.

4.3.1. Regression Tests for Excluded Data Samples

To further test the stability of the effect of digital inclusive finance development on the construction of digital villages, the following two methods are used in this study. One is to exclude geographical panel data, with samples randomly excluded from five provinces and cities including Beijing, Jilin, Fujian, Guangdong, and Yunnan, and a two-way stationary regression test is performed. The regression results are listed in column (1) of Table 4, suggesting that the regression coefficient of 0.738 for the randomly excluded provinces remains significant at 1%. Thus, the results of this study are robust. Second, after excluding

the time panel data, the development of digital inclusive finance shows a close correlation with the national top-level design. Thus, the introduction of macro policies will effectively boost the formation of new ecology, novel models, and new tools for digital inclusive finance, such that the digital countryside will be empowered to gain. In the sample time series of this study, there is an exogenous policy shock, i.e., the State Council's release of the "Plan for Promoting the Development of Inclusive Finance (2016–2020)". Accordingly, this study excludes the sample data before 2013 (inclusive) and conducts regression analysis on the remaining panel data, as listed in column (2) of Table 4. As revealed by these results, the regression coefficient of 1.383 is significant at 1%, which is consistent with the overall regression results, and thus the robustness of this study is reliable.

4.3.2. Replacement of Core Explanatory Variables

In this study, a comprehensive evaluation system of digital inclusive finance is developed for 30 provinces (with Tibet, Hong Kong, Macau, and Taiwan excluded) from 2013 to 2020 in the perspectives of both inclusiveness and digitality. Subsequently, the entropy value method is applied so that the level of digital inclusive financial development (FTI) measured with this evaluation system can be used as a replacement variable for the core explanatory variables in the model. The dimensional design and specific indexes are defined as follows. Inclusiveness: total stock market capitalization/GDP (%); number of listed companies (pcs); and financial institutions' farm savings (billion yuan). Numerosity: length of fiber optic cable lines (km) and number of broadband access subscribers (million). The above indexes are standardized and determined using the entropy method, and the overall evaluation index (FTI) derived from this comprehensive evaluation system range from 0 to 1. The regression results are listed in column (3) of Table 4. The regression coefficients and significance levels for the level of development of digital financial inclusion (FTI) do not vary significantly when the regressions are estimated after the core explanatory variables are replaced.

4.3.3. Endogeneity Test

To avoid the endogeneity problem arising from reverse causality and omitted variables, this study attempts to address the estimation bias caused by endogeneity using an instrumental variable method. Drawing on the method described by Zhang Lin (2020) [46], a one-period lag in the digital inclusion index serves as an instrumental variable to maximally eliminate the endogeneity problem triggered with the reverse causality of "the better the development of digital villages, the better the development of digital inclusion". However, there are endogeneity biases (e.g., omitted variables) in the empirical regression equation. Thus, this study draws on the method of Wang Liang (2023) [47] to address the endogeneity issue using rural–urban broadband penetration as an instrumental variable.

Columns (1)–(4) in Table 5 list the regression results of the instrumental variables approach. First, the first-stage regression results are presented in columns (1) and (3). The coefficient for the number of urban and rural broadband households is significant at 1% and has a positive sign, suggesting that the higher the number of urban and rural broadband households, the higher the level of digital inclusive finance. The coefficient for the lagged period of digital inclusive finance is significant at 1% and has a positive sign, suggesting that the higher the level of the lagged period of digital inclusive finance, the higher the level of digital. The coefficient for the first period of digital inclusive finance is significant at 1%. Second, the F-values for the two instrumental variables at the first stage are significantly larger than the critical value of 10, reaching 10.94 and 38.2, respectively. According to the Stock–Yogo judgment criteria, both instrumental variables pass the weak instrumental variable test, i.e., it is appropriate to select urban and rural broadband penetration and digital inclusive finance lagged by one period as variables for the level of digital inclusive finance development. Lastly, the regression results of the second stage are listed in columns (2) and (4), where the level of digital inclusive finance is significant at 1% with a positive sign for the coefficient, suggesting that digital inclusive finance development can indeed

enhance the construction of digital villages, proving the reliability of the regression results in this study.

Table 5. Endogeneity test.

Variables	Urban and Rural Broadband Penetration		FT-lag1	
	Stage 1	Stage 2	Stage 1	Stage 2
FT	10.287 ***	2.378 ***	2.756 ***	1.186 ***
	(1.957)	(0.869)	(0.399)	(0.425)
Control	Yes	Yes	Yes	Yes
R2		0.842		0.853
Phase I F-value	10.94		38.2	

"***" indicates significance at the 1% level of significance.

4.4. Pathway Mechanism Analysis

In the previous study, empirical data were used for an overall and differential analysis of the correlation between the effect of digital inclusive finance development and the construction of the digital village, whereas the effects exerted by the transmission mechanisms involved were not investigated in depth. Thus, in this section, the mediating transmission mechanism is identified and tested from the perspective of science and technology innovation and infrastructure based on the insights of digital inclusive finance development on digital village construction. (1) Science and technology innovation. In the existing research, positive and side-by-side related discussions have been conducted on science and technology innovation as a vital transmission factor. Using science and technology innovation as a mediating variable, Li Linhan (2022) [48] confirmed that digital inclusive finance can significantly contribute to science and technology innovation. This scholar also explained that digital inclusive finance is capable of breaking the barriers of knowledge and technology from the channels, modes, and scope of science and technology spillover, facilitating the multi-proliferation of science and technology from point-to-point to point-to-face, thus increasing the efficiency of industrial innovation, and continuously enhancing industrial competitiveness. Wu Xiaoxi (2021) [49] highlighted that science and technological innovation in the new era affects the development of villagers, villages, and rural industries by enhancing the overall appearance of the countryside, while it can provide technical support to boost the digital construction of the countryside. (2) Infrastructure. Infrastructure can also mediate the transmission of digital inclusive finance for digital villages, a view shared by many scholars. Ma Hongmei (2022) [50] suggested that the regionally coordinated development of digital inclusive finance can be conducive to the construction of information infrastructure, and adjusting the subsidies for SMEs and technology-based enterprises upward can lead to a lower cost of infrastructure construction for enterprises. Moreover, Zhao Xinyu (2022) [51] reported infrastructure development as a vital opportunity for the development of the countryside, and Internet big data platforms take on a certain significance in rural governance and development. (3) Digital literacy. Digital literacy takes on critical significance as a mediating transmitter in digital inclusive finance for constructing digital villages; this view has been supported by numerous scholars. Xie Juan (2022) [52] suggested that digital inclusive finance is capable of effectively enhancing the digital capability and financial literacy of people who have been lifted out of poverty, enhancing their ability to adapt to the publicity, marketing, and business capabilities of the digital economy, and accumulating capital for farmers in areas lifted out of poverty to share the benefits of the digital economy and move towards common services. Wu Xiaolong (2023) [53] highlighted that digital literacy can significantly stimulate farmers' participation in rural digital governance. In the field of public services, an improvement in farmers' digital literacy contributes to the digital transformation of public services in rural areas.

Regarding the regression results in Table 6, column (1) lists the major effect of digital inclusive finance development on digital village construction, columns (2) and (3) present

the tests for the mediating effect of technology creation, columns (4) and (5) are tests for the mediating effect of infrastructure, and columns (6) and (7) represent tests for the mediating effect of education level. As indicated by the main effect, the coefficient for digital inclusive financial development is positive at 1%, suggesting that digital inclusive financial development can significantly contribute to the construction of digital villages. The regression results for the mediating effect of technology innovation suggest that the coefficients in columns (2) and (3) are positive and significant at 1%, with the mediating effect of technology innovation reaching 40.79% (140.985 × 0.003/1.037), and the direct effect of digital inclusive finance reaching 58.92% (0.611/1.037). The direct effect of digital inclusive finance reaches 58.92% (0.6/1.037), suggesting that digital inclusive finance can lay a solid basis for technological innovation and increase the efficiency of the circulation of all factors in the economic system while contributing to technological innovation. Following the development of digital inclusive finance, the momentum of regional technological innovation can be stimulated, low-cost and more convenient financial services can be offered for agriculture-associated enterprises and long-tail people, and the rapid spread of the "spirit of science and innovation" can be facilitated. The development of digital villages was stimulated with the development of digital inclusive finance. As revealed by the regression results for the mediating effect of infrastructure, the coefficients in columns (4) and (5) are positive and significant at 1%, with the mediating effect of infrastructure reaching 19.63% (50.883 × 0.004/1.037), whereas the direct effect of digital inclusive finance is 82.16% (0.852/1.037). As indicated by the above results, the development of digital inclusive finance is driving the trend of a "new infrastructure wave" in companies and third-party organizations in mobile communication infrastructure, such that the construction of infrastructure has been significantly facilitated. Moreover, the wave of mobile communication infrastructure construction brought about with digital inclusive finance expedited an improvement in the modern face of the countryside, such that a new chapter has been opened in the construction of the digital countryside. Furthermore, the wave of mobile communication infrastructure brought about with digital inclusion has boosted an improvement in the modernization of the countryside while opening a new chapter in the construction of the digital village. As revealed by the regression results for the mediating effect of digital literacy, the coefficients in columns (6) and (7) are positive and significant at 1% and 10%, with the mediating effect of education level reaching 15.37 (19.922 × 0.008/1.037), whereas the direct effect of digital inclusive finance is 84.09 (0.872/1.037). The development of digital inclusive finance can lay a favorable basis for enhancing the digital literacy of the regional population. Long-tail people or agricultural-associated enterprises will take the initiative to improve their digital literacy to obtain financial support, and residents with higher digital literacy play an intuitive role in boosting the construction of a digital village.

Table 6. Regression results of the intermediary mechanism test.

Variables	Digital Village (1) Stage 1	Science and Technology Innovation (2) Stage 2	Digital Village (3) Stage 3	Communication Infrastructure (4) Stage 2	Digital Village (5) Stage 3	Education Level (6) Stage 2	Digital Village (7) Stage 3
FT	1.037 ***	140.985 ***	0.611 ***	50.883 ***	0.852 ***	19.922 ***	0.872 ***
	(0.242)	(36.988)	(0.223)	(17.306)	(0.240)	(3.577)	(0.259)
TI			0.003 ***				
			(0.001)				
MCI					0.004 ***		
					(0.001)		
DL							0.008 *
							(0.005)
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−7.623 ***	−851.076 ***	−5.050 ***	−10.614 ***	−7.584 ***	−44.470 ***	−7.254 ***
	(0.676)	(103.160)	(0.697)	(48.266)	(0.654)	(9.977)	(0.706)
Fixed time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed area	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.974	0.930	0.980	0.943	0.976	0.993	0.975

"***" and "*" indicate significance at the 1% and 10% levels of significance.

In brief, there is indeed a partial mediating effect based on science and technology innovation, infrastructure construction, and digital literacy in the process of digital inclusive financial development contributing to the construction of digital villages. In other words, with the development of digital inclusive finance, the construction of digital villages can be directly promoted, whereas the construction of digital villages can be boosted by stimulating the development of technological innovation, infrastructure construction, and digital literacy level. As revealed by the above result, Hypothesis 3 of this study is valid.

4.5. Heterogeneity Analysis

4.5.1. Inter-Territorial Heterogeneity

The sample data fall into regions for step-by-step analysis, with the aim of investigating the heterogeneity in the effect of digital inclusive finance development on the construction of digital villages. Table 7 lists the results of the regional heterogeneity in the analysis of the effect of digital inclusive finance development on digital village construction by dividing the sample data into eastern, central, and western regions. In general, the regression results for the eastern and western samples suggest that digital inclusive finance significantly contributes to the construction of the digital village, while the central region does not report any significant effect. The degree of the effect differs between the east and west, with the maximum impact coefficient (2.075) in the east, where the level of infrastructure and economic development is higher, increasing the efficiency of digital village construction by 2.075 for every 1% increase in the level of digital inclusive financial progress. The second maximum impact coefficient (0.646) is in the west, increasing the efficiency of digital village construction by 0.646 for every 1% increase in the level of digital inclusive finance. The possible reasons for the above result are the more economically developed eastern region, a higher standard of living of rural residents, and the strong financial needs of enterprises and residents. Although, the progressive development of digital inclusive finance can increase financial accessibility and the efficiency of the productive lives of enterprises and resident groups, such that they yearn for the convenience brought about with the construction of the digital village. As a result, the promotion of the construction of the digital village in the eastern region can be boosted. The disadvantage in the economic development of the western region turns out to be significant, rural residents raise an urgent need for financial services, and the marginal effect of residents' access to financial services is much higher than that in the eastern region, such that digital inclusive finance is promoted to enhance the efficiency of the construction of digital countryside. The central region, on the other hand, is sandwiched in the middle. Despite its large population and certain digital base, its overall economic level is relatively low, its digital infrastructure needs to be updated, and its residents are less financially active, requiring the government to provide substantial financial support for improving the rural landscape in a holistic manner. Here, the development of digital inclusive finance cannot directly stimulate the construction of the digital countryside. Thus, the geographically differentiated effect of digital inclusive finance in H2 is verified, suggesting the strong robustness of the core findings of this study.

Table 7. Empirical results of the regional differential effect of digital inclusive finance on digital village construction.

Variables	(1) East	(2) Middle	(3) West
FT	2.075 *** (0.554)	0.138 (0.465)	0.646 ** (0.286)
Control	Yes	Yes	Yes
Constant	−5.014 *** (1.012)	−0.002 (0.089)	−0.181 (0.0745)
Fixed time	Yes	Yes	Yes
Fixed area	Yes	Yes	Yes
R2	0.986	0.930	0.971

"***" and "**" indicate significance at the 1% and 5% levels of significance.

4.5.2. Inter-Dimensional Heterogeneity

Digital inclusive finance exhibits diverse characteristics, and a reflection on the effect of multi-dimensional indexes on digital villages should be covered in an analysis of the effect of digital inclusive finance development on the construction of digital villages, with the aim of drawing normative conclusions. As depicted in Table 8, the overall regression results for the degree of coverage do not take on significance, whereas the depth of use and the degree of digitalization are significant at 1%. For the degree of impact, the regression coefficient for depth of use is 0.601, having the largest effect, whereas the regression coefficient for digitization reaches 0.361, having the second largest effect. From the perspective of the impact on the construction of digital villages, first, the breadth of coverage index of digital inclusive finance refers to the measurement of the proportion of Alipay card-tied users, the number of accounts, and the number of card-tied users, which mostly indicates the audience of a single group. However, the current financial-associated supporting facilities in China are immature and the digital quality of residents is relatively low, such that the effect on the construction of digital villages is slight. Second, the use of depth indexes expresses the services (e.g., credit loans and commercial insurance provided with digital inclusive finance) to alleviate the financing constraints of agriculture-associated MSMEs, providing financing convenience, asset allocation, and risk control for MSMEs, thus providing effective assistance to the construction of digital villages. Third, the effect of digitalization is lower than the depth of use. The underlying reason continues to be the inadequate construction of China's information digitalization network and relevant supporting infrastructure, and the degree of digitalization requires long-term development to make a qualitative breakthrough. Thus, although the effect on the construction of the digital village is significant, the degree of effect is lower than the depth of use. Accordingly, the dimensional difference effect of digital financial inclusion in H2 is verified, thus proving the robustness of the core conclusion of this study.

Table 8. Empirical results of the differential effect of digital financial inclusion on the dimensionality of digital village construction.

Variables	(2) Digital Village	(4) Digital Village	(6) Digital Village
FT1 coverage breadth	−0.156 (0.331)		
FT2 depth of use		0.601 *** (0.133)	
FT3 digitization			0.361 *** (0.083)
Control	Yes	Yes	Yes
Constant	−8.017 *** (0.709)	−7.861 *** (0.668)	−7.726 *** (0.673)
Fixed time	Yes	Yes	Yes
Fixed area	Yes	Yes	Yes
R2	0.972	0.975	0.974

"***" indicates significance at the 1% level of significance.

4.6. Exploring the Internal Foundations and External Constraints on the Effectiveness of Digital Inclusive Finance

As indicated by the analysis in this study, there is an internal base effect of rural residents' consumption and an external constraint effect of financial regulation on the effectiveness of digital financial inclusion.

On the one hand, the moderating role played by the internal basis of rural residential consumption is investigated. Most scholars suggested that the growth of resident consumption can positively facilitate digital inclusive financial residence [54], and considerable consumption stimulation can catalyze the diversity of financial derivation and the formation of financial products with the characteristics of the target clientele. Thus,

encouraging rural residents' consumption awareness has positive practical implications for promoting the development of digital inclusive finance and further building a digital village. Accordingly, this study uses the consumption number of rural residents in a respective province to examine the consumption level of rural residents and empirically studies the influence status of rural residents' consumption in the process of using digital inclusive finance to expedite the digital village. In Table 9, column (1) shows the regression results of the cross-section of digital inclusive finance indexes and rural resident consumption on the digital village. The coefficient for the cross-section is positive and significant at 5%, which means that rural residents' consumption drives the positive effect of digital inclusive finance on the digital village.

Table 9. The moderating effect of residential consumption and financial regulation.

Variables	Digital Village	Digital Village
	(1)	(2)
Digital inclusive finance	0.2417 * (0.147)	0.650 *** (0.086)
Rural consumer	0.892 *** (0.300)	
Financial regulation		4.580 ** (2.159)
Digital inclusive finance × consumption by rural residents	0.457 ** (0.203)	
Digital inclusive finance × financial regulation		81.921 ** (33.154)
Control variables	Control	Control
Constant term	0.005 *** (0.002)	−0.003 *** (0.023)
Time fixed	Yes	Yes
Region fixed	Yes	Yes

"***", "**" and "*" indicate significance at the 1%, 5% and 10% levels of significance.

On the other hand, the regulatory role of external constraints on financial regulation is investigated. Tang Song (2020) [55] argue that digital financial inclusion has not changed the "risk-reward" principle of the financial industry, but rather the digital features will allow financial risks to quickly permeate the entire financial system [56]. As a result, stronger financial regulation has become necessary. Most scholars agree that financial regulation can effectively reduce the probability of arbitrage, liquidity risk and real financialization in the financial sector, and ensure the standardized and safe operation of financial markets, thus providing better credit and fund services to farmers and increasing social trust. Accordingly, this study uses government financial regulatory expenditure as a proportion of the value added to the financial sector to examine the strength of unified financial regulation and empirically explores the potential effect of financial regulation at this stage in the process of using digital financial inclusion to expedite the digital village. In Table 9, column (2) indicates the regression results for the cross-section of digital inclusive finance indexes and financial regulation on the digital village. The coefficient for the cross-section is positive and significant at 5%, suggesting that financial regulation promotes the positive effect of digital inclusive finance on the revitalization of the village.

5. Conclusions and Recommendations

5.1. Conclusions

In this study, the mechanism underlying the role of digital inclusive finance development in promoting the construction of the digital countryside is first theoretically classified.

Subsequently, based on the digital inclusive finance index published by the Digital Research Centre of Peking University 2020 and the macro statistics on 30 Chinese provinces and municipalities from 2013 to 2020, the digital inclusive finance mechanism of action and mediated transmission mechanism underlying development are empirically investigated using a two-way fixed panel model and a mediating effect model to expedite the construction of digital villages. Finally, the geographical and dimensional heterogeneity is tested.

As indicated by the result of this study: first, the development of digital inclusive finance can positively and significantly boost the construction of digital villages and has become an important driving force in the construction of a modern Chinese style village in the new era. This conclusion holds after stability tests (e.g., replacing core variable measures, excluding random and developed provincial and municipal samples, and instrumental variable methods). Second, heterogeneity exists in the role of digital inclusive financial development in boosting the construction of the digital countryside, with eastern provinces and cities having a stronger role in promoting the construction of the digital countryside compared with central and western regions. Thus, the unevenness in the current development of digital inclusive finance in promoting the construction of digital villages is revealed. Third, digital inclusive finance can indirectly expedite the implementation of digital village construction with the positive mediating effect of promoting technological innovation and communication infrastructure construction, suggesting that technological innovation, communication infrastructure construction, and residents' education level are vital paths for digital village construction under Chinese-style modernization in the new era. Fourth, a positive moderating effect of internal conditions of rural resident consumption and external conditions of financial regulation is reported when digital inclusive finance promotes digital rural development.

5.2. Policy Recommendations

Given the above findings, the following policy recommendations are made:

First, following the aim of building Chinese modernization, China should implement differentiated policies based on regional resource endowments, social conditions, and rural characteristics and tailor them to local conditions. China should support the promotion of digital inclusive finance in the central and western provinces, bridge the digital financial gap between different regions, and eliminate financial exclusion by conforming to several complementary policies, mainly on inclusive finance for the "three rural areas", together with tax concessions, financial subsidies, and the establishment of a negative list. It is imperative for the developed provinces in the eastern region to develop a large-scale digital network for exploiting the spatial spillover effect and spreading the positive effect of digital inclusive finance to the central and western regions, such that a "fast-led" model of support can be formed. China should also give full play to the value of data as a factor for production, facilitate the open sharing of data in an orderly fashion, boost the integration of data between government and enterprises, enterprises and enterprises, and enterprises and individuals, and drive the healthy development of the digital countryside based on digital inclusive finance.

Second, China should vigorously expedite the digitalization process in rural areas, optimize and upgrade mobile communication infrastructure, and inject new momentum into the construction of its digital countryside. With the continuous promotion of China's "Digital China" strategy, mobile Internet infrastructure turns out to be the largest worldwide, whereas the status quo of "more but not stronger, bigger but not better" persists. During the "14th Five-Year Plan" period, major infrastructure projects and works are urgently needed to expand and upgrade fiber-optic networks, cover special environments with 5G base stations, build interactive artificial intelligence facilities, and expedite spectrum-based blockchain technology. Furthermore, the integration of digital technology and rural construction should be expanded to optimize the digital governance system of the countryside

and fully release digital dividends to provide rural residents with more convenient access to financial services.

Third, the investment in scientific and technological research and development and high-level innovation talents should be increased to enhance the independent innovation capacity of digital technology and facilitate the upgrading of innovation. Seizing the historical opportunity of Chinese modernization, the construction of a science and technology innovation system can be facilitated, and the strengths of the three parties can be integrated, i.e., industry, academia, and research, to place a focus on breaking through the "neck" of key digital technologies. China should also increase the popularity and promotion of the "government-led, private investment" model, so that more capital through multiple channels converge on the track of scientific and technological development and talent innovation, for the incubation of hard science and technology innovative talent teams. The cultivation of digital financial inclusion industry clusters can be accelerated, the layout of innovative industrial chains for digital financial technology can be facilitated, and the application of digital financial technology can be deepened in more financial scenarios. Next, data elements and digital technology can be further used to lead technological innovation, the effect of digital inclusive finance and technological innovation in the construction of the digital village can be activated, and the construction of digital China and the digital village can be fully empowered.

Fourth, the investment in education should be increased to enhance the digital literacy of urban and rural residents. Targeted training programs should be developed, and farmers' awareness of digital life, prevention, and privacy protection in the countryside can be strengthened using video lectures, door-to-door distribution of brochures, special lectures, and the presentation of typical cases. China should continue to enrich new digital application scenarios and deepen farmers' digital participation in five major scenarios, including digital economy, digital ecology, digital culture, digital livelihood, and digital governance, and continue to empower the cultivation of farmers' digital literacy by continuously widening the coverage of application scenarios, so as to enhance the service experience of farmers' digital production and life in different application scenarios.

Fifth, the enthusiasm of rural residents should be actively promoted to consume and achieve a healthy balance in financial regulation. The development of digital inclusive finance has led to a constant turnover of financial products, such that rural residents are stimulated to expand their consumption with the diversity and convenience of financial products, and a positive dynamic is created toward the digital village. Moreover, the rigid requirements of financial regulation should not be relaxed to curb conditions (e.g., non-performing loans and information fraud), such that a virtuous balance can be created between financial regulation and the coordination of the digital countryside.

5.3. Further Discussion

The development of digital inclusive finance takes on profound significance in the construction of digital villages, and this study explores a range of these issues and uses empirical evidence for verification. Although the discussion takes on theoretical and practical significance, there are still some limitations in this study, which are expected to be remedied in future studies. On the one hand, certain shortcomings exist in the research sample. First, the sample used in this study represents the provincial level in China. To study the issue of digital villages in depth, data can be further selected from the city and county level to be more representative. Second, the sample used lacks an international perspective. Data from developed countries (e.g., the United States, the United Kingdom, and Italy) and developing countries (e.g., India and Malaysia) should be considered for discussion and validation, with the aim of further indicating the development of the global digital village. On the other hand, in this study, the stress is placed on the effect of digital inclusive finance on the construction of the digital village. With the aim of investigating the issues regarding the digital village in depth, we can delve into the issues of digital

governance of the village and the digitization of rural industries and study more deeply the various aspects of the construction of the digital village.

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References

1. Li, H.; Yang, S. The Road to Common Prosperity: Can the Digital Countryside Construction Increase Household Income? *Sustainability* **2023**, *15*, 4020. [CrossRef]
2. General Office of the State Council. Outline of the Digital Countryside Development Strategy. Available online: http://www.gov.cn/zhengce/2019-05/16/content_5392269.htm (accessed on 20 January 2023).
3. Cyberspace Administration of China. Digital Rural Development Action Plan (2022–2025). Available online: http://www.cac.gov.cn/2022-01/25/c.1644713315749608.htm (accessed on 20 January 2023).
4. Leyshon, A.; Thrift, N. The Restructuring of the U.K. Financial Services Industry in the 1990s: A Reversal of Fortune? *J. Rural. Stud.* **1993**, *9*, 223–241. [CrossRef]
5. Sarma, M.; Pais, J. Financial inclusion and development. *J. Int. Dev.* **2011**, *23*, 613–628. [CrossRef]
6. Guo, F.; Wang, J.Y.; Wang, F.; Kong, T.; Zhang, X.; Cheng, Z. Measuring the development of digital inclusive finance in China: Indexing and spatial characteristics. *Economics* **2020**, *19*, 1401–1418. [CrossRef]
7. Tong, L.; Tian, H.; Li, Y. The inner mechanism, practical dilemma and path choice of digital inclusive finance for rural revitalization. *Agric. Econ.* **2022**, *426*, 113–114.
8. Zhou, L.; Han, L.; Xiu, J. How digital inclusive finance can help rural revitalization: A perspective based on industrial development. *Nanfang Financ.* **2022**, *548*, 70–78.
9. Wang, M.; Gu, Y.; Li, Z. Digital inclusive finance and rural revitalization: Theoretical logic and empirical test. *J. Northwestern Univ. (Philos. Soc. Sci. Ed.)* **2023**, *53*, 56–71. [CrossRef]
10. Zhang, C.; Hong, Z.; Wang, L. Research on the impact of rural inclusive finance on agricultural industrialization. *J. Guizhou Univ. Financ. Econ.* **2021**, *39*, 35–44.
11. Chen, Y.; Wen, T. Can digital inclusive finance promote rural industrial development—An analysis based on spatial econometric model. *Agric. Technol. Econ.* **2023**, *333*, 32–44. [CrossRef]
12. Cao, J.; Zhang, L. Dynamic impact of digital inclusive finance on the development of rural industrial integration—A test based on systematic GMM and threshold effect. *Southwest Financ.* **2023**, *498*, 43–55.
13. Yang, L.; Zhao, H. The theoretical logic and reality check of digital inclusive finance to help farmers increase their income. *Shandong Soc. Sci.* **2022**, *320*, 149–155. [CrossRef]
14. Lai, C.-M.; Zhou, Y. A study on the impact of digital inclusive finance on rural consumption-based on a spatial econometric model. *Econ. Geogr.* **2021**, *41*, 177–186. [CrossRef]
15. Huang, Q.; Zhu, H.; Su, H. A study on the impact of digital inclusive finance on farmers' entrepreneurial choices. *Fujian Forum (Humanit. Soc. Sci. Ed.)* **2021**, *351*, 85–102.
16. Zhou, Y.; Miao, Z. The impact of digital inclusive finance on farmers' investment in production and operation. *China Rural. Obs.* **2023**, *169*, 40–58. [CrossRef]
17. Qin, J.; Gao, C. Exploring the synergistic development of digital inclusive finance and digital countryside. *China Econ. Trade J.* **2019**, *951*, 120–121. (In Chinese)
18. Zhang, W.; Zhang, Z. Research on the Integration of Digital Inclusive Finance and Digital Rural Development. *Rural. Financ. Res.* **2022**, *505*, 3–12. [CrossRef]
19. Gurley, J.G.; Shaw, E.S. Financial Aspects of Economic Development. *Am. Econ. Rev.* **1955**, *45*, 515–538.
20. Romer, D. *Advanced Macroeconomics*, 4th ed.; McGraw-Hill Company Press: New York, NY, USA, 2012.

21. McKinnon, R.I. *The Order of Economic Liberalization: Financial Control in the Transition to a Market Economy*; Johns Hopkins University Press: Baltimore, MD, USA, 1991.
22. Hellmann, T.; Murdock, K.; Stiglitzm, J. Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough? *Am. Econ. Rev.* **2000**, *90*, 147–165. [CrossRef]
23. Yin, Z.T.; Li, J.C.; Yang, L. Can financial technology development improve the happiness of rural households?—A research perspective based on the economics of happiness. *China Rural. Econ.* **2021**, *440*, 63–79.
24. Ming, Z.; Werner, R. Beyond Online Search. The Road to Profifitability. *Calif. Manag. Rev.* **2003**, *45*, 2–107.
25. Oh, G.; Kim, H.-Y.; Park, A. Analysis of technological innovation based on citation information. *Qual. Quant.* **2017**, *51*, 1065–1091. [CrossRef]
26. Aghion, P.; Fally, T.; Scarpetta, S. Credit Constraints as a Barrier to the Entry and Post-Entry Growth of Firms. *Econ. Policy Econ. Policy* **2007**, *22*, 22–731. [CrossRef]
27. Gomber, P.; Kauffman, R.J.; Parker, C.; Weber, B.W. On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption. and Transformation in Financial Services. *J. Manag. Inf. Syst.* **2018**, *35*, 220–265. [CrossRef]
28. Zhu, J.; Li, J. Digital economy, technological innovation and urban green economic efficiency-an empirical analysis based on spatial econometric model and mediating effects. *Explor. Econ. Issues* **2023**, *487*, 65–80.
29. Zhang, Y.; Hu, S. A Study on the Impact of Digital Inclusive Finance on the Harmonious Development of Economy and Environment-the Mediating Effect of Innovation Drive. Soft Science: 1–11. Available online: http://kns.cnki.net/kcms/detail/51.1268.G3.20221108.1658.006.html (accessed on 6 May 2022).
30. Zhou, H.; Li, Y.; Li, R. Study on the spatial effect of financial industry agglomeration on regional economic growth. *Mod. Financ. Econ. (J. Tianjin Univ. Financ. Econ.)* **2016**, *36*, 63–76. [CrossRef]
31. Su, F.; Fang, L. Regional differences in financial exclusion in rural China: Insufficient supply or insufficient demand?—A comparative analysis of banking, insurance and internet finance. *Manag. World* **2016**, *276*, 70–83. [CrossRef]
32. Qian, H.; Tao, Y.; Cao, S.; Cao, Y. Theoretical and empirical evidence on the development of digital finance and economic growth in China. *Res. Quant. Econ. Technol. Econ.* **2020**, *37*, 26–46. [CrossRef]
33. Xue, Q.; Feng, S. Digital Inclusive Finance, Resident Consumption, and High Quality Economic Development. *Mod. Econ. Explor.* **2022**, 26–40. [CrossRef]
34. He, C.; Dong, W.; Ning, A. Development and Regulation of Digital Inclusive Finance. *China Financ.* **2019**, *23*, 66–67.
35. Zhang, C.; Zhang, Y.; Li, Y.; Li, S. Coupling Coordination between Fintech and Digital Villages: Mechanism, Spatiotemporal Evolution and Driving Factors—An Empirical Study Based on China. *Sustainability* **2023**, *15*, 8265. [CrossRef]
36. Wang, Y.; Gao, J.; Liu, B. High-tech industrial agglomeration, scientific and technological innovation and economic growth. *East China Econ. Manag.* **2023**, *37*, 37–56. [CrossRef]
37. Chen, F.C.; Jiang, G.H. Emission Reduction Effect of Digital Economy-Based on Spatial Panel Data of 285 Prefecture-Level Cities. Lanzhou Journal: 1–25. Available online: http://kns.cnki.net/kcms/detail/62.1015.C.20230516.1021.002.html (accessed on 22 May 2023).
38. Wang, J.; Cai, Z.J.; Ji, X. Digital literacy, farmer entrepreneurship and relative poverty alleviation. *E-Gov.* **2022**, *236*, 15–31. [CrossRef]
39. Ye, Q.; Yuan, G.; Zhang, C. Digital Inclusive Finance and Income Inequality of Opportunity. Contemporary Economic Science: 1–13. Available online: http://kns.cnki.net/kcms/detail/61.1400.F.20230410.1531.004.html (accessed on 22 May 2023).
40. Wu, X.; Yao, L.Y. Digital Economy, Innovation Drive and Regional Economic Growth. Soft Science: 1–12. Available online: http://kns.cnki.net/kcms/detail/51.1268.G3.20230517.0929.002.html (accessed on 22 May 2023).
41. Liu, X.; Han, Q. The impact of digital inclusive finance on county economic growth–based on the perspective of traditional finance and industrial structure upgrading. *China Circ. Econ.* **2023**, *37*, 107–115. [CrossRef]
42. Gajić, T.; Blešić, I.; Petrović, M.D.; Radovanović, M.M.; Đoković, F.; Demirović Bajrami, D.; Kovačić, S.; Vrgović, I.J.; Tretyakova, T.N.; Syromiatnikova, J.A. Stereotypes and Prejudices as (Non) Attractors for Willingness to Revisit Tourist-Spatial Hotspots in Serbia. *Sustainability* **2023**, *15*, 5130. [CrossRef]
43. Ji, X.; He, B. Digital inclusive finance, differentiated development and regional industrial structure upgrading. *Financ. Educ. Res.* **2023**, *36*, 54–62.
44. Meng, W.; Ren, B. The influence mechanism and spatial effect of digital finance on the integration of rural industries. *J. Southwest Univ. Natl. (Humanit. Soc. Sci. Ed.)* **2023**, *44*, 96–106.
45. Baron, R.M.; Kenny, D.A. The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *J. Personal. Soc. Psychol.* **1986**, *51*, 6–1173. [CrossRef] [PubMed]
46. Zhang, L.; Wang, Y.; Zheng, Q. How digital inclusive finance affects the growth of private enterprises. *Res. Financ. Econ.* **2023**, *474*, 474–476. [CrossRef]
47. Wang, L.; Liu, L.Y.; Jiang, Y.Z. Spatial spillover effects of the digital economy on carbon productivity. *Financ. Econ.* **2023**, *546*, 61–73. [CrossRef]
48. Li, L.; Han, M.; Hou, Y. Impact of digital inclusive finance on the real economy-an empirical analysis based on systematic GMM and panel threshold model. *East China Econ. Manag.* **2022**, *36*, 14–25. [CrossRef]
49. Wu, X. Research on the integration development of digital economy and rural industries. *Southwest Financ.* **2021**, *483*, 78–88.

50. Ma, H.; Zhao, Z. A study on the regional heterogeneous impact of digital inclusive finance on China's real economy development: Effect testing and transmission mechanism. *J. Chongqing Univ. Technol. (Soc. Sci.)* **2022**, *36*, 40–50.
51. Zhao, X.; Wang, G.; Yang, P. Construction of digital countryside in the context of rural revitalization strategy. *J. Northwest Agric. For. Univ. Sci. Technol. (Soc. Sci. Ed.)* **2022**, *22*, 52–58. [CrossRef]
52. Xie, J. *A Study on the Political Economy of Rural Digital Inclusive Finance*; Sichuan University: Chengdu, China, 2022. [CrossRef]
53. Wu, X.; Wang, H. Farmers' Digital Literacy: Framework System, Driving Effects and Cultivation Paths-an Analytical Perspective of Competency Quality Theory. E-Government: 1–15. Available online: http://kns.cnki.net/kcms/detail/11.5181.TP.20230314.1716.006.html (accessed on 22 May 2023).
54. Cheng, X.; Li, C. A study on the convergence effect of digital inclusive finance on urban-rural consumption gap. *Mod. Econ. Inq.* **2023**, *498*, 27–41. [CrossRef]
55. Tang, S.; Wu, X.; Zhu, J. Digital finance and corporate technology innovation-structural characteristics, mechanism identification and differences in effects under financial regulation. *Manag. World* **2020**, *36*, 52–66.
56. Chen, X.; Qiu, B. Digital finance, financial regulation and export expansion-evidence from Chinese industrial firms. *Int. Econ. Trade Inq.* **2021**, *37*, 35–50. [CrossRef]

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The Dynamics and Driving Mechanisms of Rural Revitalization in Western China

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Abstract: By constructing a rural revitalization index evaluation system and using measurement models and software such as AHP, the entropy method, the BCG matrix, and GeoDetector, this paper quantitatively analyzed the evolution mode and driving mechanism of rural revitalization performance based on the research of 131 cities and autonomous prefectures in western China to further put forward relevant policy suggestions and establish a new framework that integrates "performance evaluation, evolution model, driving mechanism, and management strategy". Findings: firstly, rural revitalization in western China showed slow development and significant regional heterogeneity, with a coefficient of variation of 0.46 or even higher; secondly, the different dimensions of rural revitalization and development varied greatly, with the order being: thriving businesses (about 0.04) < effective governance (about 0.06) < pleasant living environment (about 0.09) < social etiquette and civility (about 1.0) < prosperity (about 0.23); thirdly, the growth and decline of rural revitalization performance coexisted in the context of rapid development in western China, and the evolution was in diversified patterns; fourthly, there were many factors affecting the change of rural revitalization performance, and different factors exhibited significant synergistic effects with each other, with super-interacting factor pairs having a force of over 0. 7 (maximum 1), including permanent population, urbanization rate, added value of primary industry, and per capita GDP as key factors; fifthly, based on the superposition analysis of the evolution pattern and driving forces of rural revitalization, western cities are classified into 8 types (including external assistance zone, general development zone, general retention zone, general demonstration zone, internal governance zone, important development zone, important retention zone, important demonstration zone) for establishment of a zoning planning and management system and design of differentiated development policies, providing a basis for "evidence-based decision-making" for the government.

Keywords: rural revitalization; evolution model; sustainable development; influencing factors; management policy

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1. Introduction

With the rapid advancement of urbanization and industrialization, rural decline has gradually become a major challenge faced by countries all over the world [1,2]. Problems of increasingly serious village decay and hollowing out, land degradation, especially arable land abandonment, population loss, ecological damage, and environmental pollution have long plagued the sustainable development of villages, leading to the decreasing livability and vitality of villages [3,4]. They are found in developed countries and regions such as the

United States, the European Union, Japan, and South Korea, and are also common in China, India, Egypt, Mexico, Iran, and developing countries in Africa [5,6]. To boost the vitality of rural development, governments have promulgated a series of rural revitalization plans and policies. For example, developed countries such as the United Kingdom, Germany, Japan, and South Korea formulated and implemented rural revitalization strategies in the 1930s and 1970s [7,8]. The EU has implemented a series of new plans for rural revitalization and development in recent years, including the Rural Development Programme [9], the New Common Agricultural Policy [10], and LEADER (Liaisons Entre Activites de Developpement de l'Economie Rural) [11,12]. In addition, Finland sees vitality policy as a tool to promote rural revitalization [13], Vietnam implements the National Target Program for New Rural Development [14], and China has set "rural revitalization" as a national strategy [15]. In general, faced with the increasing marginalization of rural development, governments are designing and implementing proactive intervention policies to promote rural revitalization [16].

To address the backwardness and decline of rural development, the Chinese Government has implemented national strategies such as the "New Countryside" and "Rural Revitalization", which have achieved some success in promoting sustainable rural development [17,18]. In addition, due to the huge disparity in development between the eastern and western regions of China, the Chinese government has introduced the "Western Region Development Strategy" to promote coordinated development across the country, and in its latest policy, the Chinese government has explicitly called on the western region to promote rural revitalization, consolidate the gains of poverty eradication, and promote the integration of urban and rural areas, based on the full completion of poverty eradication tasks [19,20]. The core of China's rural revitalization strategy is to accelerate the modernization of agriculture and rural development in the five areas of "thriving businesses, pleasant living environments, social etiquette and civility, effective governance, and prosperity", to achieve the overall goal of strong agriculture, a beautiful countryside, and well-off farmers. To sum up, enhancing rural vitality has become an urgent task in western China, and it is of great practical value and theoretical significance to study the dynamic development and driving mechanisms of rural revitalization in western China.

Therefore, by constructing an index system for evaluating the rural revitalization performance in 131 cities in western China, this paper quantitatively analyzes the evolution patterns and driving mechanisms of rural revitalization in different cities using research methods such as Entropy, the Boston Consulting Group Matrix, and GeoDetector to provide experiences for sustainable rural development in western China and similar regions around the world. This study aims to address the following questions:

First, how do we construct a quantitative rural revitalization performance evaluation index system (referred to as the rural revitalization index in this paper) based on China's rural revitalization planning and policies to lay the foundation for the evaluation and comparison of the implementation of policies and plans for rural revitalization and development in different regions?

Second, how do we quantitatively measure the rural revitalization evolution patterns of different cities in western China with the rural revitalization index and provide a basis for scientifically identifying problematic and leading cities in rural revitalization?

Third, what factors influence changes in the rural revitalization performance in western China and provide a basis for decision-making on relevant policy design and planning optimization?

The main contributions of this paper are: first, quantitatively assessing the performance and change patterns of rural revitalization in western China, providing a basis for related policy design and management optimization; second, identifying and deconstructing the driving mechanisms of rural revitalization in the western region using the spatial econometric model; and third, establishing a new framework that integrates "performance evaluation, evolving patterns, driving mechanisms, and management strategies", which provides an emerging management tool for policymakers of rural revitalization.

2. Literature Review

Rural areas have a non-negligible role in global sustainable development and have long been a hotspot for academic research. A review of related literature reveals that more than 3000 scholars from 60 countries and regions around the world are currently involved in rural revitalization research, with the majority of papers published by Chinese and American scholars [21]. Recent years have witnessed an increasing number of papers on rural revitalization and sustainable rural development, as well as an increasing diversity of research contents and methodological pluralism.

In terms of research content, international scholars focus on discussing rural decline [22], sustainable rural development [23,24], urban-rural integration and urbanization [25], and smart rural construction [26,27]; Chinese scholars prefer to analyze rural governance in the context of rural revitalization [28], digital countryside [29,30], rural land consolidation and rural land use change [31,32], rural carbon emission [33], and rural habitat transformation [34,35]. Rural revitalization and rural sustainable development are generally equivalent [36], where digital countryside, smart countryside, and low-carbon countryside are the latest development trends and policy design directions. Based on the analysis of a large number of cases and index studies, scholars generally agree that rural revitalization is the core content of urbanization, and the development of rural revitalization and the rise of its research indicate that urbanization research gradually changes from "urban bias" to "urban-rural integration" [37,38]. It should be noted that the paths of rural revitalization vary significantly across countries and regions, with rural tourism [39], local agricultural or mineral resources [40,41], institutions and organizations [42], farmer entrepreneurship [43], and partnerships for sustainable rural development [44] being of significant value in most cases.

According to the research methodology, most of the papers were qualitative and used case studies. The studies on rural revitalization are in their infancy, and most of the papers try to summarize experiences, discover models, and develop technologies mainly by analyzing representative cases in old revolutionary areas [45], autonomous minority regions [46], historical and cultural villages and traditional villages [47], urban agglomerations and metropolitan areas [48], remote mountainous areas [49], poverty-stricken areas [50], and low-density population areas [51]. It is a remarkable fact that some scholars have already attempted the study of the theoretical construction of rural revitalization development based on case analysis and put forward three fundamental functions and four critical tasks of rural revitalization in China. Based on the study of rural decline and rural revitalization strategies in China, Liu constructed a theoretical framework of rural revitalization based on the two-way integration and interaction of population, land, industry, and rights between urban and rural areas and considered land system reform as the key point for management policy design [52]. Giving full play to the functions of the countryside is a prerequisite for truly revitalizing rural development. Guaranteeing national food security, providing high-quality ecological products/environments/barriers (ecological barriers), and passing on the excellent traditional Chinese culture, especially the farming culture, are the three fundamental functions of the Chinese countryside, and they are also the focus of efforts that should be made in the design of rural revitalization planning and policies [53]. Rural civilization is the guarantee of rural revitalization. Emphasis is placed on both material and spiritual civilization together to inherit, develop, and enhance the excellent traditional culture of rural areas, to improve the spiritual outlook of farmers, to cultivate a civilized countryside, a good family culture, and a simple folk culture, and thus to continuously improve the civilization of rural society. Prosperity is fundamental to the revitalization of the countryside, so environmentally friendly enterprises should be encouraged in rural areas to diversify the rural economy, provide more jobs, raise farmers' incomes, and keep rural residents' incomes growing at a faster rate than those of urban residents. Efforts should be made to continuously improve the rural habitat, build beautiful villages that are pleasant to live in and work in, and narrow the gap between urban and rural living environments. By studying the development problems of China's rural areas,

agriculture, and farmers, especially the weak points, we identified and determined four critical tasks for the development of China's rural revitalization, that is, winning the battle against poverty, stabilizing agricultural and rural development, completing the initial tasks of rural revitalization, and establishing an effective policy framework, while mobilizing and gathering development factors around the four priorities of personnel, resources, funding, and public service allocation to support the development of rural revitalization [54].

To sum up, the research on rural revitalization and sustainable rural development has received increasing attention, with some scholars devoted to case, phenomenon, and empirical analyses, while others are devoted to law discovery and theory construction, all of which have made breakthroughs in research depth and width. However, it is worthwhile to note that the existing studies also have some shortcomings, which limit the application value of the findings. The research gap is in three main areas:

First, there are relatively few quantitative empirical studies; most papers use case studies and qualitative analysis methods, except for some scholars who have conducted exploratory studies using econometric models [55]. Qualitative and quantitative studies are equally important, and both are complementary and indispensable. As the development of rural revitalization moves from the stage of theoretical construction to the stage of practical guidance, developing a quantitative evaluation scale for rural revitalization performance to reveal the evolution pattern of rural revitalization and its driving mechanisms is of great value for the design of development and management policies and the formulation of village and spatial planning related to rural revitalization.

Second, there are relatively few micro-scale studies, and most papers place their focus on macro-scale studies of countries, provinces, and regions while ignoring mesoscale and micro-scale studies of cities, counties, and towns [56]. Given that any single scale cannot satisfy all the needs of consumers, multi-scale analysis is necessary for rural revitalization research, and the micro-scale should not be marginalized. With the in-depth implementation of the rural revitalization strategy, more and more cities, counties, and towns have started to formulate and implement their own rural revitalization development plans and programs under the guidance of the national strategic planning outline and provincial master plans. Therefore, the practice of rural revitalization development requires scholars to conduct micro-scale research to provide a basis for government decision-making.

3. Research Design

3.1. Study Area

The study area covers 131 cities and ethnic minority autonomous prefectures under the jurisdiction of 12 provincial-level administrative regions in China, that is, Sichuan, Shaanxi, Gansu, Qinghai, Yunnan, Guizhou, Chongqing, Guangxi Zhuang Autonomous Region, Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, Xinjiang Uygur Autonomous Region, and Tibet Autonomous Region, involved in the Western Region Development Strategy (Figure 1). It is noteworthy that Yangling Demonstration Zone in Shaanxi Province, Shihezi, Aral, Tumxuk, Wujiaqu, Beitun, Tiemenguan provincial county-level city, and the Xinjiang Production and Construction Corps in Xinjiang Uygur Autonomous Region are excluded from the study area due to a lack of data. Since Enshi Tujia and Miao Autonomous Prefecture in Hubei Province, Xiangxi Tujia and Miao Autonomous Prefecture in Hunan Province, and Yanbian Korean Autonomous Prefecture in Jilin Province, which enjoy China's western development policy, are not part of the western region, they are also excluded from the study area.

Unlike the central and eastern regions, the western region has lagged behind in economic and social development due to the constraints of the natural environment, geographical location, and transportation facilities for a long time, with an excessively wide gap between urban and rural areas and a particularly prominent rural decline, so the revitalization of the western region has become a critical part of China's overall promotion of rural revitalization. A comprehensive assessment of the level of rural revitalization from a quantitative point of view makes it possible to identify the effectiveness of rural

revitalization strategies and policies at the stage of implementation while allowing for the establishment of rural development goals for each region, analysis of existing problems, promotion of construction through assessment, and extracting and popularizing useful experience. At a critical period when western China is consolidating and expanding the achievements of poverty alleviation and rural revitalization, it is of great theoretical and practical significance to construct an index system for objectively evaluating the implementation effect of rural revitalization, understanding the development of rural revitalization, assessing the problems in the implementation of relevant policies and plans, and deeply analyzing the external factors affecting the implementation effect of rural revitalization in western China.

Figure 1. Study area.

3.2. Research Steps and Methods

This study includes three critical steps. The first step is to construct the rural revitalization index through the analytic hierarchy process to lay the foundation for quantitative evaluation of rural revitalization development performance; the second step is to quantitatively analyze the evolution pattern of rural revitalization using the Boston matrix; and the third step is to quantitatively analyze the regional differences of rural revitalization and the driving mechanism of development evolution based on the GeoDetector. The operational steps of the significant components of the study implementation process are detailed below:

3.2.1. Rural Revitalization Index and Analytic Hierarchy Process

According to the *Strategic Plan for Rural Revitalization (2018–2022)* and *Opinions on the Implementation of Rural Revitalization Strategy* issued by the State Council of the Central Committee of the Communist Party of China, governments at all levels should promote the revitalization of rural industries, talents, culture, ecology, and organization in a scientific and orderly manner in accordance with the general requirements of thriving businesses, a pleasant living environment, social etiquette and civility, effective governance, and prosperity. To implement rural revitalization, the focus is on thriving businesses; the key is a pleasant living environment; the guarantee is social etiquette and civility; the foundation is effective governance; and the core is prosperity. The literature review shows that most scholars have constructed the evaluation index system of rural revitalization around the

overall plan for promoting "all-round economic, political, cultural, social, and ecological progress", but the applicability of the index system varies.

According to the above explanations and analyses as well as the studies of scholars such as Xu [57], Wan [58], and Yang [59], we constructed a rural revitalization index evaluation system containing five subsystems and 30 measurement indicators based on the actual conditions of rural development in western China as well as the available data and the hierarchical evaluation system using the AHP method (Table 1) in a scientific, feasible, and measurable manner. Notably, the primary task of rural revitalization in the western region is to crack the predicament of a large rural poverty population, deep poverty, extensive poverty-stricken areas, accumulated poverty, and multi-dimensional poverty, while the revitalization of rural industry is a powerful support to eradicate poverty, the improvement of rural governance is a basic guarantee, the revitalization of rural ecology is a powerful way, and social etiquette and civility are a basic premise. Therefore, the revitalization of the countryside in western China is a comprehensive development based on getting the population out of poverty, and is a holistic enhancement of rural industry, economy, ecology, culture, and governance.

Table 1. Indicator system of the rural revitalization index.

Subsystem	Indicator	Code	Weight	Implication
Thriving Businesses	Per capita, the total power of agricultural machinery (KW)	Z_1	0.023	Agricultural Production Capacity
	Comprehensive grain production capacity (10,000 Tons)	Z_2	0.001	
	Agricultural labor productivity (Yuan/Person)	Z_3	0.041	Agricultural Production Efficiency
	Main business income of agricultural product processing enterprises above the designated size (100 Million Yuan)	Z_4	0.001	Industry Convergence
Pleasant Living Environments	Consumption of pesticides and fertilizers (10,000 Tons)	Z_5	0.098	Greenization of Agriculture
	Comprehensive utilization rate of livestock and poultry manure (%)	Z_6	0.032	
	The proportion of administrative villages that treat household sewage (%)	Z_7	0.03	Rural Living and Ecological Environment Governance
	The proportion of administrative villages that manage household waste (%)	Z_8	0.032	
	Coverage rate of sanitary toilets (%)	Z_9	0.033	
	Rural greening rate (%)	Z_{10}	0.025	
Social Etiquette and Civility	Proportion of education, culture, and entertainment expenses of rural residents (%)	Z_{11}	0.033	Education Level of Farmers
	The proportion of full-time teachers in rural compulsory education schools with a bachelor's degree or above (%)	Z_{12}	0.031	
	Average education time of rural residents (Years)	Z_{13}	0.038	
	Coverage ratio of cable Television (%)	Z_{14}	0.029	Dissemination and Construction of Traditional Culture
	The proportion of administrative villages that have opened internet broadband services (%)	Z_{15}	0.034	
	Number of rural cultural stations (Units)	Z_{16}	0.001	

Table 1. *Cont.*

Subsystem	Indicator	Code	Weight	Implication
Effective Governance	Proportion of village directors and secretaries; "one shoulder multi-task"(%)	Z_{17}	0.037	Governance Capability and Measures
	Proportion of administrative villages that have prepared village plans (%)	Z_{18}	0.027	
	Proportion of administrative villages that have undergone village renovation (%)	Z_{19}	0.032	
Prosperity	Per capita net income of farmers (Yuan)	Z_{20}	0.047	Farmers' Economic and Consumption Structure
	Growth rate of per capita net income of farmers (%)	Z_{21}	0.052	
	Income ratio of urban and rural residents (%)	Z_{22}	0.036	
	Rural poverty incidence rate (%)	Z_{23}	0.043	
	Engel's coefficient of rural residents (%)	Z_{24}	0.037	
	Car ownership per 100 households (Vehicles)	Z_{25}	0.036	Farmers' Living Conditions
	Per capita housing area of rural residents (Square Meters)	Z_{26}	0.026	
	Number of health technicians per thousand people in rural areas (Person)	Z_{27}	0.031	
	Popularization rate of safe drinking water (%)	Z_{28}	0.034	Rural Infrastructure
	Village Road Hardening Rate (%)	Z_{29}	0.040	
	Per capita road area (Square Meters)	Z_{30}	0.040	

The selection of indicators of livelihood affluence should take into account the critical needs of farmers such as transportation, housing, health care, and water safety in an integrated manner and should give prominence to transportation. Since the Chinese embrace the belief that "transportation infrastructure is fundamental for a region's development", poor transportation is also a major reason why most villages fall into poverty. Now that rural China has entered a critical period of automobile penetration, automobiles rather than motorcycles (bicycles, e-bikes, and motorcycles have become completely commonplace and are in every household) are seen by farmers as a key indicator of affluence, so we take the number of automobiles owned as an important indicator. Televisions and refrigerators have completely covered Chinese rural households, and smartphones have achieved full penetration except for children, the elderly, the illiterate, and other unsuitable populations. As a result, these indicators are not regarded by farmers as signs of a prosperous life and are not included in the government's assessment, so they are excluded from the indicator system. However, strengthening rural public health services and building healthy villages is a concern for villagers and a key task in assessing the government. Therefore, the number of health technicians per thousand people in rural areas, one of the most commonly written indicators, is incorporated into the indicator system. Furthermore, transferring the rural population to live in cities and towns and modernizing agriculture are two core objectives of rural revitalization, so agricultural labor productivity is included in the indicator system.

Since the hierarchical analysis method allows better consideration of multiple dimensions of rural revitalization and the entropy method has the advantage of objective weighting, this paper adopts the AHP and entropy methods to calculate the rural revitalization index. The calculation steps are presented as follows: First, given that all indicators are in different units of measurement, standardize the indicators before the calculation and non-negatize the positive and negative indicators by adding 0.01 to them all to prevent the logarithm calculation from being meaningless when finding the entropy value. It is calculated by the following equation:

$$Positive\ indicators: Z'_{ij} = \frac{Max - Z_{ij}}{Max - Min} + 0.01 \quad (1)$$

$$egative\ indicators: Z'_{ij} = \frac{Z_{ij} - Min}{Max - Min} + 0.01 \quad (2)$$

where Z'_{ij} is standardized data, Max is the maximum value of all cities for an indicator, Min is the minimum value of all cities for an indicator, i and j are the serial numbers of cities and indicators, respectively, $i = 1, 2, 3, \ldots\ldots, n$; $j = 1, 2, 3, \ldots\ldots, m$.

Second, calculate the proportion of the j-th indicator of the i-th city as follows:

$$P_{ij} = \frac{Z'_{ij}}{\sum_{i=1}^{n} Z'_{ij}} \quad (3)$$

Third, calculate the entropy value of the j-th indicator, with $0 \leq e_j \leq 1$, as follows:

$$e_j = \frac{-1}{\ln(n)} \sum_{i=1}^{n} P_{ij} \ln(P_{ij}) \quad (4)$$

Fourth, calculate the difference coefficient of the j-th indicator, with $0 \leq g_j \leq 1$, as follows:

$$g_j = 1 - e_j \quad (5)$$

Fifth, calculate the weight of the j-th indicator as follows:

$$w_j = \frac{g_j}{\sum_{j=1}^{m} g_j} \quad (6)$$

Sixth, calculate the overall score of each city (weighted sum, i.e., the rural revitalization index value), as follows:

$$RRI_i = \sum_{j=1}^{m} w_j Z'_{ij} \quad (7)$$

3.2.2. Evolution Model and Boston Consulting Group Matrix

In traditional trend analysis, the growth rate is one of the most commonly used indicators to characterize the growth of the rural revitalization index (RRI). However, the growth rate does not measure the regional status of the RRI. To this end, this paper introduces the Boston matrix method of business management to analyze the evolution patterns of the RRI, which was created by the Boston Consulting Group in response to the need to manage business analysis and the selection of growth strategies. It classifies corporate products and businesses into four types: star, gazelle, cow, and dog, based on a combination of two indicators of product sales growth rate and market share.

The assessment of the dynamics of rural revitalization requires consideration of trends in the time dimension as well as the regional position in the spatial dimension. Based on the combination of rural revitalization indices of relative share (RS) and growth rate (GR), this paper classifies the evolution model of rural revitalization into four types. Where RS is based on the comparison of spatial dimension, representing the regional status of rural revitalization, and a larger value represents a higher degree of leadership; GR is based on the evaluation of temporal dimension, representing the growth ability of rural revitalization development, and a larger value represents a faster speed of improvement. The calculation equations are as follows [60]:

$$\text{Relative Share} = \frac{RRI_i}{RRI_{max}} \times 100\% \quad (8)$$

$$\text{Growth Rate} = \left(\frac{RRI_{end} - RRI_{star}}{RRI_{star}} - 1 \right) \times 100\% \quad (9)$$

where RRI_{max} is the maximum rural revitalization index in the study area, RRI_{end} is the final rural revitalization index, and RRI_{star} is the base rural revitalization index. To exclude artificial interference, this paper uses the median of RS and GR as the threshold for the evolutionary pattern division. The star indicates that both RS and GR are greater than the median, representing strong strength and good growth of rural revitalization in the most ideal state, which is the best choice to build a regional demonstration point and leader. Cow indicates that RS is greater than the mean but GR is smaller than the median, representing the leading position in rural revitalization but small potential in future growth, which requires that the input of related resources be appropriately controlled in the future. Gazelle indicates that RS is smaller than the mean but GR is larger than the median, representing the serious lag but good growth of rural revitalization, which requires that the government increase resource input and policy support to induce them to grow into new leaders of regional rural revitalization by means of reasonable intervention and guidance. Dog indicates that both RS and GR are smaller than the median, representing a serious lag and poor growth of rural revitalization, which requires the government to strengthen targeted research and problem analysis and introduce reasonable and strong intervention policies to trigger rural revitalization and prevent rural returns to poverty.

3.2.3. Driving Mechanism and GeoDetector

The developmental stages and resource endowments of different cities vary greatly, leading to significant differences in the developmental performance, evolutionary patterns, and trends of rural revitalization. Policymakers want to measure the level of rural revitalization and, more importantly, figure out what factors affect its performance. Rural revitalization, as a complex, systematic project, is directly affected by a variety of factors, and when different factors work together, they also interact with each other to form a complex mechanism of action. Based on GeoDetector, this paper quantitatively measured the degree of influence of different factors on the spatial difference and evolution pattern of the rural revitalization index and revealed the interaction of different factors.

GeoDetector is an emerging spatial statistical model developed by Wang that is widely used in the analysis of factors affecting the humanities and social sciences [61]. The model is based on the fundamental assumption that the geographic space of the study area is divided into multiple partitions, and if the independent variable (X_i) and the dependent variable (Y_i) converge in spatial distribution, the former is considered to be able to explain the latter well. The software output index q represents the degree of explanation of the dependent variable by the independent variable. In the analysis of direct influence and interactive influence, the maximum value of the index q is 1 and the minimum value is zero, with a larger value representing a stronger explanatory power. In this paper, $q(X_i)$ is used to denote direct influence, and $q(X_i \cap X_j)$ is used to denote interactive influence. The index q is calculated by the following equation [62]:

$$q = 1 - \frac{\sum_{h=1}^{l} N_h \sigma_h^2}{N\sigma^2} = 1 - \frac{SSW}{SST} \tag{10}$$

$$SSW = \sum_{h=1}^{l} N_h \sigma_h^2 \tag{11}$$

$$SST = N\sigma^2 \tag{12}$$

where h is the number of spatial partitions, N_h and N are the numbers of cities in partition h and the study area, σ_h^2 and σ^2 are the squares of partition h and the study area, respectively; SSW is the within sum of squares in the partition; and SST is the total sum of squares in the study area. Interaction effects are classified into five types based on the relationship between interactive influence and direct influence [63]. Nonlinear weakening and single nonlinear weakening represent antagonistic effects between different factors, and measures should be taken to prevent the pairing of the two factors. The bifactor enhancement and

nonlinear enhancement imply a synergy effect between different factors, and measures should be taken to push the pairing of the two factors in the policy design [64,65] (Figure 2).

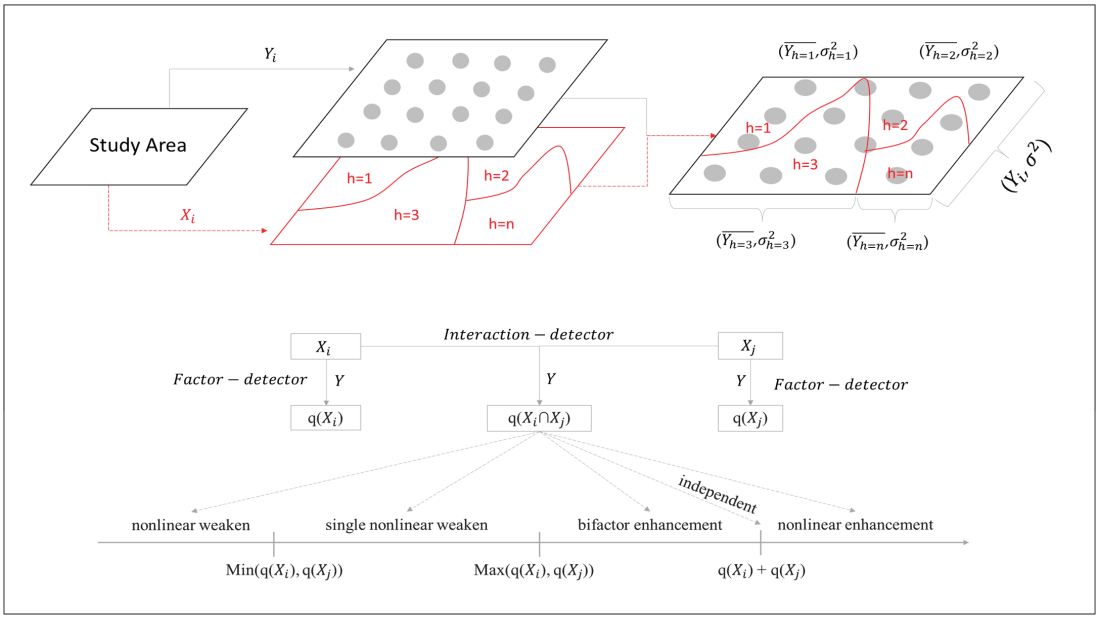

Figure 2. Factor and interaction detector of the GeoDetector.

In this paper, the rural revitalization index and evolution model of the rural revitalization index are used as dependent variables in the driving mechanism analysis, and the independent variables are chosen to combine demand creativity with supply support (Table 2). Demographic and economic demand is the basis of rural revitalization, represented in this paper using the permanent population and gross domestic product (GDP) [66]. Rural revitalization is an inevitable phenomenon and trend that comes into being when urbanization and industrialization reach a specific stage, and this paper uses the urbanization rate and per capita GDP to characterize their effects [67]. As a final demand, consumption is not only the ultimate goal and driving force of production but also a direct reflection of people's needs for a better life. The central and local governments have long been committed to promoting the expansion and upgrading of rural residents' consumption and gradually narrowing the consumption gap between urban and rural residents. This paper uses total retail sales of consumer goods to analyze the impact of consumption on rural revitalization and development [68]. Industrial structure is the basis for supporting the transformation and upgrading of agriculture and improving the level of industrial integration, with the added value of primary industry, the added value of secondary industry, and the added value of tertiary industry being common indicators [69]. The economic development of western China lags behind, and the development of rural revitalization relies more on government investment and transfer payments, so government financial expenditure is adopted in this paper to represent the government's ability to intervene [70]. In addition, poverty and return to poverty in the context of common prosperity and the urban-rural gap remain long-term challenges to rural revitalization in the western region, and this paper borrows the urban-rural income gap index to measure their impact [71].

Table 2. Indicator selection of the driving mechanism.

Variable	Indicator	Code
Dependent (Y_i)	Evolution Model of Rural Revitalization Index	Y_1
Independent (X_i)	Permanent Population	X_1
	Urbanization Rate	X_2
	Urban-Rural Income Gap Index	X_3
	Total Retail Sales of Consumer Goods	X_4
	Government Financial Expenditure	X_5
	Gross Domestic Product (GDP)	X_6
	Added Value of the Primary Industry	X_7
	Added Value of the Secondary Industry	X_8
	Added Value of the Tertiary Industry	X_9
	Per capita GDP	X_{10}

3.3. Data Source and Processing

Most of the data in this paper comes from the statistical yearbooks of 12 provinces, autonomous regions, and municipalities directly under the central government, and a small portion of the data comes from the statistical yearbooks and statistical bulletins of prefecture-level cities and autonomous regions, the Wind database, and China's economic and social big data research platform. For some missing data (e.g., pesticide and chemical fertilizer consumption, comprehensive utilization rate of livestock and poultry waste, cable TV coverage rate, and the proportion of village chiefs and secretaries who are "concurrently" employed), they are estimated at the rate of change in the previous year by assuming that they maintain the same rate of change. In view of the fact that the average years of education of rural residents are transformed by the education level, education is classified into seven levels: never finishing primary school, finishing primary school, finishing junior high school, finishing senior high school, finishing junior college, finishing undergraduate education, and finishing postgraduate education, assigned values of 0, 6, 9, 12, 15, 16, and 19, respectively. In the analysis of driving mechanisms, the evolution model of rural revitalization index is a textual variable that needs to be transformed into a quantitative indicator before being imported into the software for calculation, so star, cow, gazelle, and dog are assigned values of 4, 3, 2, and 1, respectively. According to the top-level design of the central government, the master plan for the development of western China consists of three stages: 2001–2010 as the stage of laying the foundations, 2011–2030 as the stage of accelerating development, and 2031–2050 as the stage of achieving modernization. To analyze the rural revitalization performance in western China during the stage of accelerating development, this paper sets 2010–2020 as the study period.

4. Results

4.1. Development Performance Appraisal

The measurement results of the rural revitalization index of western China are shown in Appendix A. In 2010, Tulufan had the best performance in rural revitalization, with an index of 0.81. Kezilesu, Eerduosi, Kashi, Xilinguole, Tongliao, Bayinguoleng, Wuhai, Hulunbeier, and Zhongwei also had excellent performances in rural revitalization, ranking among the top 10 in the western region of China. Nanning had the worst rural revitalization performance, with an index of 0.24. Baotou, Alashan, Yili, Akesu, Chifeng, Wulumuqi, Changji, and Xingan also had poor rural revitalization performances, ranking among the bottom ten in the western region of China. In 2020, Wulumuqi had the best rural revitalization performance, with an index of 0.81. Wuhai, Huhehaote, Bayannaoer, Xingan, Changji, Tacheng, Aletai, Baotou, and Yili also had excellent rural revitalization development performances, ranking among the top 10 in western China. Nanning had the worst rural revitalization performance, with an index of 0.24. Wulanchabu, Chifeng, Zhongwei, Akesu, Kashi, Tulufan, Bayinguoleng, Boerta, and Tongliao also had poor rural revitalization per-

formances, ranking in the bottom ten of western China. The maximum value in 2010 was 5.77 times the minimum value, further increased to 5.97 times in 2020, with the coefficient of variation remaining at 0.47 for a long time, much larger than 0.36, indicating significant spatial heterogeneity of rural revitalization performance between cities in western China (Table 3). Overall, rural revitalization in the western region is generally in a stable state with relatively small changes, and further investment is needed in future development for a better result. However, rural revitalization in the western region shows significant spatial heterogeneity and varies greatly across different regions, making it more difficult to manage.

Table 3. Statistical analysis of the rural revitalization index in Western China.

Variable	Year	Max	Min	Coefficient Variation	Average	Median
Rural Revitalization Index	2010	0.8216	0.1424	0.4704	0.5253	0.5531
	2020	0.8206	0.1375	0.4728	0.5187	0.5261
Thriving Businesses	2010	0.0646	0.0054	0.5197	0.0396	0.0403
	2020	0.0664	0.0060	0.5419	0.0398	0.0400
Pleasant Living Environments	2010	0.1624	0.0194	0.5155	0.0994	0.1047
	2020	0.1535	0.0192	0.5146	0.0936	0.0943
Social Etiquette and Civility	2010	0.1623	0.0154	0.5562	0.0975	0.1022
	2020	0.1666	0.0094	0.5740	0.0972	0.1000
Effective Governance	2010	0.0970	0.0031	0.5625	0.0581	0.0631
	2020	0.0961	0.0021	0.5717	0.0562	0.0577
Prosperity	2010	0.3364	0.0788	0.3877	0.2307	0.2458
	2020	0.3390	0.0872	0.3822	0.2318	0.2362

The indices for 2010 and 2020 were generally stable with little change, ranked as thriving businesses (about 0.04), effective governance (about 0.06), a pleasant living environment (about 0.09), social etiquette and civility (about 1.0), and prosperity (about 0.23). The coefficients of variation were all greater than 0.36, indicating large spatial differences in the rural revitalization sub-indexes. A list of the top 10 and bottom 10 cities in rural revitalization in western China is presented in Table 4. The former are regional leaders with a leading advantage in specific areas of rural revitalization and are eligible for future demonstration sites; the latter are regionally lost or diseased cities that are facing great challenges in sustainable rural development and are key areas for spatial governance by the government.

Table 4. Cluster analysis of the rural revitalization index in western China.

Grade	Year	Top 10	Bottom 10
Thriving Businesses	2010	Tulufan, Eerduosi, Kashi, Kezilesu, Wuhai, Tongliao, Xilinguole, Zhongwei, Bayinguoleng, Boerta	Aletai, Akesu, Kelamayi, Hetian, Wulumuqi, Yili, Chifeng, Changji, Xingan, Nanning
	2020	Bayannaoer, Xingan, Wuhai, Wulumuqi, Huhehaote, Changji, Tacheng, Baotou, Hami, Aletai	Kelamayi, Zhongwei, Akesu, Wulanchabu, Boerta, Kashi, Tulufan, Tongliao, Bayinguoleng, Nanning
Pleasant Living Environments	2010	Kezilesu, Tulufan, Eerduosi, Kashi, Xilinguole, Tongliao, Wuhai, Bayinguoleng, Hami, Hulunbeier	Kelamayi, Bayannaoer, Tacheng, Yili, Chifeng, Wulumuqi, Akesu, Xingan, Changji, Nanning
	2020	Wulumuqi, Wuhai, Huhehaote, Bayannaoer, Changji, Xingan, Aletai, Tacheng, Yili, Hetian	Wulanchabu, Kelamayi, Chifeng, Bayinguoleng, Kashi, Boerta, Akesu, Tongliao, Tulufan, Nanning

Table 4. *Cont.*

Grade	Year	Top 10	Bottom 10
Social Etiquette and Civility	2010	Eerduosi, Tulufan, Kezilesu, Xilinguole, Tongliao, Kashi, Wuhai, Bayinguoleng, Hulunbeier, Boerta	Kelamayi, Tacheng, Baotou, Yili, Chifeng, Akesu, Wulumuqi, Xingan, Changji, Nanning
	2020	Wuhai, Wulumuqi, Bayannaoer, Huhehaote, Xingan, Changji, Aletai, Tacheng, Baotou, Hami	Wulanchabu, Zhongwei, Kashi, Chifeng, Akesu, Tulufan, Boerta, Bayinguoleng, Tongliao, Nanning
Effective Governance	2010	Tongliao, Tulufan, Kezilesu, Xilinguole, Eerduosi, Kashi, Wuhai, Bayinguoleng, Hulunbeier, Huhehaote	Baotou, Tacheng, Yili, Akesu, Alashan, Xingan, Wulumuqi, Chifeng, Changji, Nanning
	2020	Huhehaote, Wulumuqi, Wuhai, Bayannaoer, Xingan, Changji, Tacheng, Bao-tou, Aletai, Hetian	Akesu, Zhongwei, Chifeng, Tulufan, Kelamayi, Kashi, Boerta, Tongliao, Bay-inguoleng, Nanning
Prosperity	2010	Tulufan, Kezilesu, Eerduosi, Tongliao, Xilinguole, Kashi, Bayinguoleng, Hulunbeier, Wuhai, Zhongwei	Bayannaoer, Baotou, Akesu, Chifeng, Yili, Alashan, Changji, Wulumuqi, Xingan, Nanning
	2020	Wulumuqi, Wuhai, Bayannaoer, Huhehaote, Xingan, Changji, Tacheng, Aletai, Baotou, Yili	Hulunbeier, Wulanchabu, Zhongwei, Tulufan, Bayinguoleng, Akesu, Kashi, Tongliao, Boerta, Nanning

4.2. Evolution Model Identification

From 2010 to 2020, the rural revitalization index in western China experienced both growth and decline, with 44.3% of cities seeing positive growth with a maximum value of 7.6% (Dingxi) and 55.7% experiencing decline with a minimum value of −4.2% (Lanzhou). The mean rural revitalization index in western China was −0.1%, and the coefficient of variation was 1.8, indicating that the development trend of rural revitalization is diversified and heterogeneous. The median relative share of the rural revitalization index in western China in 2020 was 64.1%, and the median growth rate from 2010 to 2020 was −0.2%, based on which the 131 cities are classified into four types: star, gazelle, cow, and dog (Table 5).

Table 5. Evolution model of the rural revitalization index in western China.

Grade	Cities
Star	Huhehaote, Baotou, Wuhai, Chifeng, Bayannaoer, Xingan, Alashan, Leshan, Ya'an, Kunming, Yuxi, Baoshan, Zhaotong, Lijiang, Lincang, Nujiang, Diqing, Ali, Linzhi, Xining, Haidong, Haibei, Hainan, Yushu, Haixi, Yinchuan, Wuzhong, Guyuan, Wulumuqi, Kelamayi, Hami, Changji, Akesu, Hetian, Yili, Tacheng, Aletai
Cow	Tongliao, Eerduosi, Hulunbeier, Wulanchabu, Xilinguole, Zigong, Guangyuan, Qujing, Pu'er, Chuxiong, Honghe, Wenshan, Xishuangbanna, Dali, Dehong, Lasa, Changdu, Shannan, Rikaze, Naqu, Huangnan, Guoluo, Shizuishan, Zhongwei, Tulufan, Boerta, Bayinguoleng, Kezilesu, Kashi
Gazelle	Nanning, Wuzhou, Beihai, Fangchenggang, Yulin-GX, Hechi, Laibin, Chongzuo, Chongqing, Chengdu, Panzhihua, Luzhou, Guang'an, Liangshan, Guiyang, Liupanshui, Zunyi, Tongren, Qiandongnan, Tongchuan, Baoji, Weinan, Hanzhong, Shangluo, Jiayuguan, Baiyin, Zhangye, Dingxi, Linxia
Dog	Liuzhou, Guilin, Qinzhou, Guigang, Baise, Hezhou, Deyang, Mianyang, Suining, Neijiang, Nanchong, Meishan, Yibin, Dazhou, Bazhong, Ziyang, Aba, Ganzi, Anshun, Bijie, Qianxinan, Qiannan, Xi'an, Xianyang, Yan'an, Yulin-SX, Ankang, Lanzhou, Jinchang, Tianshui, Wuwei, Pingliang, Jiuquan, Qingyang, Longnan, Gannan

Huhehaote, Baotou, Wuhai, and Chifeng are star cities, and they are the future leaders and early demonstration areas for rural revitalization in western China. Tongliao, Eerduosi, Hulunbeier, Wulanchabu, and Xilinguole are cow cities. They are the leaders of the regions with weak development potential and growth capacity for rural revitalization, and the government should moderately control future investment in them. Wuzhou, Beihai, Fangchenggang, Yulin-GX, Hechi, and Laibin are gazelle cities that are lagging behind in rural revitalization performance but have better growth prospects. Liuzhou, Guilin, Qinzhou, Guigang, Baise, Hezhou, Deyang, Mianyang, and Suining are dog cities, and they become losers in regional competition under the condition of limited resources for rural revitalization in western China.

4.3. Driving Mechanism Analysis

In terms of direct influence, the added value of primary industry, permanent population, per capita GDP, total retail sales of consumer goods, and urbanization rate have a strong direct influence (q has a higher value), while government financial expenditure, GDP, the added value of secondary industry, and the added value of tertiary industry have a weak direct influence (q has a lower value) (Table 6). Of note is that the urban-rural income gap index has a weak influence and fails the significance test of 0.05. The other factors passed a significance test of 0.05 or even 0.01, indicating that the impact of these factors on rural revitalization is extremely statistically significant. The mean force of the 10 influencing factors was 0.14, and the coefficient of variation was 0.37, greater than 0.36, indicating that different factors vary greatly in their driving effect on rural revitalization.

Table 6. Factor detection analysis results.

Code	Indicator	q Statistic	*p* Value
X_1	Permanent Population	0.18	0.00
X_2	Urbanization Rate	0.16	0.00
X_3	Urban-Rural Income Gap Index	0.02	0.09
X_4	Total Retail Sales of Consumer Goods	0.17	0.00
X_5	Government Financial Expenditure	0.11	0.04
X_6	Gross Domestic Product (GDP)	0.14	0.02
X_7	Added Value of the Primary Industry	0.20	0.01
X_8	Added Value of the Secondary Industry	0.14	0.05
X_9	Added Value of the Tertiary Industry	0.10	0.02
X_{10}	Per capita GDP	0.18	0.01

In terms of interactive influence, all the different factors show synergistic effects, with the urban-rural income gap index (X_3) ∩ ("∩" represents the joint action of two factors, with the same meaning in the following text), government financial expenditure (X_5), total retail sales of consumer goods (X_4) ∩ added value of tertiary industry (X_9), and GDP (X_6) ∩ added value of tertiary industry (X_9) being of bifactor enhancement, while all the rest are of nonlinear enhancement. Per capita GDP (X_{10}), added value of primary industry (X_7), added value of secondary industry (X_8), permanent population (X_1), and urbanization rate (X_2) are super interaction factors with a high mean interaction force, which can significantly amplify the actual effect of the factors and play the role of "catalyst" or "accelerator". Notably, per capita GDP (X_{10}) ∩ added value of secondary industry (X_8) is far ahead in the interactive influence, up to 0.7; per capita GDP (X_{10}) ∩ permanent population (X_1), per capita GDP (X_{10}) ∩ GDP (X_6), per capita GDP (X_{10}) ∩ added value of primary industry

(X_7), per capita GDP (X_{10}) ∩ total retail sales of consumer goods (X_4), per capita GDP (X_{10}) ∩ urbanization rate (X_2), total retail sales of consumer goods (X_4) ∩ added value of primary industry (X_7), permanent population (X_1) ∩ added value of primary industry (X_7), urbanization rate (X_2) ∩ added value of primary industry (X_7), urbanization rate (X_2) ∩ added value of secondary industry (X_8), permanent population (X_1) ∩ added value of secondary industry (X_8), urbanization rate (X_2) ∩ permanent population (X_1) have an interactive influence greater than 0.5 as super interaction factor pairs (Table 7). The comparative analysis in Tables 6 and 7 shows that the interaction force when different factors work together is much higher than the direct force, and the interaction effect should not be ignored. As a complex, systematic project, rural revitalization requires the government to adopt a variety of measures in designing, implementing, and managing the policies and plans in parallel rather than simply relying on a single strategy, which will help to bring a better result.

Table 7. Interaction detection analysis results.

Code	Indicator	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	Permanent Population	0.18									
X_2	Urbanization Rate	0.53	0.16								
X_3	Urban-Rural Income Gap Index	0.26	0.25	0.02							
X_4	Total Retail Sales of Consumer Goods	0.38	0.48	0.26	0.17						
X_5	Government Financial Expenditure	0.40	0.47	0.14	0.34	0.11					
X_6	Gross Domestic Product (GDP)	0.46	0.49	0.22	0.38	0.36	0.14				
X_7	Added Value of the Primary Industry	0.53	0.52	0.28	0.51	0.46	0.49	0.20			
X_8	Added Value of the Secondary Industry	0.56	0.55	0.21	0.44	0.48	0.33	0.49	0.14		
X_9	Added Value of the Tertiary Industry	0.37	0.41	0.16	0.20	0.29	0.22	0.38	0.39	0.10	
X_{10}	Per capita GDP	0.64	0.51	0.24	0.57	0.49	0.62	0.63	0.70	0.47	0.18
AVG	Average Interaction Force	0.43	0.44	0.20	0.37	0.35	0.37	0.45	0.43	0.30	0.50

5. Discussion

The constraints of geographical location, natural environment, and development foundation have long led to the prominent problems of regional imbalance and the slow development of rural revitalization in western China [72,73]. Regional comparisons show huge differences between cities [74,75]. Currently, Wulumuqi, Wuhai, Huhehaote, Bayannaoer, Xingan, Changji, Tacheng, Aletai, Baotou, Yili, Hetian, Alashan, Hami, Liuzhou, and Guilin have excellent performance in rural revitalization and have achieved high quality development; in contrast, Kelamayi, Wulanchabu, Chifeng, Zhongwei, Akesu, Kashi, Tulufan, Bayinguoleng, Boerta, Tongliao, and Nanning exhibit poor performance in rural revitalization and low development quality, making them typical problem cities or lost cities. From the perspective of growth and change, growth and decline coexist, and rural revitalization in more than half of the cities is in decline, indicating that the sustainable development of the rural areas in western China is facing a great obstacle and threat. According to the rural revitalization sub-index, the differences and differentiation characteristics of different dimensions are significant. Although the poverty alleviation strategy has pushed development far ahead in the prosperity dimension, the lag in business prosperity, effective governance, and a pleasant living environment should not be overlooked, as they have been key drags on rural revitalization and sustainable development in the western region [76,77]. Many villages in western China, especially those located in mountainous areas or border regions, have beautiful ecological environments but are not easily accessible, which has led to lagging agricultural development, poverty among farmers, and low livability in rural areas, which are key areas for future investment and governance in rural revitalization.

The evolutionary pattern of rural revitalization in western China is diversified, and the influence of different factors varies widely [78,79]. This paper integrates the two dimensions of temporal change and spatial pattern based on the Boston matrix and classifies the

evolutionary patterns of rural revitalization in western cities into four types: star, gazelle, cow, and dog. The government should invest more resources, capital, and funds in star cities in the future to further improve the quality and speed of their rural revitalization so that they can become the name card of the West to rival and compete with the eastern region. The government should encourage in-depth research on gazelle cities, analyze the real reasons for the rapid development of rural revitalization, and select some cities with suitable conditions for additional investment to induce them to grow into the new stars of rural revitalization in western China. The government should hire professional teams to conduct specialized and detailed research and studies in cow and dog areas, identify the obstacles and factors that limit rural revitalization, and design targeted and practical new development policies, plans, and programs for rural revitalization in each city. The results of the GeoDetector-based analysis showed that the influence of different factors on the changes in western rural revitalization varied widely, and the factors were classified into three levels based on their direct and interactive influences. Permanent population, urbanization rate, added value of primary industry, and per capita GDP had a strong direct and interactive influence as key factors; urban-rural income gap index, government financial expenditure, and added value of tertiary industry had a weak direct and interactive influence as auxiliary factors; total retail sales of consumer goods, GDP, and added value of secondary industry were important factors [80,81].

In summary, the performance of rural revitalization in the western region is characterized by large urban differences, diverse trends of change, and complex mechanisms of influence; the government should implement a zoning planning and management system and formulate differentiated development policies [82]. In addition, the interactions between different factors should not be ignored, and there is a need to design policy combinations based on the interactions in zoning plans for the best results. In the zoning planning and development policy design, the evolutionary model of rural revitalization is integrated with the driving mechanism, and the western cities are classified into eight zones: external assistance zone, general development zone, general retention zone, general demonstration zone, internal governance zone, important development zone, important retention zone, and important demonstration zone. The driving force was calculated by weighted summation of 10 independent variables and classified into high and low, with the median as the threshold (0.86) (Table 8). In this case, the weight calculation is based on the average interaction force and is represented by the specific gravity of each factor. High-type areas have a strong development momentum in rural revitalization, with self-generated growth capacity, and are in a favorable state so that they can achieve rural revitalization simply by relying on their own capacity; in contrast, low-type areas are weak in rural revitalization and are in an unfavorable state, so they need support from higher levels and even the central government, as well as external assistance, to achieve the rural revitalization goals.

Table 8. The level of driving force for rural revitalization.

Level	Cities
High	Wulanchabu, Xingan, Wuzhou, Qinzhou, Baise, Hezhou, Hechi, Laibin, Chongzuo, Guangyuan, Guang'an, Bazhong, Ziyang, Aba, Ganzi, Liupanshui, Anshun, Tongren, Qianxinan, Qiandongnan, Baoshan, Lijiang, Pu'er, Lincang, Chuxiong, Wenshan, Xishuangbanna, Dali, Dehong, Nujiang, Diqing, Changdu, Shannan, Rikaze, Ali, Linzhi, Tongchuan, Ankang, Shangluo, Jiayuguan, Jinchang, Baiyin, Tianshui, Wuwei, Zhangye, Pingliang, Jiuquan, Qingyang, Dingxi, Longnan, Linxia, Gannan, Haidong, Haibei, Huangnan, Hainan, Guoluo, Yushu, Wuzhong, Guyuan, Zhongwei, Tulufan, Kezilesu, Kashi, Hetian, Aletai
Low	Huhehaote, Baotou, Wuhai, Chifeng, Tongliao, Eerduosi, Hulunbeier, Bayannaoer, Xilinguole, Alashan, Nanning, Liuzhou, Guilin, Beihai, Fangchenggang, Guigang, Yulin-GX, Chongqing, Chengdu, Zigong, Panzhihua, Luzhou, Deyang, Mianyang, Suining, Neijiang, Leshan, Nanchong, Meishan, Yibin, Dazhou, Ya'an, Liangshan, Guiyang, Zunyi, Bijie, Qiannan, Kunming, Qujing, Yuxi, Zhaotong, Honghe, Lasa, Naqu, Xi'an, Baoji, Xianyang, Weinan, Yan'an, Hanzhong, Yulin-SX, Lanzhou, Xining, Haixi, Yinchuan, Shizuishan, Wulumuqi, Kelamayi, Hami, Changji, Boerta, Bayinguoleng, Akesu, Yili, Tacheng

Liuzhou, Guilin, Guigang, Deyang, Mianyang, Suining, and Neijiang are in the external assistance zone with weak competitiveness, growth, and driving forces, making it difficult for them to promote rural revitalization by themselves. As the lost cities of rural revitalization in western China, they need to rely on external forces and external assistance to reverse the unfavorable development situation in the future. It is suggested that the central government should increase transfer payments and investment to these cities and help them establish "one-to-one" partnerships with developed cities in the east to help them revitalize the countryside with strong government intervention and foreign aid. Nanning, Beihai, Fangchenggang, Yulin-GX, Chongqing, and Chengdu are in the general development zone with a weak driving force and competitiveness but good growth. They need external assistance to accelerate the cultivation of endogenous development momentum, maintain or further improve their growth capacity, and gradually improve the regional competitiveness of rural revitalization. Tongliao, Eerduosi, Hulunbeier, and Xilinguole are in the general retention zone, weak in driving force and growth capacity but good in competitiveness and better in development performance than in investment. They should control the amount of investment and distribution plan in the future and try to maintain the current development. Huhehaote, Baotou, Wuhai, Chifeng, Bayannaoer, and Alashan are in the general demonstration zone with good competitiveness and growth capacity but a weak driving force. They should make additional investments in the future, control investment priorities, and give priority to strengthening the endogenous driving force of rural revitalization. Qinzhou, Baise, Hezhou, Bazhong, Ziyang, Aba, Ganzi, and Anshun are in the internal governance zone with a high driving force but weak competitiveness and growth capacity. These cities are experiencing input overload, and there are barriers to the transformation of momentum into performance. These cities should take measures to strengthen internal governance, smooth the transformation mechanism of rural revitalization, and improve the efficiency of transformation. Wuzhou, Hechi, Laibin, Chongzuo, and Guang'an are in an important development zone with a high driving force and growth capacity but weak competitiveness. The government should put forward the testing and research of these cities, carefully analyze the reasons for the inadequate transformation of drivers to competitiveness, identify cities with better prospects and potential, and develop them into the new stars of the region. Wulanchabu, Dali, Dehong, Zhongwei, Tulufan, and Rikaze are in the important retention zone with a high driving force and competitiveness but weak growth capacity, resulting in excess investment. They should actively participate in cross-regional or cross-domain transactions of development elements related to rural revitalization on the basis of maintaining the current state and transferring the surplus resources, capital, and funds to other cities or industries. Xingan, Baoshan, Lijiang, Lincang, Nujiang, Diqing, and Ali are in the important demonstration zone, all with a high driving force, competitiveness, and growth capacity. They should further expand their investment and put in more resources to make them the most beautiful name cards for rural revitalization in western China (Table 9).

Promoting rural revitalization requires both top-level institutional design and regional policy innovation; therefore, strategic planning for rural revitalization should be formulated in accordance with local conditions, avoiding "one-size-fits-all" policies [83,84]."One-size-fits-all" is the practice of local governments in the central and western regions of implementing the central rural revitalization policy in a simple way to push forward the implementation of the policy in a sloppy manner, without regard for the specific realities of the target group, the policy environment, and the stage of development. China's central government regularly promulgates and implements unified policies and plans for rural revitalization, with the same requirements imposed on all regions. At present, the practice of "one size fits all" is found from time to time. In mountainous or ecologically fragile areas where ethnic minorities are concentrated, it is not possible to indiscriminately require all farmers to relocate to county towns or plains; instead, it is necessary to respect the wishes of farmers of different ethnic groups by implementing differentiated management methods and solutions. Furthermore, to push forward rural revitalization, the central

government has vigorously promoted the construction of digital villages and given local governments substantial investment, resources, and policies. Although the conditions, capabilities, foundations, and stages of digital development in western and eastern rural areas differ greatly, differentiated management policies have not yet been formulated [85].

Table 9. Design ideas for planning zoning.

		Evolution Model			
		Dog	**Gazelle**	**Cow**	**Star**
Driving Force	Low	External Assistance Zone	General Development Zone	General Retention Zone	General Demonstration Zone
		Liuzhou, Guilin, Guigang, Deyang, Mianyang, Suining, Neijiang, Nanchong, Meishan, Yibin, Dazhou, Bijie, Qiannan, Xi'an, Xianyang, Yan'an, Yulin-SX, Lanzhou	Nanning, Beihai, Fangchenggang, Yulin-GX, Chongqing, Chengdu, Panzhihua, Luzhou, Liangshan, Guiyang, Zunyi, Baoji, Weinan, Hanzhong	Tongliao, Eerduosi, Hulunbeier, Xilinguole, Zigong, Qujing, Honghe, Lasa, Naqu, Shizuishan, Boerta, Bayinguoleng	Huhehaote, Baotou, Wuhai, Chifeng, Bayannaoer, Alashan, Leshan, Ya'an, Kunming, Yuxi, Zhaotong, Xining, Haixi, Yili, Yinchuan, Wulumuqi, Kelamayi, Hami, Changji, Akesu, Tacheng
	High	Internal Governance Zone	Important Development Zone	Important Retention Zone	Important Demonstration Zone
		Qinzhou, Baise, Hezhou, Bazhong, Ziyang, Aba, Ganzi, Anshun, Qianxinan, Ankang, Jinchang, Tianshui, Wuwei, Pingliang, Jiuquan, Qingyang, Longnan, Gannan	Wuzhou, Hechi, Laibin, Chongzuo, Guang'an, Liupanshui, Tongren, Qiandongnan, Tongchuan, Shangluo, Jiayuguan, Baiyin, Zhangye, Dingxi, Linxia	Wulanchabu, Dali, Dehong, Zhongwei, Tulufan, Rikaze, Guangyuan, Pu'er, Guoluo, Chuxiong, Wenshan, Kashi, Xishuangbanna, Changdu, Shannan, Kezilesu, Huangnan	Xingan, Baoshan, Lijiang, Lincang, Nujiang, Diqing, Ali, Linzhi, Haidong, Haibei, Hainan, Yushu, Wuzhong, Guyuan, Hetian, Aletai

The following key points should be noted in designing differentiated management policies for rural revitalization: First, it is necessary to identify the three key demand elements of urbanization, industrialization, and agricultural modernization and try to seek breakthroughs in rural revitalization relying on the coordinated development of the three. Rural revitalization is one of the key tasks of China's new urbanization strategy and an inevitable product of the development of China's new industrialization and agricultural modernization to a specific stage. The results of GeoDetector-based analysis also confirmed the strong influence of the added value of primary industry, permanent population, per capita GDP, total retail sales of consumer goods, and urbanization rate, which are indicators all closely related to the development of urbanization, industrialization, and agricultural modernization. Second, given that the revitalization of rural areas in western China cannot be separated from the national strategy and policy of western development and precise poverty alleviation, they should continue to strengthen government macro-control and incorporate rural revitalization into the performance assessment system of local governments. Third, due to the complex development environment in western China and the large differences in rural revitalization development in all five dimensions, the simultaneous development of all dimensions should not be pursued mechanically. Local governments should, according to their own resources and conditions, carry out an in-depth analysis of the driving mechanism of local rural revitalization, locate the starting point and the leverage point of a dimension, and create a rural revitalization model with special characteristics according to local conditions. Fourth, the central government should strengthen macro-planning guidance for rural revitalization in the western region, build a scientific and balanced spatial distribution pattern for rural revitalization, encourage communication and interactive cooperation between different cities, and promote coordinated rural revitalization across regions. Fifth, the central government should, while increasing the support of transfer payments, establish a counterpart assistance channel for rural revitalization between the west and the east based on the mechanism of counterpart assistance for western development and give play to the driving role of cities with high quality development of rural revitalization in the east to cities with low quality development in the west through targeted assistance, experience exchange, project cooperation, and talent flow [86].

The marginal contribution of this paper is in three main areas. First, it establishes a new framework that integrates "performance evaluation, evolution model, driving mechanism, and management strategy" and builds a bridge between the application of theoretical research and translation. Although some scholars have conducted studies on the performance, changes, influencing factors, and management policies of rural revitalization, they are separated from each other and characterized by fragmentation, resulting in the unsatisfactory guidance of the analysis results on practice. Second, it promotes the paradigm shift of rural revitalization research from "qualitative" to "quantitative" and improves the accuracy and application value of analysis results based on the combination of AHP, the entropy method, BCG, GeoDetector, and other measurement models and software. Third, it reveals the driving mechanism of the evolution of rural revitalization and applies it to planning, zoning, and policy design. Although the influencing factors of rural revitalization have been discussed by scholars [87,88], the innovation of this paper is to further reveal the interaction effects of different factors.

6. Conclusions

Based on the combination of the entropy method, BCG matrix, GeoDetector, and other measurement models and software, this paper calculated the rural revitalization index of 131 cities in western China from 2010 to 2020, analyzed the evolutionary pattern of rural revitalization performance and its driving mechanisms, and put forward suggestions for policy design. The main findings are as follows:

First, the rural revitalization index has great application value with the ability to better reflect the sustainable development level of rural areas and is applicable to the performance evaluation of rural revitalization in western regions.

Second, the significant spatial imbalance and heterogeneity of rural revitalization in western China and the huge inter-urban differences suggest that a "one-size-fits-all" governance strategy should be avoided (the strategic planning for rural revitalization should be formulated according to local conditions to avoid "one-size-fits-all" policies).

Third, rural revitalization in the western region has progressed slowly, with both development and decline showing a variety of development patterns. The 131 cities were classified into four types: star, gazelle, cow, and dog, according to the BCG matrix, where the star type represents the ideal state of rural revitalization and characterizes the lost state.

Fourth, there are many factors affecting changes in the performance of rural revitalization in the west, which can be classified into three levels of key, important, and auxiliary factors, and the impact of different factors varies greatly.

Fifth, there are significant synergistic effects between the different factors, mainly in the form of non-linear enhancement, and it should be noted that super-interacting factors and pairs of factors arise from the interaction effects of the different factors and act as "catalysts" or "accelerators".

Sixth, based on the results of the superposition analysis of evolutionary patterns and driving forces, a zoning planning and management system for rural revitalization is established, and the 131 cities in western China are classified into 8 zones: external assistance zone, general development zone, general retention zone, general demonstration zone, internal governance zone, important development zone, important retention zone, and important demonstration zone, and it is suggested that a differentiated development policy should be adopted in a zone.

There are also some shortcomings in this paper. First, there were few indicators about effective governance in the rural revitalization evaluation index system, and the impact of digitalization on rural governance was neglected, mainly due to the difficulty in data acquisition. Second, natural and ecological environmental factors were not taken into account in the driving mechanism analysis, mainly influenced by the study period. On the one hand, the natural factors have a long period of change, and the study period of this paper is short (10 years), so their influence remained stable during the study; on the other hand, the period from 2010 to 2020 was the stage of accelerating development with

the social and economic environment changing to a much greater extent than the natural environment, which is the influencing factor that deserves more attention and analysis.

In addition, each method has both advantages and limitations, and a single method does not solve all problems. In the spatial measurement model, GeoDetector has the advantage of allowing for measuring the interaction effects of different factors (synergistic or antagonistic effects) and being immune to multifactor covariance, with the limitation that it is unable to measure the direction of each factor's effect (positive or negative); the geographically weighted regression model is just the opposite, with the advantage that it is able to measure the direction of the factor's effect, but it is unable to measure the interaction effects and is greatly affected by factor covariance. Given the complexity of the rural revitalization process, the fact that development performance is affected by many factors, and the extensive and profound interactions between different factors (a hypothesis or prediction confirmed by the results of the study), the GeoDetector rather than the geographically weighted regression model was used in the study. Therefore, due to the limitations of the research methodology, this paper cannot measure the direction of action of each factor. It should be noted that it is entirely possible to change the methodology (e.g., geographically weighted regression models, spatial Durbin models, etc.) in future studies so as to measure whether a factor plays a negative or positive role.

In summary, it is of great importance to carry out a quantitative evaluation of rural revitalization performance, identify evolutionary patterns, and analyze driving mechanisms in the era of rural decline and marginalization. The analysis results and research framework of this paper are applicable to western China and provide a basis for the design of relevant rural revitalization policies, and they can also provide reference and guidance for sustainable rural development in other regions of China or developing countries with similar development conditions and environments as western China.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Analysis of the Rural Revitalization Index and its evolution model in western China.

No.	Cities	Rural Revitalization Index		Thriving Businesses		Pleasant Living Environment		Social Etiquette and Civility		Effective Governance		Prosperity	
		2010	2020	2010	2020	2010	2020	2010	2020	2010	2020	2010	2020
1	Huhehaote	0.77	0.81	0.06	0.06	0.15	0.15	0.15	0.16	0.09	0.10	0.32	0.33
2	Baotou	0.74	0.78	0.06	0.06	0.14	0.14	0.14	0.16	0.09	0.09	0.31	0.32
3	Wuhai	0.79	0.81	0.06	0.06	0.15	0.15	0.16	0.17	0.09	0.10	0.32	0.34
4	Chifeng	0.72	0.72	0.05	0.06	0.14	0.13	0.14	0.14	0.08	0.08	0.30	0.31
5	Tongliao	0.80	0.70	0.06	0.06	0.15	0.13	0.16	0.14	0.10	0.08	0.33	0.30
6	Eerduosi	0.80	0.76	0.06	0.06	0.16	0.14	0.16	0.15	0.09	0.09	0.33	0.32
7	Hulunbeier	0.78	0.74	0.06	0.06	0.15	0.14	0.16	0.15	0.09	0.09	0.32	0.31
8	Bayannaoer	0.74	0.81	0.06	0.07	0.14	0.15	0.14	0.16	0.09	0.09	0.31	0.33
9	Wulanchabu	0.76	0.73	0.06	0.06	0.15	0.13	0.15	0.14	0.09	0.09	0.32	0.31
10	Xingan	0.70	0.80	0.05	0.06	0.14	0.15	0.14	0.16	0.08	0.09	0.29	0.33
11	Xilinguole	0.80	0.74	0.06	0.06	0.16	0.14	0.16	0.15	0.09	0.08	0.33	0.31
12	Alashan	0.73	0.77	0.06	0.06	0.14	0.14	0.14	0.15	0.08	0.09	0.30	0.32
13	Nanning	0.24	0.24	0.02	0.02	0.03	0.04	0.04	0.04	0.02	0.03	0.14	0.13
14	Liuzhou	0.29	0.21	0.02	0.01	0.05	0.03	0.04	0.03	0.03	0.01	0.14	0.13
15	Guilin	0.27	0.21	0.02	0.01	0.05	0.03	0.04	0.02	0.02	0.02	0.14	0.13
16	Wuzhou	0.15	0.23	0.01	0.01	0.03	0.04	0.02	0.04	0.01	0.01	0.08	0.13
17	Beihai	0.17	0.27	0.01	0.02	0.02	0.05	0.02	0.04	0.01	0.03	0.11	0.14
18	Fangchenggang	0.19	0.28	0.01	0.02	0.02	0.04	0.02	0.04	0.01	0.02	0.12	0.15
19	Qinzhou	0.19	0.18	0.01	0.01	0.03	0.03	0.02	0.03	0.02	0.01	0.11	0.11
20	Guigang	0.28	0.28	0.02	0.02	0.05	0.05	0.05	0.04	0.02	0.03	0.15	0.14
21	Yulin-GX	0.20	0.25	0.02	0.01	0.03	0.04	0.03	0.04	0.02	0.03	0.11	0.13
22	Baise	0.21	0.14	0.01	0.01	0.04	0.02	0.03	0.02	0.01	0.00	0.12	0.09
23	Hezhou	0.26	0.18	0.02	0.01	0.05	0.02	0.04	0.02	0.03	0.01	0.12	0.12
24	Hechi	0.17	0.27	0.02	0.02	0.02	0.05	0.02	0.04	0.02	0.02	0.10	0.14
25	Laibin	0.22	0.26	0.02	0.02	0.03	0.04	0.02	0.04	0.02	0.02	0.12	0.15
26	Chongzuo	0.18	0.21	0.01	0.01	0.03	0.04	0.02	0.02	0.00	0.02	0.11	0.12
27	Chongqing	0.31	0.32	0.01	0.01	0.13	0.13	0.03	0.03	0.02	0.02	0.12	0.13
28	Chengdu	0.42	0.49	0.03	0.04	0.07	0.08	0.07	0.09	0.05	0.06	0.19	0.22
29	Zigong	0.56	0.53	0.04	0.04	0.10	0.09	0.10	0.10	0.07	0.06	0.25	0.24
30	Panzhihua	0.45	0.45	0.03	0.03	0.08	0.08	0.08	0.08	0.05	0.05	0.20	0.21
31	Luzhou	0.48	0.48	0.04	0.04	0.08	0.09	0.09	0.09	0.06	0.05	0.22	0.22
32	Deyang	0.55	0.46	0.04	0.03	0.10	0.08	0.10	0.09	0.06	0.05	0.25	0.21
33	Mianyang	0.53	0.48	0.04	0.03	0.10	0.09	0.10	0.09	0.06	0.05	0.24	0.22
34	Guangyuan	0.57	0.53	0.04	0.04	0.11	0.09	0.11	0.10	0.07	0.06	0.25	0.24
35	Suining	0.53	0.49	0.04	0.04	0.10	0.09	0.10	0.09	0.05	0.06	0.23	0.23
36	Neijiang	0.56	0.44	0.04	0.04	0.11	0.08	0.10	0.07	0.06	0.04	0.25	0.22
37	Leshan	0.47	0.56	0.03	0.04	0.09	0.10	0.09	0.10	0.06	0.06	0.21	0.26
38	Nanchong	0.52	0.46	0.04	0.04	0.09	0.08	0.09	0.08	0.06	0.05	0.24	0.22
39	Meishan	0.55	0.47	0.04	0.04	0.10	0.09	0.10	0.08	0.06	0.05	0.24	0.21
40	Yibin	0.49	0.45	0.04	0.03	0.10	0.08	0.09	0.08	0.05	0.04	0.22	0.21
41	Guang'an	0.49	0.50	0.03	0.04	0.09	0.09	0.09	0.09	0.05	0.05	0.22	0.23
42	Dazhou	0.52	0.44	0.04	0.03	0.10	0.08	0.10	0.08	0.05	0.04	0.23	0.21
43	Ya'an	0.51	0.55	0.04	0.04	0.09	0.10	0.10	0.10	0.06	0.06	0.23	0.24
44	Bazhong	0.54	0.45	0.04	0.03	0.10	0.08	0.10	0.08	0.05	0.05	0.24	0.21
45	Ziyang	0.54	0.42	0.04	0.03	0.10	0.08	0.10	0.08	0.06	0.04	0.24	0.19
46	Aba	0.53	0.52	0.04	0.04	0.10	0.09	0.10	0.10	0.06	0.06	0.23	0.23
47	Ganzi	0.53	0.48	0.04	0.04	0.10	0.09	0.10	0.09	0.06	0.05	0.23	0.22
48	Liangshan	0.53	0.52	0.04	0.04	0.10	0.09	0.10	0.10	0.06	0.05	0.23	0.24
49	Guiyang	0.26	0.29	0.02	0.02	0.04	0.05	0.03	0.04	0.02	0.03	0.14	0.15
50	Liupanshui	0.19	0.20	0.01	0.01	0.03	0.03	0.03	0.03	0.02	0.01	0.10	0.12
51	Zunyi	0.20	0.20	0.01	0.01	0.03	0.04	0.03	0.03	0.01	0.01	0.11	0.12
52	Anshun	0.27	0.21	0.02	0.01	0.05	0.03	0.04	0.02	0.03	0.02	0.13	0.13
53	Bijie	0.27	0.18	0.02	0.01	0.05	0.03	0.04	0.02	0.03	0.01	0.14	0.12
54	Tongren	0.15	0.22	0.01	0.01	0.03	0.04	0.02	0.03	0.02	0.02	0.08	0.13
55	Qianxinan	0.26	0.20	0.01	0.02	0.04	0.03	0.04	0.03	0.02	0.02	0.14	0.11
56	Qiandongnan	0.21	0.24	0.02	0.01	0.03	0.04	0.03	0.03	0.01	0.03	0.12	0.13
57	Qiannan	0.20	0.18	0.01	0.01	0.03	0.04	0.03	0.01	0.01	0.01	0.12	0.11
58	Kunming	0.77	0.79	0.06	0.06	0.15	0.15	0.15	0.16	0.09	0.09	0.32	0.33
59	Qujing	0.74	0.70	0.06	0.05	0.14	0.13	0.14	0.14	0.09	0.08	0.31	0.30
60	Yuxi	0.70	0.81	0.05	0.06	0.14	0.15	0.14	0.16	0.08	0.10	0.29	0.34

Table A1. *Cont.*

No.	Cities	Rural Revitalization Index		Thriving Businesses		Pleasant Living Environment		Social Etiquette and Civility		Effective Governance		Prosperity	
		2010	2020	2010	2020	2010	2020	2010	2020	2010	2020	2010	2020
61	Baoshan	0.73	0.79	0.06	0.06	0.14	0.15	0.14	0.16	0.09	0.09	0.31	0.33
62	Zhaotong	0.79	0.79	0.06	0.06	0.15	0.15	0.15	0.16	0.09	0.09	0.33	0.33
63	Lijiang	0.69	0.73	0.05	0.06	0.13	0.13	0.13	0.15	0.08	0.08	0.29	0.31
64	Pu'er	0.76	0.73	0.06	0.06	0.15	0.14	0.15	0.15	0.09	0.08	0.31	0.31
65	Lincang	0.78	0.78	0.06	0.06	0.15	0.14	0.16	0.16	0.09	0.09	0.32	0.33
66	Chuxiong	0.78	0.70	0.06	0.06	0.15	0.13	0.16	0.14	0.09	0.08	0.32	0.30
67	Honghe	0.73	0.72	0.06	0.06	0.14	0.13	0.14	0.14	0.09	0.08	0.31	0.30
68	Wenshan	0.77	0.73	0.06	0.06	0.15	0.13	0.15	0.15	0.09	0.08	0.32	0.31
69	Xishuangbanna	0.75	0.72	0.06	0.06	0.14	0.13	0.15	0.14	0.09	0.08	0.31	0.30
70	Dali	0.77	0.71	0.06	0.06	0.15	0.13	0.15	0.14	0.09	0.08	0.32	0.31
71	Dehong	0.82	0.80	0.06	0.06	0.16	0.15	0.16	0.16	0.10	0.09	0.33	0.33
72	Nujiang	0.76	0.79	0.06	0.06	0.15	0.15	0.15	0.16	0.09	0.09	0.32	0.33
73	Diqing	0.78	0.81	0.06	0.07	0.15	0.15	0.15	0.17	0.09	0.09	0.32	0.33
74	Lasa	0.76	0.71	0.06	0.06	0.15	0.13	0.15	0.14	0.09	0.08	0.32	0.30
75	Changdu	0.75	0.73	0.06	0.06	0.15	0.13	0.15	0.15	0.09	0.08	0.31	0.31
76	Shannan	0.75	0.72	0.06	0.06	0.15	0.13	0.15	0.14	0.09	0.08	0.31	0.31
77	Rikaze	0.78	0.70	0.06	0.06	0.15	0.13	0.15	0.14	0.09	0.08	0.32	0.30
78	Naqu	0.81	0.76	0.06	0.06	0.16	0.14	0.16	0.15	0.10	0.09	0.33	0.32
79	Ali	0.74	0.76	0.06	0.06	0.14	0.14	0.14	0.15	0.08	0.09	0.31	0.32
80	Linzhi	0.78	0.82	0.06	0.07	0.15	0.15	0.15	0.17	0.09	0.10	0.32	0.34
81	Xi'an	0.28	0.20	0.02	0.02	0.05	0.03	0.04	0.03	0.02	0.02	0.15	0.11
82	Tongchuan	0.17	0.22	0.01	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.11	0.12
83	Baoji	0.20	0.23	0.02	0.02	0.03	0.04	0.02	0.03	0.02	0.02	0.11	0.13
84	Xianyang	0.21	0.14	0.01	0.01	0.03	0.02	0.03	0.01	0.01	0.00	0.12	0.10
85	Weinan	0.15	0.23	0.01	0.01	0.02	0.04	0.02	0.04	0.01	0.01	0.10	0.12
86	Yan'an	0.24	0.18	0.02	0.01	0.04	0.03	0.03	0.02	0.01	0.02	0.14	0.11
87	Hanzhong	0.17	0.26	0.02	0.02	0.03	0.04	0.02	0.04	0.02	0.02	0.09	0.13
88	Yulin-SX	0.25	0.22	0.01	0.01	0.05	0.03	0.04	0.03	0.03	0.02	0.13	0.12
89	Ankang	0.25	0.23	0.02	0.01	0.03	0.03	0.04	0.02	0.03	0.02	0.13	0.14
90	Shangluo	0.18	0.24	0.01	0.01	0.03	0.04	0.03	0.04	0.02	0.02	0.10	0.13
91	Lanzhou	0.29	0.19	0.02	0.01	0.05	0.04	0.04	0.02	0.03	0.02	0.15	0.10
92	Jiayuguan	0.27	0.28	0.02	0.02	0.04	0.04	0.05	0.05	0.03	0.02	0.13	0.15
93	Jinchang	0.28	0.28	0.01	0.02	0.05	0.04	0.05	0.04	0.03	0.03	0.15	0.14
94	Baiyin	0.25	0.28	0.02	0.02	0.04	0.04	0.04	0.05	0.02	0.03	0.13	0.14
95	Tianshui	0.22	0.19	0.01	0.02	0.03	0.02	0.03	0.02	0.02	0.01	0.12	0.12
96	Wuwei	0.20	0.18	0.01	0.01	0.03	0.02	0.03	0.02	0.01	0.01	0.12	0.11
97	Zhangye	0.20	0.23	0.01	0.02	0.03	0.04	0.03	0.02	0.01	0.03	0.11	0.13
98	Pingliang	0.26	0.24	0.01	0.02	0.05	0.04	0.04	0.04	0.02	0.02	0.14	0.12
99	Jiuquan	0.29	0.22	0.02	0.02	0.05	0.04	0.05	0.03	0.03	0.02	0.15	0.11
100	Qingyang	0.21	0.18	0.01	0.01	0.03	0.03	0.03	0.02	0.02	0.01	0.11	0.10
101	Dingxi	0.14	0.30	0.01	0.03	0.02	0.05	0.02	0.05	0.00	0.02	0.09	0.15
102	Longnan	0.28	0.21	0.02	0.01	0.05	0.03	0.04	0.03	0.03	0.01	0.14	0.13
103	Linxia	0.20	0.24	0.01	0.01	0.03	0.04	0.03	0.03	0.01	0.01	0.11	0.14
104	Gannan	0.30	0.26	0.02	0.02	0.05	0.04	0.05	0.04	0.03	0.02	0.15	0.14
105	Xining	0.78	0.82	0.06	0.07	0.15	0.15	0.15	0.17	0.09	0.10	0.32	0.34
106	Haidong	0.81	0.80	0.06	0.07	0.16	0.15	0.16	0.16	0.10	0.09	0.33	0.33
107	Haibei	0.72	0.73	0.06	0.06	0.14	0.13	0.14	0.15	0.08	0.08	0.30	0.31
108	Huangnan	0.79	0.74	0.06	0.06	0.15	0.14	0.15	0.15	0.09	0.08	0.33	0.31
109	Hainan	0.76	0.81	0.06	0.07	0.15	0.15	0.15	0.17	0.09	0.10	0.31	0.33
110	Guoluo	0.72	0.71	0.06	0.06	0.14	0.13	0.14	0.14	0.08	0.08	0.30	0.30
111	Yushu	0.74	0.78	0.06	0.06	0.14	0.15	0.15	0.16	0.09	0.09	0.31	0.33
112	Haixi	0.74	0.80	0.06	0.06	0.14	0.15	0.15	0.16	0.09	0.09	0.31	0.33
113	Yinchuan	0.70	0.72	0.05	0.06	0.14	0.13	0.14	0.14	0.08	0.08	0.30	0.31
114	Shizuishan	0.82	0.73	0.06	0.06	0.16	0.13	0.16	0.14	0.10	0.08	0.34	0.31
115	Wuzhong	0.81	0.80	0.06	0.07	0.16	0.15	0.16	0.16	0.10	0.09	0.33	0.33
116	Guyuan	0.76	0.74	0.06	0.06	0.15	0.14	0.15	0.15	0.09	0.09	0.31	0.31
117	Zhongwei	0.77	0.72	0.06	0.06	0.15	0.13	0.15	0.14	0.09	0.08	0.32	0.30
118	Wulumuqi	0.71	0.81	0.06	0.06	0.14	0.15	0.14	0.16	0.08	0.10	0.30	0.34
119	Kelamayi	0.74	0.74	0.06	0.06	0.14	0.13	0.14	0.15	0.09	0.08	0.31	0.32
120	Tulufan	0.81	0.71	0.06	0.06	0.16	0.13	0.16	0.14	0.10	0.08	0.33	0.30

Table A1. *Cont.*

No.	Cities	Rural Revitalization Index		Thriving Businesses		Pleasant Living Environment		Social Etiquette and Civility		Effective Governance		Prosperity	
		2010	2020	2010	2020	2010	2020	2010	2020	2010	2020	2010	2020
121	Hami	0.77	0.76	0.06	0.06	0.15	0.14	0.15	0.15	0.09	0.09	0.32	0.32
122	Changji	0.70	0.79	0.05	0.06	0.14	0.15	0.13	0.16	0.08	0.09	0.30	0.33
123	Boerta	0.76	0.70	0.06	0.06	0.15	0.13	0.15	0.14	0.09	0.08	0.31	0.30
124	Bayinguoleng	0.79	0.71	0.06	0.05	0.15	0.13	0.16	0.14	0.09	0.08	0.33	0.30
125	Akesu	0.72	0.71	0.06	0.06	0.14	0.13	0.14	0.14	0.08	0.08	0.30	0.30
126	Kezilesu	0.81	0.75	0.06	0.06	0.16	0.14	0.16	0.15	0.09	0.09	0.33	0.32
127	Kashi	0.80	0.71	0.06	0.06	0.16	0.13	0.16	0.14	0.09	0.08	0.33	0.30
128	Hetian	0.74	0.77	0.06	0.06	0.14	0.14	0.15	0.15	0.09	0.09	0.31	0.32
129	Yili	0.73	0.77	0.06	0.06	0.14	0.14	0.14	0.15	0.08	0.09	0.30	0.32
130	Tacheng	0.74	0.79	0.06	0.06	0.14	0.15	0.14	0.16	0.09	0.09	0.31	0.33
131	Aletai	0.75	0.78	0.06	0.06	0.15	0.15	0.15	0.16	0.09	0.09	0.31	0.33

References

1. Tietjen, A.; Jorgensen, G. Translating a wicked problem: A strategic planning approach to rural shrinkage in Denmark. *Landsc. Urban Plan.* **2016**, *154*, 29–43. [CrossRef]
2. Tenza-Peral, A.; Perez-Ibarra, I.; Breceda, A.; Martinez-Fernandez, J.; Gimenez, A. Can Local Policy Options Reverse the Decline Process of Small and Marginalized Rural Areas Influenced by Global Change? *Environ. Sci. Policy* **2021**, *127*, 57–65. [CrossRef]
3. Newsham, N.; Rowe, F. Understanding Trajectories of Population Decline Across Rural and Urban Europe: A Sequence Analysis. *Popul. Space Place* **2022**, *29*, 3. [CrossRef]
4. Valenzuela, V.G.; Holl, A. Growth and decline in rural Spain: An exploratory analysis. *Eur. Plan. Stud.* **2023**. [CrossRef]
5. Van der Star, M.E.; Hochstenbach, C. Continuity Among Stayers: Levels, Predictors and Meanings of Place Attachment in Rural Shrinking Regions. *J. Rural. Stud.* **2022**, *96*, 369–380. [CrossRef]
6. Makkonen, T.; Inkinen, T. Benchmarking the vitality of shrinking rural regions in Finland. *J. Rural. Stud.* **2023**, *97*, 334–344. [CrossRef]
7. Georgios, C.; Nikolaos, N.; Michalis, P. Neo-Endogenous Rural Development: A Path Toward Reviving Rural Europe. *Rural. Sociol.* **2021**, *86*, 911–937. [CrossRef]
8. Laidin, C.; Berriet-Solliec, M. Understanding Rural Development Policies: A Proposal for A Typology of The Seven Main Policy Repertoires in Europe and Locally, Based on French Case Studies. *Ann. Reg. Sci.* **2022**. [CrossRef]
9. Michalek, J.; Ciaian, P.; Di Marcantonio, F. Regional impacts of the EU Rural Development Programme: Poland's food processing sector. *Reg. Stud.* **2020**, *54*, 1389–1401. [CrossRef]
10. Ferraris, L. The 2021–2027 EU Rural Development Policy: A New Paradigm of Shared Management? *Eur. Law Rev.* **2020**, *44*, 855–872.
11. Aubert, F.; Frere, Q.; Lepicier, D.; Vedrine, L. Decentralization and Rural Development Policies Effectiveness: A Quasi-Experimental Evaluation of the LEADER Programme. *Reg. Stud.* **2022**. [CrossRef]
12. Opria, A.M.; Rosu, L.; Iatu, C. LEADER Program—An Inclusive or Selective Instrument for the Development of Rural Space in Romania? *Sustainability* **2021**, *13*, 12187. [CrossRef]
13. Makkonen, T.; Kahila, P. Vitality policy as a tool for rural development in peripheral Finland. *Growth Chang.* **2021**, *52*, 706–726. [CrossRef]
14. Tung, D.T.; Diem, L.T.T.; Luan, D.X.; Linh, N.H.K. The National Target Program for New Rural Development in Vietnam: An Understanding of People's Participation and Its Determinants. *Sustainability* **2022**, *14*, 12140. [CrossRef]
15. Zang, Y.Z.; Liu, Y.S.; Yang, Y.Y.; Woods, M.; Fois, F. Rural Decline or Restructuring? Implications For Sustainability Transitions in Rural China. *Land Use Policy* **2020**, *94*, 104531. [CrossRef]
16. Lu, Y.; de Vries, W.T. A Bibliometric and Visual Analysis of Rural Development Research. *Sustainability* **2021**, *13*, 6136. [CrossRef]
17. Zhang, D.S.; Gao, W.; Lv, Y.Q. The Triple Logic and Choice Strategy of Rural Revitalization in the 70 Years since the Founding of the People's Republic of China, Based on the Perspective of Historical Evolution. *Agriculture* **2020**, *10*, 125. [CrossRef]
18. Wong, S.W.; Tang, B.S.; Liu, J.L. Rethinking China's Rural Revitalization from a Historical Perspective. *J. Urban Hist.* **2020**, *48*, 565–577. [CrossRef]
19. Jia, J.X.; Ma, G.R.; Qin, C.; Wang, L.Y. Place-Based Policies, State-Led Industrialisation, and Regional Development: Evidence from China's Great Western Development Programme. *Eur. Econ. Rev.* **2020**, *123*, 103398. [CrossRef]
20. Tan, M.J.; Liu, Q.; Huang, N.N. Path Model and Countermeasures of China's Targeted Poverty Alleviation and Rural Revitalization. *Rev. Cercet. Interv. Soc.* **2020**, *70*, 312–332. [CrossRef]
21. Liu, L.; Cao, C.J.; Song, W. Bibliometric Analysis in the Field of Rural Revitalization: Current Status, Progress, and Prospects. *Int. J. Environ. Res. Public Health* **2023**, *20*, 823. [CrossRef]

22. Li, Y.H.; Westlund, H.; Liu, Y.S. Why Some Rural Areas Decline While Some Others Not: An Overview of Rural Evolution in the World. *J. Rural. Stud.* **2019**, *68*, 135–143. [CrossRef]
23. Diez, M.A.; Izquierdo, B.; Malagon, E. Increasing the Use of Evaluation Through Participation: The Experience of a Rural Sustainable Development Plan Evaluation. *Environ. Policy Gov.* **2016**, *26*, 366–376. [CrossRef]
24. Stiernstrom, A. Sustainable Development and Sacrifice in the Rural North. *Sociol. Rural.* **2023**. [CrossRef]
25. Jiang, L.J.; Wang, L.L. New Urbanization and Rural Tourism Development under the Rural Revitalization Strategy Environment. *J. Environ. Public Health* **2022**, *2022*, 4095446. [CrossRef]
26. Wang, Q.; Luo, S.X.; Zhang, J.; Furuya, K. Increased Attention to Smart Development in Rural Areas: A Scientometric Analysis of Smart Village Research. *Land* **2022**, *11*, 1362. [CrossRef]
27. Adamowicz, M.; Zwolinska-Ligaj, M. The "Smart Village" as a Way to Achieve Sustainable Development in Rural Areas of Poland. *Sustainability* **2020**, *12*, 6503. [CrossRef]
28. Xu, L.; Zhao, H.Y.; Chernova, V.; Strielkowski, W.; Chen, G.N. Research on Rural Revitalization and Governance from the Perspective of Sustainable Development. *Front. Environ. Sci.* **2022**, *10*, 839994. [CrossRef]
29. Li, W.; Zhang, P.; Zhao, K.; Chen, H.; Zhao, S. The Evolution Model of and Factors Influencing Digital Villages: Evidence from Guangxi, China. *Agriculture* **2023**, *13*, 659. [CrossRef]
30. Zhao, W.; Liang, Z.Y.; Li, B.R. Realizing a Rural Sustainable Development through a Digital Village Construction: Experiences from China. *Sustainability* **2022**, *14*, 14199. [CrossRef]
31. Li, S.C.; Song, W. Research Progress in Land Consolidation and Rural Revitalization: Current Status, Characteristics, Regional Differences, and Evolution Laws. *Land* **2023**, *12*, 210. [CrossRef]
32. Gong, J.Z.; Jian, Y.Q.; Chen, W.L.; Liu, Y.S.; Hu, Y.M. Transitions in rural settlements and implications for rural revitalization in Guangdong Province. *J. Rural. Stud.* **2022**, *93*, 359–366. [CrossRef]
33. Zhou, Q.; Liu, Y.; Qu, S. Emission Effects of China's Rural Revitalization: The Nexus of Infrastructure Investment, Household Income, and Direct Residential CO_2 Emissions. *Renew. Sustain. Energy Rev.* **2022**, *167*, 112829. [CrossRef]
34. Liu, Q.; Gong, D.C.; Gong, Y.X. Index System of Rural Human Settlement in Rural Revitalization Under the Perspective of China. *Sci. Rep.* **2022**, *12*, 10586. [CrossRef]
35. Zhang, G.Q.; Zeng, Z.X. Environmental Quality Optimization of Sustainable Rural Revitalization Strategy Based on Improved Genetic Algorithm. *Mob. Inf. Syst.* **2022**, *2022*, 3775515. [CrossRef]
36. Diaz-Sarachaga, J.M. Combining Participatory Processes and Sustainable Development Goals to Revitalize a Rural Area in Cantabria (Spain). *Land* **2020**, *9*, 412. [CrossRef]
37. Chen, M.X.; Zhou, Y.; Huang, X.R.; Ye, C. The Integration of New-Type Urbanization and Rural Revitalization Strategies in China: Origin, Reality and Future Trends. *Land* **2021**, *10*, 207. [CrossRef]
38. Lopez-Penabad, M.C.; Iglesias-Casal, A.; Rey-Ares, L. Proposal for a Sustainable Development Index for Rural Municipalities. *J. Clean. Prod.* **2022**, *357*, 131876. [CrossRef]
39. Iannucci, G.; Martellozzo, F.; Randelli, F. Sustainable Development of Rural Areas: A Dynamic Model in Between Tourism Exploitation and Landscape Decline. *J. Evol. Econ.* **2022**, *32*, 991–1016. [CrossRef]
40. Jitariu, D.; Popescu, M.; Moise, I.; Urdea, C. Rural Sustainable Development Opportunity by Exploiting the Melliferous Resources—Case Study: The Ciucurova Village, Tulcea County, Romania. *J. Environ. Prot. Ecol.* **2014**, *15*, 1074–1085.
41. Muhirwa, F.; Shen, L.; Elshkaki, A.; Hirwa, H.; Umuziranenge, G.; Velempini, K. Linking Large Extractive Industries to Sustainable Development of Rural Communities at Mining Sites in Africa: Challenges and Pathways. *Resour. Policy* **2023**, *81*, 103322. [CrossRef]
42. Akbari, M.; Ebrahimi, M.S.; Amini, A.M.; Shahzad, U.; Janeckova, K.; Sklenicka, P.; Miceikien, A.; Azadi, H. Performance of Rural Cooperatives? Production In Iran: Implications for Sustainable Development. *J. Clean. Prod.* **2023**, *405*, 136836. [CrossRef]
43. Raja, S.S.; Raju, V.; Husnain, M.; Sarfraz, S.; Malik, F.; Raja, S.S. Framework for Sustainable Rural Development through Entrepreneurial Initiatives in Emerging Economies. *Sustainability* **2022**, *14*, 11972. [CrossRef]
44. Esengulova, N.; Carella, M.M.; Lopolito, A. Stakeholder Empowerment in Sustainable Rural Development Partnerships: Two Case Studies from Italy. *Sustainability* **2023**, *15*, 6977. [CrossRef]
45. Liu, Y.; Qiao, J.J.; Xiao, J.; Han, D.; Pan, T. Evaluation of the Effectiveness of Rural Revitalization and an Improvement Path: A Typical Old Revolutionary Cultural Area as an Example. *Int. J. Environ. Res. Public Health* **2022**, *19*, 13494. [CrossRef]
46. He, R.W.; Guo, S.L.; Deng, X.; Zhou, K. Influence of Social Capital on the Livelihood Strategies of Farmers Under China's Rural Revitalization Strategy in Poor Mountain Areas: A Case Study of the Liangshan Yi Autonomous Prefecture. *J. Mt. Sci.* **2022**, *19*, 958–973. [CrossRef]
47. Li, Y.; Li, J.L.; Chu, J.L. Research on the Revitalization of Huizhou Traditional Villages Based on the PAF Model. *J. Asian Archit. Build. Eng.* **2023**. [CrossRef]
48. Cao, J. Construction of Ecological Landscape Environment in Guanzhong Traditional Villages from the Perspective of Rural Revitalization. *Health Soc. Care Community* **2023**, *2023*, 9974511. [CrossRef]
49. Li, Z.H.; Miao, X.R.; Wang, M.Y.; Jiang, S.G.; Wang, Y.X. The Classification and Regulation of Mountain Villages in the Context of Rural Revitalization-The Example of Zhaotong, Yunnan Province. *Sustainability* **2022**, *14*, 11381. [CrossRef]
50. Zuo, T.A.; Zhang, F.T.; Zhang, J.Y.; Gao, L.; Yu, S.J. Rocky Desertification Poverty in Southwest China: Progress, Challenges and Enlightenment to Rural Revitalization. *J. Geogr. Sci.* **2022**, *32*, 1357–1382. [CrossRef]

51. Alonso, G.C.; Masot, A.N. Towards Rural Sustainable Development? Contributions of the EAFRD 2007-2013 in Low Demographic Density Territories: The Case of Extremadura (SW Spain). *Sustainability* **2017**, *9*, 1173. [CrossRef]
52. Liu, Y.S.; Zang, Y.Z.; Yang, Y.Y. China's Rural Revitalization and Development: Theory, Technology and Management. *J. Geogr. Sci.* **2021**, *30*, 1923–1942. [CrossRef]
53. Chen, X.W. The Core of China's Rural Revitalization: Exerting the Functions of Rural Area. *China Agric. Econ. Rev.* **2020**, *12*, 1–13. [CrossRef]
54. Han, J. Prioritizing Agricultural, Rural Development and Implementing the Rural Revitalization Strategy. *China Agric. Econ. Rev.* **2020**, *12*, 14–19. [CrossRef]
55. Yang, J.; Xu, C.; Fang, Z.Y.; Shi, Y.B. Spatial Distribution Characteristics and Driving Factors of Rural Revitalization Model Villages in the Yangtze River Delta. *Land* **2022**, *11*, 1935. [CrossRef]
56. Yang, Z.H.; Liu, T.T.; Shen, N.N.; Guan, M.; Zheng, Y.F.; Jiang, H.L. Resource and Environment Constraints and Promotion Strategies of Rural Vitality: An Empirical Analysis of Rural Revitalization Model Towns. *Front. Environ. Sci.* **2022**, *10*, 956644. [CrossRef]
57. Xu, X.; Wang, Y. Measurement, Regional Difference and Dynamic Evolution of Rural Revitalization Level in China. *J. Quant. Technol. Econ.* **2022**, *39*, 64–83. [CrossRef]
58. Wan, J.; Li, S.; Zhang, Q. Measurement, Pattern, and Logic of Rural Revitalization in China. *Guizhou Soc. Sci.* **2022**, *3*, 143–152. [CrossRef]
59. Yang, X. Construction and Application of Evaluation Index System of Rural Revitalization Comprehensive Index in China. *Reg. Econ. Rev.* **2023**, *1*, 54–65. [CrossRef]
60. Chen, H.; Zhao, S.; Zhang, P.; Zhou, Y.; Li, K. Dynamics and Driving Mechanism of Real Estate in China's Small Cities: A Case Study of Gansu Province. *Buildings* **2022**, *12*, 1512. [CrossRef]
61. Wang, J.F.; Li, X.H.; Christakos, G.; Liao, Y.L.; Zhang, T.; Gu, X.; Zheng, X.Y. Geographical detectors-based health risk assessment and its application in the neural tube defects study of the Heshun region, China. *Int. J. Geogr. Inf. Sci.* **2010**, *24*, 107–127. [CrossRef]
62. Wang, J.F.; Hu, Y. Environmental health risk detection with GeogDetector. *Environ. Model. Softw.* **2012**, *33*, 114–115. [CrossRef]
63. Ma, Y.; Zhang, P.; Zhao, K.; Zhou, Y.; Zhao, S. A Dynamic Performance and Differentiation Management Policy for Urban Construction Land Use Change in Gansu, China. *Land* **2022**, *11*, 942. [CrossRef]
64. Zhao, S.; Zhang, C.; Qi, J. The Key Factors Driving the Development of New Towns by Mother Cities and Regions: Evidence from China. *ISPRS Int. J. Geo-Inf.* **2021**, *10*, 223. [CrossRef]
65. Zhao, S.; Li, W.; Zhao, K.; Zhang, P. Change Characteristics and Multilevel Influencing Factors of Real Estate Inventory—Case Studies from 35 Key Cities in China. *Land* **2021**, *10*, 928. [CrossRef]
66. Zhao, S.D.; Zhao, K.X.; Zhang, P. Spatial Inequality in China's Housing Market and the Driving Mechanism. *Land* **2021**, *10*, 841. [CrossRef]
67. Li, L.; Zhao, K.; Wang, X.; Zhao, S.; Liu, X.; Li, W. Spatio-Temporal Evolution and Driving Mechanism of Urbanization in Small Cities: Case Study from Guangxi. *Land* **2022**, *11*, 415. [CrossRef]
68. Zhang, P.; Li, W.; Zhao, K.; Zhao, S. Spatial Pattern and Driving Mechanism of Urban–Rural Income Gap in Gansu Province of China. *Land* **2021**, *10*, 1002. [CrossRef]
69. Zhao, S.; Yan, Y.; Han, J. Industrial Land Change in Chinese Silk Road Cities and Its Influence on Environments. *Land* **2021**, *10*, 806. [CrossRef]
70. Ouyang, D.; Zhu, X.; Liu, X.; He, R.; Wan, Q. Spatial Differentiation and Driving Factor Analysis of Urban Construction Land Change in County-Level City of Guangxi, China. *Land* **2021**, *10*, 691. [CrossRef]
71. Xing, Q.F.; Yao, W.Y. Digital governance and its benchmarking college talent training under the rural revitalization in China—A case study of Yixian County (China). *Front. Public Health* **2022**, *10*, 984427. [CrossRef] [PubMed]
72. Xu, X.; Wang, Y. Measurement of Rural Revitalization Level of the Western Development in the New Era and Analysis of Influencing Factors. *J. Southwest Minzu Univ. (Humanit. Soc. Sci. Ed.)* **2021**, *42*, 129–137.
73. Lu, B.; Xu, C.; Meng, X. Measurement and comprehensive evaluation of the development of provincial rural area in China: A comprehensive evaluation method based on the analytic hierarchy process. *J. Appl. Stat. Manag.* **2021**, *40*, 205–221. [CrossRef]
74. Zhang, W.; Bai, Y. Research on Regional Differences, Distribution Dynamic Evolution, and Spatial Correlation of China's Rural Revitalization Level. *J. Quant. Technol. Econ.* **2022**, *39*, 84–102. [CrossRef]
75. Xue, L.; Cao, Z.; Yang, C. Regional Differences and Dynamic Evolution of Rural Revitalization Evaluation in China. *Chin. J. Agric. Resour. Reg. Plan.* **2022**, *43*, 240–251. [CrossRef]
76. Shi, J.W.; Yang, X.Y. Sustainable Development Levels and Influence Factors in Rural China Based on Rural Revitalization Strategy. *Sustainability* **2022**, *14*, 8908. [CrossRef]
77. Niu, W.; Shen, S.; Zhang, B. Spatial Pattern and Influencing Factors of Coordination Development of Rural Revitalization's Five Dimensions in China. *Chin. J. Agric. Resour. Reg. Plan.* **2021**, *42*, 218–231. [CrossRef]
78. Xiao, T.; Du, J.; Yang, T. Spatiotemporal Characteristics and Influencing Factors of Rural Revitalization and Development in Counties in Anhui Province. *J. Yunnan Agric. Univ. (Soc. Sci.)* **2023**, *17*, 10–17. [CrossRef]
79. Wu, J.; Huang, X. Current diagnosis and spatial differentiation pattern of China's rural revitalization: An empirical study on the scale of Prefecture-level cities. *Econ. Manag.* **2020**, *34*, 48–54.

80. Zhu, J.; Hou, Z.; Li, X.; Xu, J. The Effect and Mechanism of Urbanization on Rural Revitalization in China. *Econ. Geogr.* **2022**, *42*, 200–209. [CrossRef]
81. Qin, Q.; Lu, R.; Duan, L.; Wu, B.; Liu, S.; Zhang, L. Coupling Coordination and Influencing Factors of Urbanization and Rural Revitalization in Nine Border Provinces of China. *Bull. Soil Water Conserv.* **2022**, *42*, 208–216. [CrossRef]
82. Liu, Y. The Basic Theory and Methodology of Rural Revitalization Planning in China. *Acta Geogr. Sin.* **2020**, *75*, 1120–1133. [CrossRef]
83. Chen, J.; Shi, H.; Lin, Y.; Mao, D. Differential Strategies for Rural Revitalization Under the Background of the Integration of the Yangtze River Delta. *East China Econ. Manag.* **2021**, *35*, 21–30. [CrossRef]
84. Ottomano Palmisano, G.; Govindan, K.; Boggia, A.; Loisi, R.V.; De Boni, A.; Roma, R. Local Action Groups and Rural Sustainable Development. A Spatial Multiple Criteria Approach for Efficient Territorial Planning. *Land Use Policy* **2016**, *59*, 12–26. [CrossRef]
85. Zhang, P.; Li, W.; Zhao, K.; Zhao, Y.; Chen, H.; Zhao, S. The Impact Factors and Management Policy of Digital Village Development: A Case Study of Gansu Province, China. *Land* **2023**, *12*, 616. [CrossRef]
86. Lu, F.; Deng, G. Dynamic Comparison and Regional Differences of Rural Revitalization Levels in China's Provinces. *Chin. J. Agric. Resour. Reg. Plan.* **2022**, *43*, 199–208. [CrossRef]
87. Liu, Y.; Wang, Q. The temporal and spatial pattern of China's rural revitalization and its influencing factors. *Inq. Into Econ. Issues* **2022**, *9*, 12–25.
88. Huang, D.; Jiang, J. Analysis of the spatiotemporal evolution characteristics and influencing factors of rural revitalization in the Yangtze River Economic Belt. *Stat. Decis.* **2023**, *39*, 44–49. [CrossRef]

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