JOHAR – Journal of Hospitality Application & Research
21 (1) 2026, 82-106
www.publishingindia.com/johar/
https://doi.org/10.21863/johar/2026.21.1.004

Submitted: 13 April, 2025
Revision: 01 July, 2025
Accepted: 12 August, 2025

FARMERS' PARTICIPATION WILLINGNESS AND SUSTAINABLE DEVELOPMENT OF AGRICULTURAL HERITAGE SYSTEM TOURISM: A CASE STUDY IN WANG JINZHUANG, CHINA

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Abstract

The development of sustainable agricultural heritage system tourism (AHST) primarily relies on how local farmers view tourism and whether they choose to join. This study explores the key factors that shape their choices to engage in AHST and to analyse the configuration effect from a holistic perspective to examine the causal relationships between influential factors and farmers' willingness to participate. Six influential factors, including farmer type, tourism-related knowledge and skills, economic benefits, heritage conservation, community attachment, and level of government support, were identified as important antecedents. Taking Wang Jinzhuang in China as a case, this study adopted fsQCA to identify the condition configurations leading to farmers' willingness to participate in AHST. The findings show that community attachment is a core factor influencing farmers' willingness to participate in AHST. There was

How to cite: Li, H., Zhang, Y., & Lien, C. H. (2026). Farmers' participation willingness and sustainable development of agricultural heritage system tourism: A case study in Wang Jinzhuang, China. *JOHAR – Journal of Hospitality Application & Research, 21*(1), 82-106.

a total of nine configuration solutions, including four configuration solutions for artisan farmers and five configuration solutions for non-artisan farmers. The research outcomes provide implications for government decision-makers and managers of agricultural heritage sites to develop policies and implement innovative measures to promote the sustainable development of AHST.

Keywords: *Agricultural Heritage System Tourism (AHST), Community-Based Tourism (CBT), Fuzzy-Set Qualitative Comparative Analysis (fsQCA), Farmers, Sustainable Development*

Introduction

The agricultural heritage system describes a dynamic and evolving framework involving human communities in a complex relationship with their territory, cultural or agricultural landscape, or broader social environment (FAO, 2022). Tourism plays an essential role in both preserving and dynamically managing agricultural heritage systems, which encompass various dimensions such as cultural heritage, ecological functions, agronomic practices, and economic activities. Tourism development in biodiversity conservation, traditional agriculture and heritage, and ecotourism is classified as Agricultural Heritage Systems Tourism (AHST) (Tian et al., 2016). Through integrating nature with culture, AHST enhances the experience of the whole agricultural system (Zhang et al., 2024). Tourism can balance agricultural heritage conservation and farmers' economic benefits because the benefits of tourism are an important incentive for farmers to conduct further conservation and development and keep agricultural heritage system sustainable (Sun et al., 2022).

The research on AHST has attracted scholars' attention from different disciplines. Some scholars focus on the participation of local farmers in agricultural heritage tourism (Ocelli et al., 2022). Agricultural heritage systems are unique agricultural production systems created and inherited from the long-term coordinated development of farmers and the environment. Their resilience depends on their ability to adapt to new challenges without losing their biological and cultural wealth and productive capacity. Farmers, as the core stakeholders of agricultural heritage tourism and the principal community members in the heritage sites, their support and participation in AHST are the premise and guarantee of sustainable tourism development. Therefore, it is crucial to understand what factors influence farmers' participation in AHST (Wang et al., 2024). The sustainable development of AHST largely depends on farmers' perceptions of tourism impacts and attitudes toward tourism development.

The importance of farmers' participation in tourism has been well documented. However, there are two limitations in extant literature.

First, previous research is mainly based on rural tourism or agricultural tourism (Bhatta et al., 2019), which cannot fully reflect the characteristics of farmers specifically in AHST. The reason why AHST can achieve sustainable development is that there are a group of artisan farmers referring to who use traditional, sustainable farming techniques for agricultural production (Tian et al., 2016). Artisan farmers specialize in traditional farming activities related to agricultural heritage and reconnect consumers with agricultural heritage systems (Tian et al., 2016). Artisan farmers are not only the primary owners of heritage tourism resources, but also essential providers of tourism products and services. Non-artisan farmers refer to those who do not own traditional farming techniques, or farmers who own traditional farming techniques but no longer engage in relevant traditional farming activities related to agricultural heritage for a long time. Artisan and non-artisan farmers may have different attitudes toward participating in AHST, which was not explored by previous research. To bridge the gap, this study identifies that farmer's type could be an important antecedent and investigates its influence on farmers' participation willingness of AHST.

Second, previous research assumed the linear relationship to explain the effect of factor(s), such as economic income and government support, on farmers' participation willingness. However, the formation of participation willingness is a complex process that could also be influenced by the interaction of various factors. Little research explores the configuration effect from a holistic perspective to study the causal relationships between antecedents and farmers' willingness to participate in AHST, which generates a new call for research. To bridge the gap, this study uses fuzzy-set qualitative comparative analysis (fsQCA) to investigate the important factors influencing farmers' willingness to participate in AHST.

Wang Jinzhuang is a typical heritage village in the core protection area of the Shexian dryland stone-ridge terrace system in China. This system was rated as an important agricultural heritage system of China by the Chinese Ministry of Agriculture in 2014 and was recognized as a globally important agricultural heritage system (GIAHS) by FAO in 2022. The tourism industry in Wang Jinzhuang has been developed for several years. Terraces view, donkeys and slate streets are special characteristics of Wang Jinzhuang, which attracts thousands of tourists to visit each year. Wang Jinzhuang is regarded as the representative AHST destination. Therefore, this research conducts a case study in Wang Jinzhuang.

Theoretical Background

Community-Based Tourism and Agricultural Heritage System Tourism

Community participation has long been proposed as an important foundation of sustainable tourism development (Liang et al., 2024). Community-based Tourism (CBT) fully considers the opinions and demands of community members during decision-making and planning and treats community members as the main party in developing destinations to ensure the sustainable development of tourism. CBT focuses on local governance, community empowerment, and sustainable development, especially emphasizing that local people should be encouraged to participate in tourism development so that they can share in the benefits of tourism (Shandilya & Srivastava, 2024; Zielinski et al., 2020). The primary goal of CBT is to involve community members in tourism by overseeing tourism resources and enhancing essential facilities, including lodging, dining options, and other supplementary services, to host visitors. CBT has become an essential theoretical basis for the research of AHST.

Agricultural heritage possesses rich and unique tourism resources including traditional agricultural tourism resources such as landscape and rural customs as well as unique cultural heritage resources such as traditional farming techniques, folk culture, and traditional villages. AHST must be supported by local farmers and requires a combination of ongoing agroecological and social innovations, along with the thoughtful transfer of knowledge and experience across generations (Zhang et al., 2020). Farmers are the providers of tourism products or services as well as the owners of tourism resources. Artisan farmers serve as the principal providers of tourism resources at agricultural heritage sites, making them indispensable to AHST. They act as active interpreters of cultural heritage and primary suppliers of tourism goods (Tian et al., 2016), and their participation's enthusiasm will directly affect the development of AHST. Developing tourism enables farmers to secure extra income, thereby ensuring the long-term sustainability of traditional agriculture. Thus, it is important to analyse critical factors to understand their influence on farmers' participation willingness in AHST.

Factors Influencing Farmers' Participation Willingness in AHST

The important factors influencing farmers' willingness to participate in AHST are discussed as follows:

Farmer's Type

Previous research on farmers' classification is related to agritourism and rural tourism which cannot adequately depict AHST in a comprehensive way (Bhatta et al., 2019). AHST has combined the properties of agritourism, cultural heritage tourism, and ecotourism (Tian et al., 2016). This study draws on the definition of artisan farmers of Tian et al. (2016) in AHST and further classifies farmers into artisan farmers and non-artisan farmers. Artisan farmers have lived in agricultural heritage sites for generations and have very strong emotional attachment to them (Tian et al., 2016). They maintain a profound attachment to the resources related to the heritage, such as ancient agricultural tools, and regard the preservation of these resources as essential for the connection to the land (Bahnasy, 2025). They hope to obtain economic gains from tourism and to promote agricultural heritage through tourism. Therefore, it may be easier to attract their participation by carrying out tourism development based on protecting and inheriting heritage. For those non-artisan farmers, because of their low involvement with the local agricultural heritage, although they will also be proud of the agricultural heritage of their hometown, more important is that they hope tourism can bring them more economic benefits. In addition, because of limited resources, they expect that the government can provide funding to support their participation in tourism activities. Therefore, the factors influencing artisan and non-artisan farmers' willingness to participate in AHST could be different.

Tourism-Related Knowledge and Skills

Farmers' knowledge and skills about tourism were identified as a key factor influencing their involvement in tourism activities. For example, farmers possess knowledge of local agricultural heritage and tourism projects, enabling them to be capable tour guides. Choenkwan et al. (2016) examined the relationship between agriculture and tourism and found that farmers who have the knowledge and skills would involve and take advantage of the opportunities in tourism. Yamagishi et al. (2021) studied farm tourism in the Philippines and the findings indicated that lack of knowledge and skills impedes farmers' participation in farm tourism. Xu et al. (2022) investigated farmers' participation in tourism and the outcome showed that when farmers have better knowledge and understanding about tourism, they will rethink their product offerings and interact more directly with their customers and will more actively involved in tourism.

Economic Benefits

Prior research showed that farmers' perceived economic benefits (e.g., additional income, expanding farming operations) obtained from tourism is a crucial factor influencing their participation in tourism (Pilving et al., 2019). For example, Sun et al. (2013) noted that the most significant contribution of AHST to rural development is its economic benefit, which is a prime driver for farmers to attend tourism activities at heritage sites (Sun et al., 2013). Obtaining economic benefit is a primary objective of the agritourism development strategy, with local farmers as the main beneficiaries of tourism development (Ndhlovu & Dube, 2024). Agritourism development would bring economic benefits (e.g., employment growth, higher household income) to farmers (Bhatta et al., 2025). Farmers' support and participation in agritourism development can be determined by evaluating the impact of tourism. If they perceive the positive impact of tourism, they will show a positive intention to participate in agritourism. Cheng et al. (2018) studied the attitudes of local farmers toward tourism and found that their participation willingness in tourism will be positively affected by their perceptions of economic benefits. Van Zyl and van der Merwe (2021) examined motives of farmers for offering agritourism and the outcome demonstrated that economic advantages are the main reason that farmers involve and offer agritourism on a farm.

Agriculture Heritage Conservation

Developing tourism is a valuable instrument for the appropriate and sustainable conservation of agricultural heritage (Li & Gao, 2025). If local farmers perceive agricultural heritage protection as important, they would willingly participate in the development of agricultural heritage tourism (Wang et al., 2024). Cassia et al.'s (2015) research on agritourism entrepreneurship showed that heritage preservation and enhancement have a pivotal role and is a non-economic motive driving farm operator to start the agritourism activity. Mitchell and Barrett (2015) indicated that farmers' perceptions toward heritage values and agricultural landscapes motivate them to engage in tourism. A study of agritourism in South Africa showed that preservation of culture and heritage is an important reason for farmers to participate and offer agritourism activities (van Zyl & van der Merwe, 2021).

Community Attachment

Rooted in environmental psychology, community attachment in this study refers to farmers' emotional bond to their community (Rasoolimanesh

& Jaafar, 2017). Residents demonstrate their attachment to the community by bonding with it and relying on it (Adongo et al., 2017). Previous studies showed that a stronger community attachment positively impacts residents' participation and their endorsement of tourism initiatives. For example, in a study of resident support in Kota Kinabalu, Malaysia, attached residents were found to be interested in seeing their community develop and are actively engaged in sustainable tourism development (Sher et al., 2015). Adongo et al. (2017) examined tourism in Hoi An, Vietnam, a UNESCO World Heritage site renowned for its rich cultural tapestry, and found that residents who share a deep sense of community attachment are significantly more inclined to attend community meetings concerning tourism. In an olive-oil tourism case study in Spain, residents strongly attached to their community are more likely to engage in and support rural tourism development (Campón-Cerro et al., 2017).

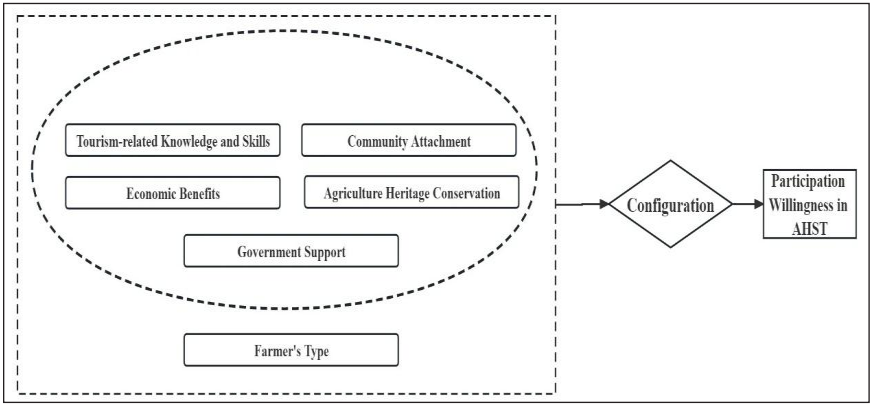
Government Support

Malkanthi et al. (2015) conducted a study to examine the determinants shaping farmers' decisions to participate in agritourism in Sri Lanka. The absence of government support was identified as a barrier that limits farmers' interest in starting spice tourism. The Sri Lankan government should equip farmers with targeted education and training, along with upgrading necessary infrastructure. Bannor et al. (2022) explored cocoa farmers' willingness to participate in agritourism in Ghana and indicated that if the government could support farmers technically and financially to host tourists on their farms, farmers' willingness to participate in agritourism would be high. Dinh et al.'s research (2022) showed that local government policy support is an important factor influencing farmers' decisions to participate in agricultural tourism activities in the MeKong Delta, Vietnam. Local governments should prioritize infrastructure investment including electricity, rural roads, Internet transmission system, a local agricultural tourism marketing program, etc.

Theoretical Framework

Farmers are core stakeholders of AHST and their attitudes toward tourism are critical to the sustainable development of AHST. Based on the foregoing discussions, six factors are identified as antecedents of farmers' participation willingness in AHST. A configurational method is used to examine the complex causality between six important factors and farmers' willingness to participate in AHST.

The theoretical framework of this study is depicted in Fig. 1.



Source: Author's own work.

Fig. 1: Theoretical Framework

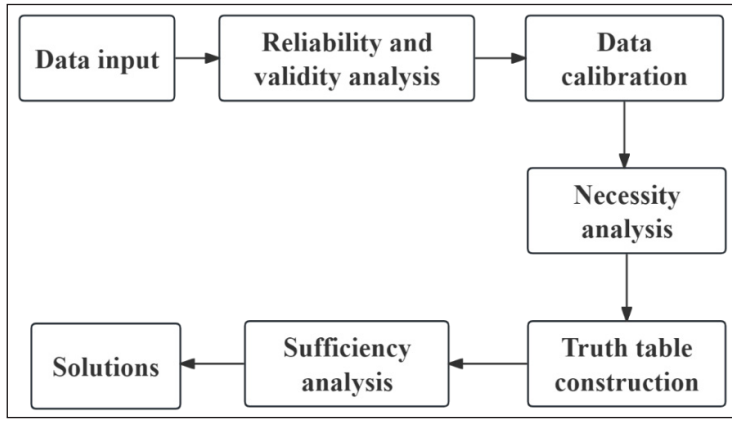
Methodology

fsQCA

This study employs fsQCA as the primary data analysis method for the following three reasons: firstly, compared with traditional analysis methods, fsQCA is particularly suitable for studying complex causality and multiple interactions from a holistic perspective; secondly, fsQCA is suitable for analysis of small to medium-sized data, handling sample sizes below 300; thirdly, fsQCA can explain the configurations of causal conditions as well as the outcome in question (Fiss, 2007), and verify the complex nonlinear and asymmetric causal relationships between condition variables and consequence variables. This study aims to test the complex causal relationship between the configuration of six conditional variables and farmers' willingness to participate in AHST, applicable to the fsQCA.

The data analysis process of fsQCA is shown in Fig. 2. Data were collected through a survey and the reliability and validity test were first employed to assess the quality of constructs. After that, fsQCA was conducted including data calibration, necessity analysis, truth table construction, sufficiency analysis, and solutions. Data calibration is used to improve the interpretability of the results. Necessity analysis is performed to check if any single variable is necessary. Truth table construction is used to display all

possible configuration states of a given data set and to help us gain expected results. Sufficiency analysis is conducted to judge whether conditions or combinations of conditions can consistently present results. The last step of fsQCA provides configuration solutions.



Source: Author's own work.

Fig. 2: Data Analysis Process of fsQCA

Questionnaire Development, Construct Measures and Data Collection

This study considers the unique characteristics of agricultural heritage sites and reviews the literature to develop the questionnaire consisting of constructs (tourism-related knowledge and skills, economic benefits, agriculture heritage conservation, community attachment, government support, and participation willingness in AHST) and the demographic characteristics (annual household income, primary source of income, directly participate in AHST, and farmer's type). A 7-point Likert scale was used, with 1 representing "strongly disagree" and 7 representing "strongly agree". Specifically, measures of tourism-related knowledge and skills are adapted from Yamagishi et al. (2021) and Xu et al. (2022). Economic benefits measures are derived from Cheng et al. (2018). Measures of agricultural heritage conservation are derived from Sun et al. (2013) and Cassia et al. (2015). Measures of community attachment are adapted from Rasoolimanesh and Jaafar (2017) and Adongo et al. (2017). Measures of government support are adapted from Malkanthi et al. (2015) and Dinh et al. (2022). Measures of willingness to participate in AHST are adapted from Rasoolimanesh and Jaafar (2017). The questionnaire was pre-tested in Wang Jinzhuang and 30 farmers from there were interviewed. Their feedback demonstrated that the survey questions in this questionnaire are clear and well-understood.

The survey was conducted in Wang Jinzhuang village from July 10 to July 18, 2022. To obtain more representative samples, a cluster sampling method was used to collect data. There are five streets in Wang Jinzhuang. The research team was divided into five groups to distribute the questionnaires on each village street and each group randomly interviewed 50 farmers. The research objective was verbally explained to farmers before the start of the interview, providing them with a basic understanding of the study and what participation would involve. Of the 250 distributed questionnaires, 207 were completed. After deleting responses with missing data, 194 valid questionnaires were obtained for data analysis.

Data Processing

Profile of Respondents

The outcomes (shown in Table 1) demonstrate that more than 50% of farmers have an annual household income higher than RMB 30,000. The majority (71.7%) of farmers' primary source of income is from agriculture. However, only 31.4% of farmers directly participate in AHST indicating that farmers' participation in AHST needs to be improved. 70.6% of farmers are artisan farmers.

Table 1: Demographic Characteristics of Respondents

Constructs		Percentage
Annual household income (CNY)	<= 10000	10.3%
	10000-29999	28.9%
	30000-49999	42.3%
	50000-69999	12.9%
	>=70000	5.6%
Primary source of income	Mainly from agriculture	71.7%
	Mainly from tourism	15.9%
	Mainly from other businesses	12.4%
Directly participate in AHST	Yes	31.4%
	No	68.6%
Farmer's type	Artisan farmers	70.6%
	Non-artisan farmers	29.4%

Source: Author's own work.

Reliability and Validity Test

All constructs are assessed for reliability using Cronbach's α coefficient and Composite Reliability indicators. The findings from the reliability analysis are presented in Table 2. The Cronbach's α coefficient of each variable in this study was between 0.869 and 0.914 (> 0.8), implying that the reliability of the constructs was high (Hair et al., 2019). KMO=0.870 (> 0.7), p=0.000 (< 0.05), indicating suitable for factor analysis (Hair et al., 2019) The standardized factor loading of each measurement item ranges from 0.740 to 0.851(> 0.7), the combined reliability (CR) is from 0.871 to 0.915(> 0.7), and the average extraction variation (AVE) values exceed 0.5 (Hair et al., 2019), providing evidence of good convergent validity. The square root of each construct's AVE surpasses the correlation coefficient between the constructs, indicating good discriminant validity (Kline, 2015).

Table 2: Variable Analysis Results

Variable	Measurement Items	Factor Loadings	Cronbach's α Coefficient	Combined Reliability (CR)	Average Extraction Variation (AVE)
TKS	TKS1	0.747	0.869	0.871	0.576
	TKS2	0.790			
	TKS3	0.803			
	TKS4	0.806			
	TKS5	0.812			
CA	CA1	0.755	0.871	0.873	0.635
	CA2	0.805			
	CA3	0.764			
	CA4	0.814			
EB	EB1	0.809	0.889	0.887	0.613
	EB2	0.752			
	EB3	0.835			
	EB4	0.756			
	EB5	0.755			

Variable	Measurement Items	Factor Loadings	Cronbach's α Coefficient	Combined Reliability (CR)	Average Extraction Variation (AVE)
AHC	AHC1	0.824	0.889	0.892	0.623
	AHC2	0.744			
	AHC3	0.755			
	AHC4	0.750			
	AHC5	0.740			
GS	GS1	0.788	0.911	0.911	0.672
	GS2	0.776			
	GS3	0.842			
	GS4	0.851			
	GS5	0.805			
PW	PW1	0.814	0.914	0.915	0.684
	PW 2	0.851			
	PW 3	0.831			
	PW 4	0.771			
	PW 5	0.759			

Source: Author's own work.

* Note: TKS-Tourism-related knowledge and skills, CA-Community attachment, EB-Economic benefits, AHC- Agriculture heritage conservation, GS- Government support, PW-Participation willingness in AHST.

fsQCA Findings

Data Calibration

Data calibration is a process of mapping variables to their corresponding numerical values. fsQCA can calibrate condition variables and outcome variables into fuzzy set membership scores between 0 and 1, where 1 represents full membership and 0 represents full non-membership. Since the expressions of the measurement items in the questionnaire are all positive, in the 7-point Likert scale, when the score is 1, 2, 3, or 4, it shows that respondents do not agree with the statement of the measurement item (score is 1, 2, 3) or they have neutral opinions with the statement of the measurement item (score is 4), which does not belong to the set of latent variable measurement. Thus, the

value (calibration) is 0. When the score is 5, the value is 0.33 (partial non-membership). When the score is 6, the value is 0.67 (partial membership). When the score is 7, it indicates that respondents fully agree with the statement of this item, that is, they are entirely part of the set of measurement latent variables, and the value is 1. Regarding farmer's type, the value of artisan farmers is 1 and the value of non-artisan farmers is 0.

Necessity Analysis

In fsQCA, each antecedent variable needs to be checked before performing configuration analysis to determine whether any single variable is necessary for causing the results. The necessity analysis can be measured by consistency value. Consistency refers to how well cases align with the set relationships outlined in a solution (Fiss, 2011). An antecedent variable with a consistency of 0.9 or higher is considered a necessary condition for the outcome. This study employs fsQCA 3.0 to test the necessity. The outcomes are depicted in Table 3. The consistency value of community attachment is greater than 0.9 and thus, is a necessary condition for influencing the participation willingness of farmers in AHST. The consistency value of other variables does not exceed 0.9 indicating that they are not necessary conditions for the results.

Table 3: Results of Necessity Analysis

Variable	Consistency	Coverage
TKS	0.595222	0.968907
CA	0.937393	0.946296
EB	0.712567	0.951500
AHC	0.869084	0.976488
GS	0.687193	0.960013
AF	0.716786	0.917591
NAF	0.283214	0.871403

Source: Author's own work.

* Note. AF- Artisan farmers, NAF- Non-artisan farmers.

Truth Table and Sufficiency Analysis

The truth table was sorted based on the frequency and consistency criteria (Pappas et al., 2019). In this study, the frequency threshold is set to 1, as it is necessary to ensure that at least 75% of the observed samples are included. With a total of 194 samples in this paper, this setting is appropriate.

Table 4: Results of Sufficient Configurations of Antecedent Conditions

Condition Variables	C1	C2	C3	C4	C5	C6	C7	C8	C9
TKS		⊗	⊗			•		⊗	
CA	●	●	●	●	●	●	●	●	●
EB			⊗		•	•			•
AHC				•			•		
GS	⊗						•	•	•
AF	•	•		•	•				
NAF			•			•	•	•	•
Raw coverage	0.250200	0.294218	0.068138	0.627551	0.486487	0.132968	0.171285	0.104288	0.172996
Unique coverage	0.005702	0	0.011518	0.092941	0.001882	0.007641	0.015395	0.001882	0.001882
Consistency	0.956617	0.944882	0.946910	0.988149	0.969656	0.945278	1	1	1
Overall Solution coverage	0.877181								
Overall Solution consistency	0.960300								

Source: Author's own work.

* Note: ● indicates the presence of core conditions, ⊗ indicates the absence of core conditions, • indicates the presence of peripheral conditions, blank indicates a condition may be either present or absent.

The PRI consistency metric effectively indicates the likelihood that a specific row represents "Y" rather than "~Y". A higher PRI value suggests a lower probability of the row appearing in two different subset relationships. This paper sets the PRI consistency threshold to 0.7, which is a standard metric for sufficiency analysis (Greckhamer et al., 2018).

Sufficiency analysis in fsQCA is a grouping study of the condition variables to judge whether conditions or combinations of conditions can consistently present results. Sufficiency analysis is measured by coverage values and consistency values using Boolean truth table method. Coverage is the percentage of the number of cases with a sufficient condition or condition combination over the total number of cases (Vlachos, 2021). During the analysis of sufficient conditions, the consistency threshold is set as 0.8. To reduce the potential configuration contradiction, the Proportional Reduction in Inconsistency (PRI) threshold is set as 0.7, and the case threshold is set as 1. According to the intermediate solution results, the preconditions configuration of farmers' willingness to participate in AHST includes 9 configuration paths (Table 4). The overall solution consistency rate of 0.960300 and the overall solution coverage rate of 0.877181, which are greater than 0.8 required by qualitative comparative analysis. The consistency of each configuration path is also greater than 0.8 indicating that these configuration conditions can provide sufficient solutions to the farmers' willingness to participate in AHST.

Solutions

The overall coverage rate of the conditional configuration for farmers' participation willingness in AHST is 0.877181 showing that around 87.72% of the cases could be explained by the nine configuration solutions. Among the solutions, C7, C8, and C9 have the strongest interpretation (consistency value= 1). Community attachment is a necessary condition and plays a central role in all configuration solutions. However, the configuration paths show that the components of the two types of farmers are different. Therefore, the configuration solutions of farmers' willingness to participate in AHST can be analyzed from the perspective of artisan farmers and non-artisan farmers.

Artisan Farmers-Four Configuration Solutions Include C1, C2, C4, and C5.

Solutions C1 and C2: These two configuration solutions show that artisan farmers' attachment to their community is a crucial factor influencing their participation willingness in AHST. Artisan farmers with a strong sense of

community attachment will be highly willing to participate in AHST even though the level of government support is low or tourism-related knowledge and skills are poor.

Solutions C4 and C5: These two configuration solutions show that community attachment is the core factor influencing artisan farmers' willingness to participate in AHST. Economic benefits and agriculture heritage conservation are the peripheral conditions. Artisan farmers with strong community attachment and economic benefits or agriculture heritage conservation perception have a strong willingness to participate in AHST, no matter what other conditions are present or not. Furthermore, consistency value of C4 is higher than that of C5 and the original coverage of C4 is the highest among all configuration solutions demonstrating that C4 is the most important configuration solution influencing the willingness of artisan farmers to participate in AHST.

Non-Artisan Farmers-Five Configuration Solutions Include C3, C6, C7, C8, and C9.

Solution C3: Community attachment is the core factor affecting non-artisan farmers' willingness to participate in AHST. Non-artisan farmers with a strong sense of community attachment will be highly willing to participate in AHST even though their tourism-related knowledge and skills are poor and economic benefits are low.

Solution C8: Community attachment is the core factor influencing non-artisan farmers' willingness to participate in AHST. Government support is the peripheral condition. The higher the government support, the stronger the non-artisan farmers' desire to participate in AHST. Even though tourism-related knowledge and skills are low, non-artisan farmers with a strong sense of community attachment and government support will be highly willing to participate in AHST.

Solutions C6, C7, and C9: Community attachment is the core factor influencing non-artisan farmers' willingness to participate in AHST. Economic benefits, agriculture heritage conservation, tourism-related knowledge and skills, and government support are peripheral conditions. Consistency value of C7 and C9 is 1 which is the highest among all configuration solutions. The original coverage of C9 is the highest among all configuration solutions. Thus, C9 is the most important configuration solution influencing the willingness of non-artisan farmers to participate in AHST.

Conclusions

The results indicate that farmers' willingness to participate in AHST is influenced by several factors which is consistent with the findings of previous studies including farmer's type, tourism-related knowledge and skills, community attachment, economic benefit, agriculture heritage conservation, and government support. However, the outcomes of fsQCA show that these six factors do not independently influence farmers' participation willingness. The configuration effect of these six antecedents exists and includes nine configuration solutions.

Community attachment is a core factor of all configuration solutions showing that the sense of identification and attachment are the core factor influencing farmers' participation willingness in AHST. The outcome is different from previous studies about CBT, where the benefit perception of tourism is always the core factor in motivating residents to participate in tourism activities. A possible reason for the difference could be the unique characteristic of AHST. Ancestral succession and self-sufficiency are still the main living conditions of farmers in agricultural heritage areas and agricultural heritage systems are the basis for the survival of local farmers. Their attachment to the village is prominent and they hope that more people will know about the place. Even though they are not very clear about the benefits, but they expect that the agricultural heritage can be passed on forever.

For non-artisan farmers, both solutions C6 and C9 include economic benefits and C9 has the highest consistency value and original coverage. Only C7 includes agricultural heritage conservation. These imply that for non-artisan farmers, they are more concerned about economic benefits than agricultural heritage conservation. The results are consistent with the findings of Van Zyl and van der Merwe (2021). Higher economic benefits are more likely to stimulate non-artisan farmers to participate in AHST. The outcomes of fsQCA for artisan farmers show that both solutions C4 and C5 include community attachment, but the consistency of C4 (community attachment + agricultural heritage conservation) is higher than C5 (community attachment + economic benefits). It indicates that the perception on agricultural heritage conservation for artisan farmers is more important than economic benefits. Artisan farmers are inheritors of agricultural heritage and they hope that tourism can improve the inheritance and promote agricultural heritage. Positive perception of the tourism effect on agricultural heritage conservation enhances artisan farmers' participation willingness in AHST.

Even though government support has an impact on both artisan and non-artisan farmers, but it is more important for non-artisan farmers. The findings show that government support appears in solutions C7, C8, and C9. Moreover, consistency of these three solutions (with government support) is significantly higher than that of C6 (without government support) indicating that government support has a more significant impact on non-artisan farmers' willingness to participate in AHST. The outcome not only confirms the important role of government support in AHST, which is consistent with previous research (Bannor et al., 2022), but also further indicates that the impact on different type of farmers differs. For artisan farmers, improving their community attachment and perception of heritage conservation is helpful to motivate their participation in AHST. For non-artisan farmers, enhancing their community attachment and government policy and support in financing and training and improving infrastructure strengthen their intentions to participate in AHST.

Discussions

Theoretical Implications

First, a theoretical framework from an integrated and holistic perspective is proposed to explain the configuration influence of six antecedents on farmers' participation willingness in AHST. Previous research examined how influential factors independently affect farmers' participation willingness. By employing the fsQCA approach, this study extends the knowledge and understanding of the complex causal relationships between influential factors and farmers' willingness to participate in AHST.

Second, this study refines the classification of farmers in AHST. Although previous studies have identified farmer's type as an important factor influencing farmers' participation willingness in rural tourism, this classification does not highlight the characteristics of farmers in AHST. In terms of the role played by farmers in AHST, this study classifies farmers into artisan farmers and non-artisan farmers and explores the configuration impact on artisan farmers' and non-artisan farmers' participation willingness in AHST. It is conducive to expanding future theoretical research on AHST.

Third, this study provides insights into the impact of farmers' affective attachment to the community on their participation willingness in AHST. Previous research focused on economic benefits gained from developing tourism activities and discussed how economic benefits influence farmers'

participation in tourism. However, the conclusions do not consider the special purpose of AHST. Because the main purpose of AHST is to protect agricultural heritage and realize sustainable development, thus, local farmers' community attachment and their perceived agriculture heritage conservation need to be emphasized in AHST. The findings enrich the sustainable and tourism literature in identifying the key role of community attachment in influencing farmers' willingness of participating in AHST.

Managerial Implications

Farmers are vital for preserving agricultural heritage and promoting sustainable tourism. It is essential to design reasonable policies to improve farmers' participation in AHST, especially focusing on characteristics of local tourism resources and different types of farmers. Three managerial implications are discussed.

First, government decision makers or managers of agricultural heritage sites need to consider how to enhance farmers' community attachment. Community attachment is the most prominent factor in each conditional configuration. In modern society, farmers' functional attachment to the village is shrinking, and their community attachment is more cohesive as emotional attachment, with the appearance of "retaining nostalgia" (Stannard, 2020). For agricultural heritage sites, this nostalgia is more about cherishing the traditional farming culture, relying on the rooted land, and remaining attached to the style and features of traditional village sites. Therefore, local government and administrators should organize more festivals and events with the theme of local heritage culture and provide a platform for farmers to communicate and further understand local culture and traditions, so that they can enhance their sense of pride and belonging, and raise their emotional perceptions of nostalgia. In addition, it is necessary to strengthen the protection of agricultural heritage sites. On the premise of not destroying the authenticity of the heritage landscapes, reasonable plans about the landscape design and the construction of infrastructure should be put forward, so that the farmers can feel the convenience of local life, and the original landscape layout of the village can also activate the nostalgia of farmers and increase their level of community attachment.

Second, artisan farmers' perceptions of agriculture heritage conservation should not be ignored because they play the dominant role in AHST. They are deeply attached to the agricultural heritage site and would like to promote the heritage culture. Thus, local government decision makers or managers need to consider the demand of artisan farmers in tourism development. For

example, build exclusive tourism product brands of artisan farmers, establish educational bases for agricultural heritage systems, and provide more opportunities for artisan farmers to exhibit traditional farming techniques to tourists. It is necessary to find a balance between benefit objectives and heritage conservation objectives. To ensure equity, the income disparity between those managing tourism services and artisan farmers who remain committed to agricultural activities but cannot benefit from tourism directly should be addressed. When the artisan farmers realize that tourism can not only bring them economic benefits but also protect and inherit agricultural heritage, their trust and responsibility in tourism will be increased, and their enthusiasm to participate in tourism will be improved.

Finally, decision makers or managers should develop more tourism policies and measures scientifically and rationally to provide support for non-artisan farmers to participate in tourism. Non-artisan farmers are relatively less competent in tourism participation due to their lack of core farming technologies of agricultural heritage. Their willingness to participate in AHST will be increased when the level of policy support and the perception of benefits are higher. It is necessary to formulate practical policies based on the local situation, and further specify the policy implementation measures to motivate non-artisan farmers to participate in tourism-related businesses to increase their direct benefits from tourism development and improve the benefit-sharing level of tourism. Specifically, tourism-related skills training can be provided to non-artisan farmers to increase the effectiveness of their tourism activities. Managers and developers can provide more employment opportunities related to tourism for non-artisan farmers, so that they can obtain more economic benefits and enhance their professional skills and personal achievements while participating in AHST.

Limitations and Future Research

First, although this research identifies six important factors influencing farmers' willingness to participate in AHST, other important factors may be ignored. For example, the characteristics of artisan and non-artisan farmers from various cultural backgrounds may differ. To improve the external validity and enrich the theoretical framework, future research should consider other influencing factors, especially cultural backgrounds of farmers. Second, this research studies AHST from the perspective of farmers, while other perspectives, such as tourists, government, and enterprises, are not taken into consideration. Future research could explore the factors influencing farmers' willingness to participate in AHST from different perspectives. Third, data are all from Wang Jinzhuang, China. It makes more difficult to generalize

the results of the study. Further exploration could be conducted at various agricultural heritage sites to test whether the results are consistent.

Funding: This work was supported by the project of Humanities and Social Sciences Research funded by the Ministry of Education of China under Grant No. 22YJAZH045.

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