

ANALYSIS OF THE CURRENT STATUS OF AGRITOURISM RESEARCH BASED ON CITESPACE

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Abstract. Agritourism has been a popular research topic over the last decade. However, there has been a lack of systematic, comprehensive, and objective literature reviews in this field. Therefore, this study carried out a visual bibliometric analysis of the knowledge structure and evolution by analyzing 1377 documents related to agritourism using CiteSpace. The results show that agritourism research is prevalent, but most published journals lack high academic credibility. Research teams communicate frequently; however, individual collaborative networks remain relatively independent. Over the past decade, China and the United States have invested significantly in agritourism research, forming a relatively close partnership with notable academic influence. Current research focuses on rural tourism's development paths and challenges, sustainability issues, and ecological protection of tourism destinations. Future research may include interdisciplinary approaches and forecasting, particularly integrating agritourism with sustainable development, marketing, and artificial intelligence. This study constructs a knowledge framework by identifying research gaps, proposing directions for future investigation, and enriching the knowledge system with valuable references.

Keywords: *agricultural tourism, framework, progress, bibliometrics, sustainability*

Introduction

Agritourism is becoming a popular form of tourism globally. The global recreational agriculture market is expected to grow from USD 53.23 billion in 2022 to USD 56.97 billion by 2023 (Statista, 2023). Various stakeholders have implemented strategies to promote the growth of agritourism. Agritourism operators attract customers with innovative services such as parent-child entertainment packages and agricultural education classes with field activities (Roman et al., 2020). Meanwhile, local governments actively promote agritourism, contributing to the growth of this market; for instance, Ireland's Minister of Agriculture allocated USD 3.06 million in funding for local projects aimed at enhancing the region's agritourism products and services in 2022 (Statista, 2023). Additionally, Saint Kitts and Nevis launched a farm tourism program allowing tourists to camp for free on fruit farms in 2021 (Statista, 2023). Key opinion leaders have further advanced agritourism promotion. Martano, the popular aloe vera city, has enhanced its reputation as an eco-friendly destination that attracts international stars like actress Helen Mirren and director Taylor Hackford due to its commitment to ecosystem protection (Palmi and Lezzi, 2020). The growing interest and innovations within agritourism underscore its significance and encourage further research. Interest and innovations in agritourism highlight its importance, spurring further research.

Researchers have varying definitions of agritourism (Barbieri et al., 2019). Some define it as any farm practice aimed at attracting tourists (Barbieri and Mshenga, 2008), while others see it as a specific type of rural tourism that integrates nature, rural culture, and local lifestyles (McGehee et al., 2007). Agritourism is also described in some studies as a rural enterprise combining a working farm with commercial tourism elements (Santeramo and Barbieri, 2017). Additionally, some scholars argue that rural tourism and agritourism are synonymous (Karabati et al., 2009; Tew and Barbieri, 2012; Santeramo and Barbieri, 2017), whereas others contend that agritourism is a subset of rural tourism activities (Clarke, 1999; Nilsson, 2002; Sonnino, 2004). Currently, there is a lack of consensus on the definition and scope of agritourism; in this study, we define agritourism as a business model linking agricultural production or processing with tourism to attract visitors to farms or ranches while generating income for these enterprises.

The study of agritourism has obtained increasing popularity. The development of agritourism began in the 19th century, when urban dwellers sought to escape to the countryside in pursuit of natural tranquillity (Kohl, 2006). It was not until the 1950s that agritourism emerged as a commercial practice, facilitated by advancements in railway and communication systems (Lane, 1994a,b). Academic research on agritourism was formally initiated in the 1980s as developed nations began to support rural tourism initiatives to revitalize rural economies (Lane and Kastenholz, 2018). During this period, scholars concentrated on strategies for diversifying farm incomes to stimulate rural development and enhance benefits for farmers (Ilbery, 1991; From, 1998; Saxena and Ilbery, 2008; Wang et al., 2022). As we progress into the 21st century, there is an increasing focus on sustainable development within agritourism—particularly concerning marginalized areas in developing countries (Wang et al., 2022). Consequently, researchers have become more attuned to examining tourists' preferences and motivations for demand while emphasizing ecological protection and cultural heritage.

The current research on agritourism is notably diverse. From an economic perspective, numerous studies have focused on the economic benefits associated with agritourism. Research indicates that agritourism significantly enhances income diversification for farmers, particularly in remote areas facing developmental constraints (Yang, 2012). For instance, the economic advantages of agritourism can be disseminated across a wide array of activities, including local restaurants and handicraft production. Furthermore, ensuring that tourists experience positive agritourism can foster a 'virtuous' cycle within the local economy. Increased revenues generated from agritourism may facilitate improvements in rural infrastructure, which enhances residents' quality of life and increases the likelihood of repeat visits by tourists (Besculides et al., 2002). However, not all economic benefits of agritourism are sustainable (Smith and Jenner, 1989; Besculides et al., 2002; Barbieri, 2020). Unscientific practices in agritourism may fail to alleviate poverty and exacerbate inequalities at the community level (Barbieri, 2020). Overcommercialising agritourism often results in increased congestion, waste accumulation, rising prices for local goods, and elevated living costs—factors that can further aggravate existing economic challenges within communities. The issues stemming from unscientific approaches to agritourism may arise due to insufficient financial resources (Campbell and Kubickova, 2020), lack of innovation within agricultural businesses (Palmi and Lezzi, 2020), or irrational allocation of funds designated for developing agritourism initiatives (Joyner et al., 2018). Consequently, ensuring the economic sustainability of agritourism emerges as a critical area for future research endeavours.

From an environmental perspective, agritourism is controversial. Some scholars argue its popularity pressures the ecological environment, leading to land loss, biodiversity decline, water pollution, and increased carbon emissions (Geng et al., 2021, 2022a). Conversely, others believe a high-quality ecological landscape enhances agritourism's competitiveness and boosts tourist satisfaction (Malkanthi and Routray, 2012; Van Trung and Mohanty, 2021). Additionally, some researchers propose that a sustainable tourism model can facilitate resource reuse (Geng et al., 2020a,b). For instance, unsold food from traditional channels in agritourism can be processed for sale to tourists (e.g., fruits made into jam), stimulating resource recycling and environmental governance. Overall, sustainable agritourism remains a significant topic of interest as scholars continue to explore ways to harmonize environmental conservation with agritourism development.

From a social perspective, current research on agritourism emphasizes two main components: education and feminism. Agritourism offers tourists experiences that connect them to nature, rural life, and local culture, serving an educational purpose (Geng et al., 2023b). On the feminist side, women play a crucial role in agritourism development. Scholars have noted that agritourism promotes women's rights and independence from psychological, sociological, and political viewpoints (Addinsall et al., 2017; Campbell and Kubickova, 2020). Surveys indicate that most agritourism initiatives are initiated by women (Barbieri and Mshenga, 2008), and the sector also creates additional job opportunities for rural women (Kizos and Iosifides, 2007). Consequently, agritourism has enhanced women's self-confidence, rights, and economic status.

Current studies on agritourism have notable shortcomings. Current research primarily examines the relationship between agritourism and sustainable development but often overlooks insights from other disciplines (Ammirato et al., 2020). Consequently, there is a lack of comprehensive and interdisciplinary literature reviews on agritourism and insufficient visualized clustering and analysis of dynamic trends in related topics. This paper addresses these gaps by analysing agritourism literature from 2003 to 2023 using bibliometric visualization software CiteSpace.

Bibliometric analysis quantitatively examines knowledge domains using principles from information science, statistics, and mathematics. It combines these fields to create a system focused on quantification (Gao et al., 2024). Visual bibliometric analysis presents key information through figures, making essential insights easier for readers to grasp intuitively. This method systematically collects and analyses scientific literature quantitatively, transforming findings into visual elements that display multi-dimensional data on trends, knowledge structures, collaboration networks, and influence distribution in research (Geng et al., 2024a). Specifically, this study gathers the database's agritourism research data from 2003 to 2023. Using bibliometric visualization software CiteSpace, we conduct statistical analyses (including collaboration, co-citation, and co-occurrence analysis) and convert key results into images. This approach aims to visually explore correlations and patterns in the data while revealing development dynamics, research hotspots, and potential trends in agritourism research.

The contributions of this paper are (1) to offer a comprehensive overview of agritourism research from various perspectives, equipping scholars with key literature, dynamic visualizations, and insights; (2) to develop a knowledge framework for agritourism that provides a clearer understanding of the field and facilitates access to essential information; (3) to identify research hotspots and potential features, enabling scholars to pursue further research with more effective techniques and tools.

Materials and methods

Data sources and selection processes

The Web of Science Core Collection (WoS), a leading scholarly publishing database, covers various specialized subjects and ensures comprehensive and diverse data. It served as the data source for this study, specifically utilizing the Science Citation Index Expanded (SCIE) and the Social Sciences Citation Index (SSCI) to enhance reliability and authority. Specific search criteria were applied to target agritourism research and minimize errors. A "*" at the end of a word indicates that all variations of that stem were included in the search. For instance, "agricultur*" encompasses both "agriculture" and "agricultural," while "tour*" includes "tourism," "tour," "tourist," and "tourists."

(1) Title = [("agricultur*") OR ("rural*") OR ("farm*")] AND Title = [("tour*") OR ("travel*")] OR Title = ("ag*tour*").

(2) Language = "English".

(3) Period = "2003-2023" (from 2003-01-01 to 2023-06-25).

(4) Document type = "Article" or "Review".

A total of 1481 publications were screened. This study rechecked the data to remove duplicates, irrelevant articles, and retraction papers for improved accuracy and relevance. Ultimately, 1377 publications were selected.

Analysis methods selection

There are various visualization tools for literature analysis, each with its limitations. NetDraw lacks data processing capabilities; Ucinet does not dynamically present the clustering process, and VOSviewer is unsuitable for large datasets. Despite CiteSpace's tendency to lag when handling extensive data, it compensates for the shortcomings of other software (Geng et al., 2022b, 2023c; Geng and Maimaituerxun, 2022). Thus, CiteSpace is chosen for this study's bibliometric analysis. CiteSpace is a popular tool for literature mining and information visualization; its strength lies in its ability to deeply explore the correlations among article data and illustrate knowledge structures. Researchers can observe developments and trends in the knowledge field through CiteSpace's comprehensive and dynamic visualizations (Geng et al., 2024a,d).

Procedures

This study's analysis consists of five steps: (1) Analyse the statistical characteristics of agritourism publications from 2003 to 2023, providing insights into its development and popularity. (2) Evaluate researchers' collaborative relationships through collaboration network analysis. (3) Use co-citation network analysis to assess the current state of agritourism research. (4) Highlight the progress and potential research trends by analysing co-occurrences. (5) Summarize findings, develop a knowledge framework, and suggest future research directions, as illustrated in *Figure 1*.

Results

Publication statistical analysis

Number of publications by years

The distribution of articles published on agritourism each year aids scholars in understanding the field's development history. *Figure 2* illustrates the number of papers

and trends in agritourism from 2003 to 2023. Overall, the last 20 years (2003-2022) show a fluctuating upward trend in publications. Key findings include: (1) The number of papers published in 2022 was 30 times that of 2003, indicating significant growth in agritourism research. This boom may be attributed to increased Internet access and the rise of online journals; thus, rapid growth could result from heightened scientific interest and more open-access journals publishing annually. While this trend is found across various scientific fields, the growth within agritourism is particularly remarkable. (2) The cumulative total of papers published between 2018 and 2022 reached 775, accounting for 56% of all publications over the observed period (due to incomplete data, 2023 has been excluded from calculations for objectivity). Recent years (2018-2022) demonstrate a consistent increase in publications, highlighting growing academic attention towards agritourism research. Additionally, fewer publications in 2023 were linked to a June cut-off date for data collection; nonetheless, this still indicates rising popularity in agritourism studies.

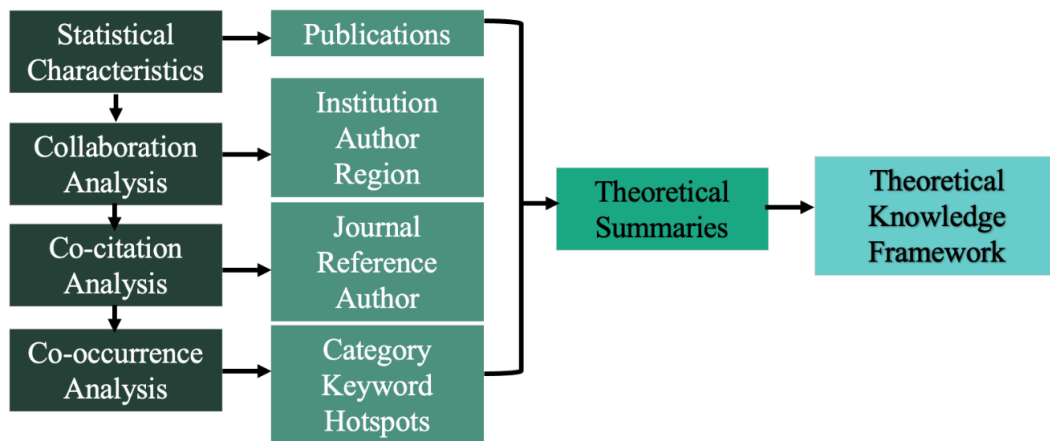


Figure 1. Research steps

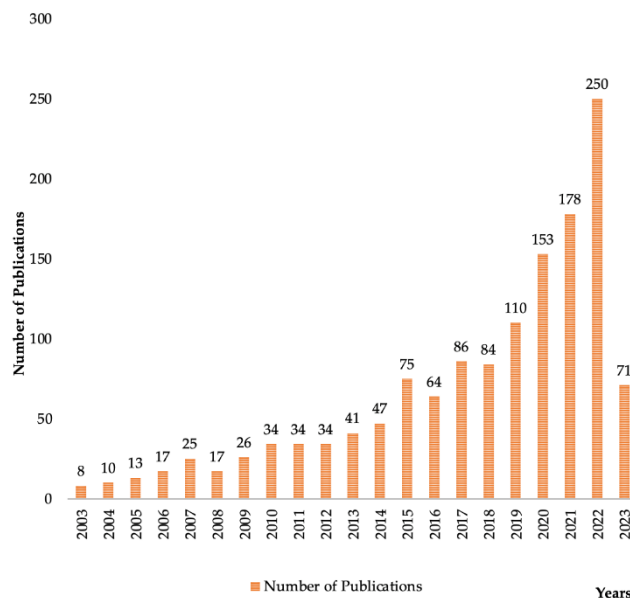


Figure 2. Number of publications by years

Number of publications by journals

The statistics of journals aim to assist scholars in understanding which journals welcome publishing agritourism research. Data from the WoS database indicate that between 2003 and 2023, agritourism research appeared in 435 journals. *Table 1* lists the top ten journals in this field. Three key findings emerged: (1) Most high-publication journals focus on tourism and rural development. The leading journals include Sustainability, Tourism Management, Journal of Sustainable Tourism, Current Issues in Tourism, and Journal of Rural Studies (15.08%, 4.07%, 3.56%, 2.42%, and 2.04% respectively). Notably, several prolific journals were established around the late 2000s to early 2010s; for instance, Sustainability was founded in 2009 and was recognized as a "mega" journal, publishing over ten thousand papers annually recently. It correlates with *Figure 2* and reinforces that those new mega journals have significantly contributed to the growth of agritourism research over the past decade. (2) Agritourism articles are primarily published in influential but not predominantly high-ranking journals; the top ten accounted for only 35.62% of total publications—7 being Q1 and 3 Q2. (3) There are fewer publications in top-tier journals overall; while Sustainability led with a notable count (237), it remains a Q2 journal. Additionally, some listed as predatory by Norway's scientific journal list (including Sustainability) highlight that agritourism research should strive for publication in more reputable journals. Thus, we encourage scholars to enhance their research quality and target influential journals for publication.

Table 1. Number of publications by journals

Ranking	Journals	Frequency	Percentage	Quartile in Category
1	Sustainability	237	15.08%	Q2
2	Tourism Management	64	4.07%	Q1
3	Journal of Sustainable Tourism	56	3.56%	Q1
4	Current Issues in Tourism	38	2.42%	Q1
5	Journal of Rural Studies	32	2.04%	Q1
6	Land	32	2.04%	Q2
7	Asia Pacific Journal of Tourism Research	30	1.91%	Q1
8	International Journal of Tourism Research	26	1.65%	Q2
9	Agriculture-Basel	23	1.46%	Q1
10	Journal of Travel Research	22	1.40%	Q1

Number of publications by categories

The statistics on journal categories help scholars understand the primary discipline of agritourism research. *Table 2* presents the top 10 journal categories in this field. (1) The environmental field dominates, with a combined share of Environmental Sciences (25.25%) and Environmental Studies (24.87%) reaching 50.12%. According to the WoS classification, these are distinct disciplines: Environmental Sciences scientifically focuses on the natural environment, while Environmental Studies examines human or social environments through cultural interactions. (2) Agritourism research spans multiple subjects, including Management (144 occurrences, 9.16%), Geography (106 occurrences, 6.74%), Economics (95 occurrences, 6.04%), and Sociology (67 occurrences, 4.26%). It indicates that agritourism studies are diverse in scope; thus, we encourage scholars to pursue multidisciplinary and comprehensive research based on their interests and directions.

Table 2. Number of publications by categories

Ranking	Categories	Frequency	Percentage
1	Hospitality Leisure Sport Tourism	444	28.24%
2	Environmental Sciences	397	25.25%
3	Environmental Studies	391	24.87%
4	Green Sustainable Science Technology	317	20.17%
5	Management	144	9.16%
6	Geography	106	6.74%
7	Economics	95	6.04%
8	Public Environmental Occupational Health	74	4.71%
9	Sociology	67	4.26%
10	Regional Urban Planning	62	3.94%

Collaboration analysis

Collaboration analysis shows the correlation among participants, highlighting active stakeholders. The “Year” in this section’s tables indicates the starting year of collaboration for stakeholders (e.g., author, region, institution).

Author collaboration network

The global collaborations among authors are in *Table 3*. Statistical results indicate that only two out of 306 authors have ten collaborations. Key findings include: (1) The most frequent collaborator is Carla Barbieri (North Carolina State University, the United States), followed by Elisabeth Kastenzholz (University of Aveiro, Portugal). Carla Barbieri's research primarily focuses on defining agritourism and assessing its sustainability from various stakeholders’ perspectives (Barbieri and Mshenga, 2008; Barbieri and Mahoney, 2009; Tew and Barbieri, 2012; Arroyo et al., 2013), highlighting a lack of common understanding that diminishes consumer appeal and hinders stakeholder cooperation (Arroyo et al., 2013).

Table 3. Author collaboration

Rank	Author	Institution	Region	Frequency	Year
1	Carla Barbieri	North Carolina State University	United States (USA)	11	2008
2	Elisabeth Kastenzholz	University of Aveiro	Portugal	10	2015
3	Tiberiu Iancu	West University of Timisoara	Romania	9	2019
4	Geoffrey Wall	University of Waterloo	Canada	9	2015
5	Maria Joao Carneiro	University of Aveiro	Portugal	8	2015
6	Ramona Ciolac	Life Science University “King Mihai I” from Timisoara	Romania	8	2019
7	Gabriela Popescu	USAMVB Timisoara	Romania	7	2019
8	Tabita Adamov	USAMVB Timisoara	Romania	7	2019
9	Ana Isabel Polo Pena	University of Granada	Spain	6	2010
10	Michal Roman	University of Warsaw	Poland	6	2020

Elisabeth Kastenholtz has co-authored eight articles, mainly exploring how consumers develop emotional connections like place attachment during rural tourism experiences in the Portuguese countryside (Loureiro and Kastenholtz, 2011; Kastenholtz et al., 2012; Sidali et al., 2015; Lane and Kastenholtz, 2018). (2) The early bird may not be the most active participant. For instance, Anna Isabel Polo Pena (University of Granada, Spain), who began collaborating in 2010, has only a collaboration frequency of 6, ranking 9th. This author's collaborative research focuses on agritourism marketing (Polo Peña and Frías Jamilena, 2011; Polo Peña et al., 2011; Peña et al., 2012a,b). One notable study examines the connections between tourists' motivations, perceived values, and rural tourism services (Peña et al., 2012a). We encourage scholars in this field to work diligently to offset the disadvantages of starting late. Furthermore, it is noteworthy that the first two collaborative authors had a centrality of 0, indicating they need more active and broad collaborations globally. That also applies to other highly collaborative authors, suggesting that they need to enhance their cooperation to advance agritourism research.

Figure 3 visualizes the authors' collaborative network, comprising 306 nodes and 207 links. It indicates academics are more connected within their groups, with limited external team collaboration. Details are as follows. (1) Different collaboration teams focus on distinct research interests. For instance, Tiberiu Iancu's team (West University of Timisoara, Romania) studies sustainable rural tourism by integrating local resources and products to boost the rural economy (Pirvulescu et al., 2017; Ciolac et al., 2020, 2021; Adamov et al., 2020), primarily in Romania's mountainous regions (Pirvulescu et al., 2017; Călina et al., 2017; Adamov et al., 2020; Ciolac et al., 2019, 2021). Ana Isabel Polo Pena's team (University of Granada, Spain) investigates rural tourism performances and marketing strategies in Spanish villages (Peña and Jamilena, 2010; Polo and Frías, 2010; Peña et al., 2012a). Wei Wei's team (University of Central Florida, the United States) focuses on enhancing the destination image of rural tourist attractions in China to improve visitor experience and satisfaction (Ye et al., 2021; Cao et al., 2022; Zheng et al., 2022). Consequently, there are various research topics in this field. (2) Agritourism has been studied mainly in isolation with minimal communication among different groups. As shown in Figure 3, few apparent connections exist between groups, which hinders future collaboration and progress in this field. Increasing collaboration is essential among individual authors and across research teams to enhance novelty, diversity, and validity within agritourism research.



Figure 3. Author collaboration network

Region collaboration network

The significance of regional collaboration network analysis lies in examining current interactions among various regions in agritourism research. *Table 4* presents the top 10 regions or countries with strong collaborations in this field. Our findings reveal that: (1) Collaboration shows spatial variations, predominantly concentrated in Europe, which accounts for half of the top regions (5/10). The Americas and Asia each represent 2 out of 10, while Oceania has 1. Notably, Africa is absent from the collaboration network. Additionally, developed regions comprise 70 percent of these collaborations, indicating disparities in agritourism research between developed and developing areas. (2) China and the United States of America (USA) are at the forefront of regional collaboration. China leads with 330 collaborative publications and centrality of 0.42, reflecting significant investment in agriculture and agritourism research over the past decade, resulting in stronger partnerships and academic influence. The USA follows closely with a centrality of 0.39, having initiated studies that established its leading role in research output and influence within this field. (3) Some regions actively collaborate, but their global influences are limited. For example, Spain ranks third with a centrality of only 0.08, indicating that while it seeks collaboration opportunities, its broad impact is relatively small. The same applies to Taiwan China (frequency 40, centrality 0.02), Italy (frequency 51, centrality 0.19), Canada (frequency 29, centrality 0.09), and Norway (frequency 28, centrality 0.06). In other words, popularity does not equate to authority.

Table 4. Region collaboration

Rank	Region	Frequency	Centrality	Years
1	Peoples R China	330	0.42	2004
2	USA	212	0.39	2003
3	Spain	68	0.08	2003
4	England, UK	60	0.24	2003
5	Italy	51	0.19	2006
6	Taiwan, China	40	0.02	2006
7	Romania	32	0.03	2006
8	Australia	31	0.17	2003
9	Canada	29	0.09	2003
10	Norway	28	0.06	2003

Cluster analysis categorizes nodes based on similar characteristics, aiding in identifying key research directions and collaborative networks across different regions. *Figure 4* illustrates the clustered view of regional collaboration, highlighting diverse research preferences and relationship networks. The top 6 clusters are labeled: #0 transport disadvantage, #1 coordinated development, #2 sensory experiences, #3 Dobrogea (also known as Dobrudja, a place in south-eastern Romania), #4 outcomes, and #5 nature conservation. Several major findings emerge: (1) There is significant cooperation between England (the UK) and the USA regarding transport disadvantages. Although no specific studies focus solely on transport issues in agritourism, many collaborations reference it as a factor. For instance, research indicates that rural tourism can enhance economic viability in marginalized areas by attracting tourists to undeveloped natural sites; however, transportation challenges hinder this potential (Briedenhann and Wickens, 2004). Interviews with British tourists visiting the Lake

District also highlighted transport problems in remote areas (Sharpley and Jepson, 2011). That underscores that while transport issues are a prominent trend in agritourism, research remains limited. We encourage future researchers to collaborate regionally to address these transportation concerns specifically. (2) #1 coordinated development and #5 nature conservation share similarities, focusing on agritourism and environmental sustainability, yet they differ. In China, collaborative studies emphasize promoting rural tourism through ecological conservation to boost the rural economy and alleviate poverty (Ying and Zhou, 2007; Su, 2011; Gao and Wu, 2017). Conversely, Malaysia and Indonesia explore how natural environment conservation relates to cultural heritage and its positive impact on tourists' emotional attachment (Su, 2011; Rasoolimanesh et al., 2017b; Pujiastuti et al., 2017). (3) Collaborative studies between Portugal and Italy are prominent in the "sensory experiences" cluster. For instance, pleasant emotions can mediate tourism behavioural intentions among rural holidaymakers in southern Portugal (Loureiro, 2014), while image is identified as a key factor influencing the perceived quality of rural tourism in border regions of Spain and Portugal (Loureiro and González, 2008). In conclusion, different regions prioritize distinct cooperation topics. We encourage researchers to seek regional partners for effective collaboration while broadening their research scope beyond single topics or partners.

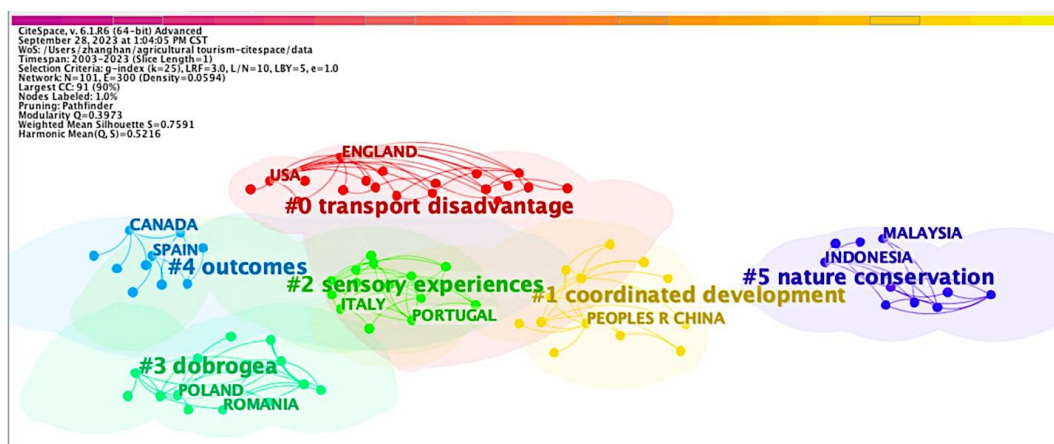


Figure 4. Region collaboration network

Institution collaboration network

The institutional collaboration network illustrates the cooperative relationships among institutions in agritourism research, highlighting this field's most active collaborative research entities. Table 5 lists the top 10 collaborative institutions in agritourism. Key findings include: (1) The top 10 institutions are primarily from China (4) and Spain (2). These regions exhibit different emphases; Chinese institutions focus more on agriculture, while Spanish institutions prioritize tourism. This difference stems from their distinct approaches to agritourism: China views it as a means for rural revitalization, whereas Spain considers it a niche within the broader tourism market (San Martín and Herrero, 2012; Lane and Kastenholz, 2018; Geng et al., 2023b). (2) The Chinese Academy of Sciences stands out for its collaboration efforts. It led to collaborative studies and initiated cooperation as early as 2004. Furthermore, it has a higher centrality (0.01), indicating stronger influential external collaborations than other institutions (Geng et al., 2023c,

2024b). That suggests that the Chinese Academy of Sciences significantly contributes to agritourism research, particularly regarding its relationship with rural revitalization, rural enterprise growth, and urban-rural dynamics (Feng, 2021; Lun et al., 2021; Yang et al., 2022; Wang et al., 2023). (3) Other institutions collaborate on various topics, but their low centralities indicate limited impacts on this field’s collaboration. For example, the University of Extremadura published 23 articles from 2003 to 2023, focusing on tourist behaviour and preferences in agritourism—particularly tourist satisfaction, loyalty, and repeat visit behaviour between 2021 and 2023 (Sánchez-Oro Sánchez et al., 2021; Sánchez-Martín et al., 2022; Ruiz-Labrador et al., 2023). Additionally, institutions like the University of Aveiro, Sun-Yat Sen University, the University of Johannesburg, and Sichuan University have fewer collaborative publications with minimal impact (fewer than 11 papers since 2008 with a centrality of zero). Specifically, the most cited study from Sichuan University examined risk perception’s effect on agritourism during COVID-19 (Zhu and Deng, 2020), while the University of Aveiro focused on factors influencing agritourism’s visitor loyalty (Loureiro and González, 2008). To enhance agritourism research, we strongly encourage global institutions to improve communication and collaboration with external parties during their research efforts to increase collaborative impacts gradually.

Table 5. *Institution collaboration*

Rank	Institutions	Region	Frequency	Centrality	Year
1	Chinese Academy of Sciences	Mainland China	25	0.01	2004
2	University of Extremadura	Spain	23	0	2008
3	University of Aveiro	Portugal	11	0	2008
4	Sun Yat-Sen University	Mainland China	11	0	2019
5	University of Johannesburg	South Africa	10	0	2014
6	Sichuan University	Mainland China	10	0	2017
7	University of Granada	Spain	9	0	2012
8	Alexandru Ioan Cuza University	Romania	8	0	2017
9	Centre for Rural Research	Norway	8	0	2005
10	Natl Kaohsiung University Hospitality & Tourism	Taiwan China	7	0	2017

Figure 5 visualizes the collaborative networks of institutions in agritourism research. While there are some collaborations among global institutions, many prefer to operate independently. Notable collaboration groups include: (1) The first group is led by the Chinese Academy of Sciences, which has the most collaborations but primarily engages with domestic institutions (in China) like Sichuan University and Beijing Union University. This group focuses on utilizing rural resources and preserving cultural heritage to enhance local agritourism (Zhu and Deng, 2020; Gao and Cheng, 2020; Li et al., 2021; Zhou and Chen, 2023). (2) The second group is led by the University of Extremadura, which conducted 23 collaborative studies from 2003 to 2023. One notable study from 2008 obtained 177 citations for its insights into tourist satisfaction in agritourism (Loureiro and González, 2008). (3) Sun Yat-Sen University represents a significant institution in China, with eleven collaborative studies between 2003 and 2023. However, as shown in *Figure 5*, it exhibits less collaboration overall. Its research focuses on case studies in rural China regarding culinary heritage and urban-rural growth through agritourism (Zheng et al., 2019; Guan et al., 2019; Zhang et al., 2021). That highlights a broader need for increased cooperation among institutions.



Figure 5. *Institutions collaboration network*

Co-citation Analysis

Co-citation analysis illustrates the current state of this research field, emphasizing key stakeholders. The "Year" in the tables indicates the initial year stakeholders (e.g., references, journals, authors) were co-cited.

Reference co-citation network

The reference co-citation reveals key research findings and the status of a field. Co-cited literature is typically classic, authoritative, and widely discussed among peers. *Table 6* presents the top ten most co-cited works in agritourism, leading to several insights. (1) Highly co-cited papers are often published in prestigious journals; nearly half (4/10) appeared in *Tourism Management*, a globally recognized tourism journal. These studies primarily focus on agritourism management, sustainable agritourism, and rural development—examining topics such as sustainable livelihoods in rural tourist destinations and how rural tourism can aid village economic revitalization (Gao and Wu, 2017; Su et al., 2019). That indicates that enhancing sustainability in rural tourist destinations is a prominent theme within agritourism. (2) The most co-cited literature does not always have the most significant impact. For instance, Su’s 2019 study (Su is from Renmin University of China, China) in *Tourism Management* was co-cited 48 times but had a low centrality of 0.03. In contrast, Tew’s 2012 paper (Tew is from the University of Missouri, the USA) had only 32 co-citations yet achieved a higher centrality of 0.26. That indicates that co-citation counts do not necessarily correlate with influence; more profound research can enhance a paper’s impact. Specifically, these studies address different aspects: Su reconstructs the sustainable livelihoods framework to analyze rural tourism’s effects on communities in Anhui Province (Su et al., 2019), while Tew explores agritourism benefits and its four dimensions (Tew and Barbieri, 2012). (3) Earlier co-cited studies may have greater centrality, whereas those published in the last five years show relatively lower centrality; thus, “publication year” is crucial when discussing reference influences. For example, Tew’s early work from 2012 has a high centrality (0.26) despite fewer co-citations compared to recent studies like Su’s paper from Renmin

University of China published in 2019, which has 0.03 centrality. That suggests foundational literature may remain influential even with fewer co-citations, while newer publications might reflect emerging trends but lack significant influence due to limited exposure time.

Table 6. Reference co-citation

Rank	Co-cited References	Counts	Centrality	Years
1	Su MM, <i>Tourism Manage</i> , V71, P272	48	0.03	2019
2	Gao J, <i>Tourism Manage</i> , V63, P223	43	0.04	2017
3	Tew C, <i>Tourism Manage</i> , V33, P215	32	0.26	2012
4	Lane B, <i>J Sustain Tour</i> , V23, P1133	29	0.02	2015
5	Ciolac R, <i>Sustainability Basel</i> , V11, P0	28	0.03	2019
6	Lupi C, <i>Land Use Policy</i> , V64, P383	28	0.05	2017
7	Rosalina PD, <i>J Hosp Tour Manage</i> , V47, P134	26	0.01	2021
8	Flanigan S, <i>Tourism Manage</i> , V40, P394	25	0.03	2014
9	Muresan IC, <i>Sustainability Basel</i> , V8, P0	24	0.02	2016
10	Liu CY, <i>J Rural Stud</i> , V79, P177	24	0.00	2020

Note: Co-citation counts of references may be affected by publication years; earlier literature tends to receive more co-citations over time

The reference co-citation clustering network is significant for illustrating the research themes of co-cited references. *Figure 6* presents a clustered view of this network, featuring 903 nodes and 3193 links. The first six clusters are: #0 agritourism, #1 local community, #2 farm tourism, #3 social innovation, #4 destination marketing, and #5 governance. Each category contains rich nodes with some interconnections between clusters. Several key conclusions are: (1) Some research has focused on the future development priorities and challenges of rural tourism. Cluster #0 highlights that some co-cited study discusses how rural governments can enhance rural tourism to foster economic growth (Liu et al., 2020). Additionally, studies in this cluster indicate that both developed and developing countries face significant challenges in rural tourism due to internal resource issues (Rosalina et al., 2021). That underscores the scholarly focus on improving agritourism efficiency and planning for future resources. (2) Early research on agritourism focused on managing community residents. Cluster #5 governance indicates that early research examined the characteristics of community residents in agritourism areas (Kizos and Iosifides, 2007); the studies citing this literature were mainly published before 2017. That suggests that research in this area is outdated, and scholars should explore more relevant topics. (3) The sustainability of agritourism destinations has recently gained popularity. A key co-cited discussion in #4 destination marketing involves using a sustainable livelihoods framework to analyse the relationship between tourism and rural livelihoods in Hetu Township, China (Su et al., 2019). Future researchers are encouraged to investigate agritourism from a sustainable development perspective.

Journal co-citation network

The significance of analysing co-cited journals lies in understanding influential journals in agritourism and rationalizing the current research landscape. *Table 7* presents the top ten most co-cited journals, characterized by the following features: (1) The most

co-cited journals are not necessarily the most influential. Tourism Management has 899 co-citations since 2003 but a centrality of only 0.04, while the International Journal of Tourism Research has just 204 co-citations yet a higher centrality of 0.08 (0.08). That suggests no direct correlation between co-citation frequency and impact on agritourism research. (2) The earliest co-citations for these journals occurred from 2003 to 2006 and again from 2014 to 2017, with a notable increase in impact factors during the former period. That indicates that scholars began focusing on agritourism's development between these years, establishing a foundation for future research. Key topics included perceptions of agritourism (Ciolac et al., 2019), future development plans (Rasoolimanesh et al., 2017a), consumers' willingness to buy (San Martín and Herrero, 2012), and travel intentions (Park and Yoon, 2009). (3) The overall impact of these journals is low, particularly from 2014 to 2017; some have a centrality as low as zero despite being co-cited frequently. Thus, journals should enhance their impact and prioritize more research-intensive articles for publication.

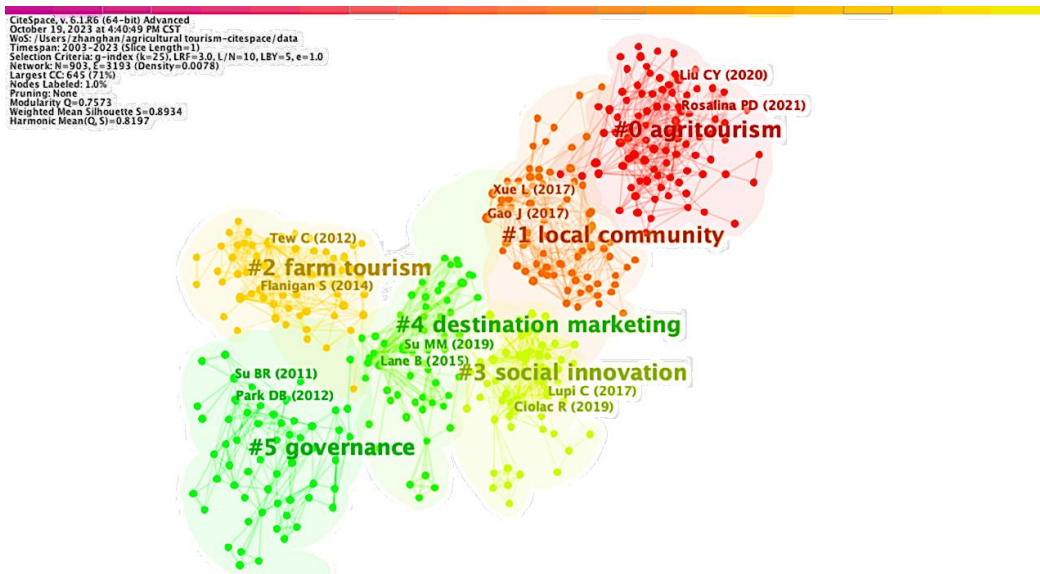


Figure 6. Reference co-citation network

Table 7. Journal co-citation

Rank	Co-cited Journals	Frequency	Centrality	Years	Quartile in Category
1	Tourism Management	899	0.04	2003	Q1
2	Annals of Tourism Research	771	0.06	2003	Q1
3	Journal of Rural Studies	440	0.02	2003	Q1
4	Sustainability	433	0.00	2016	Q2
5	Journal of Sustainable Tourism	388	0.02	2004	Q1
6	Journal of Travel Research	385	0.03	2005	Q1
7	Sociologia Ruralis	237	0.03	2004	Q
8	International Journal of Tourism Research	204	0.08	2006	Q2
9	Journal of Hospitality and Tourism Management	183	0.00	2014	Q
10	Journal of Destination Marketing & Management	176	0.03	2017	Q1

The journal co-citation clusters provide insight into the topics these journals cover. *Figure 7* illustrates the clustering view of the journal co-citation network, featuring 873 nodes and 1558 links. The top six clusters are #0 rural tourism, #1 conservation intentions, #2 rural idyllic, #3 place attachment, #4 planned behaviour, and #5 multi-group analysis. The co-citation journals address diverse topics, which are summarized as follows: (1) Cluster #0 rural tourism is a key focus in agritourism. Prominent nodes include the Journal of Sustainable Tourism and Tourism Geographies, which emphasize perceived benefits and perceptions of rural tourism to guide its future development for revitalization (Tew and Barbieri, 2012; Rasoolimanesh et al., 2017a; Gao and Wu, 2017; Lane and Kastenholz, 2018). (2) The research focus of cluster #1 conservation intentions leans towards ecological aspects. The journal Landscape and Urban Planning indicates that much literature on agritourism examines ecological environments as a perspective. Despite varying themes, their common goal is enhancing sustainability in agritourism and ecosystems (Yang et al., 2010; Westerberg et al., 2013; Cuadrado-Ciuraneta et al., 2017; Carneiro et al., 2018). For instance, landscapes significantly influence tourists' experiences—especially vegetation types—suggesting that integrating tourism with landscape management is a promising trend (Carneiro et al., 2018). Additionally, developing agritourism in peri-urban areas can mitigate environmental pollution from urbanization while promoting sustainable urban-rural integration (Yang et al., 2010). (3) The #2 rural idyllic, #3 place attachment, and #4 planned behaviour clusters primarily focus on tourists' perspectives. The most co-cited study in Tourism Management (cluster #2) analysed Korean tourists' motivations for rural tourism to revitalize local economies and communities (Park and Yoon, 2009). Additionally, a questionnaire survey examined motivations for rural activities in Gambia to support rural tourism and mitigate local economic loss (Rid et al., 2014). In the Journal of Travel & Tourism Marketing (cluster #3), a highly co-cited study explored how positive memories from rural tourism enhance place attachment and travel intentions (Loureiro, 2014). These clusters indicate that co-cited journals in agritourism encompass various topics across disciplines such as tourism, economics, management, marketing, and ecological conservation.

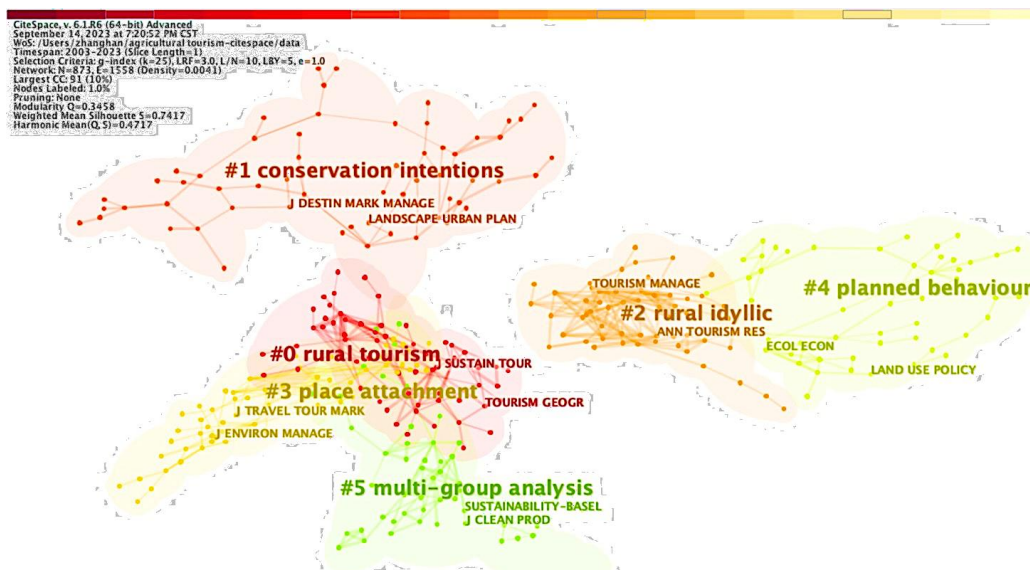


Figure 7. Journal co-citation network

Author co-citation network

The co-citation of authors identifies key contributors in agritourism research. *Table 8* lists the ten most co-cited authors, leading to the following conclusions: (1) Sharpley R (University of Central Lancashire, the United Kingdom) has the highest co-citation count (188), but a low centrality of 0.04, indicating that while this author's work is frequently co-cited, it has limited impact. This author's most influential study focuses on 'agrotourism' development in Cyprus, highlighting challenges such as high costs, low returns, weak demand, and skill shortages. This author recommends long-term financial and technical support for agritourism development (Sharpley, 2002). Following Sharpley are Lane B, Tew C, Park DB, Phillip S, and Saxena G—all with centrality below 0.05—suggesting they should explore more impactful research topics. (2) Busby G (Plymouth University, the United Kingdom) has only 89 co-citations but a significant impact score of 0.26. That indicates that co-cited counts may not directly correlate with authors' impacts; in contrast, the author was co-cited relatively early (2005), suggesting that this author's higher influence may be due to the "year of initial publication" effect. Busby's research covers farm tourism definitions, history (Busby and Rendle, 2000), and agritourism's economic effects (Barbieri and Tew, 2016). (3) In 2005, four of the ten authors published highly co-cited articles on agritourism, indicating that they gained significant academic attention and success that year. Their research established a solid foundation, with Busby G's contributions having the most impact. Additionally, three co-cited authors since 2005 have the highest co-citation frequencies (ranking 1st, 2nd, and 4th), suggesting that publication year should be considered as a contextual factor in reference counting; time accumulation may enhance popularity.

Table 8. Author co-citation

Rank	Co-cited Authors	Institution	Region	Frequency	Centrality	Years
1	Sharpley R	University of Central Lancashire	England, UK	188	0.04	2005
2	Lane B	James Cook Univeristy	Singapore	162	0.02	2005
3	Barbieri C	North Carolina State University	United States	135	0.1	2010
4	Fleisher A	Rice University	United States	128	0.08	2005
5	Mcgehee N. G	Virginia Tech	United States	122	0.09	2008
6	Tew C	University of Missouri	United States	106	0.03	2013
7	Park DB	Kongju National University	South Korea	94	0.03	2011
8	Phillip S	University of Aberdeen	England, UK	93	0.04	2013
9	Busby G	Plymouth University	England, UK	89	0.26	2005
10	Saxena G	University of Hull	England, UK	87	0.02	2007

Note: Co-citation counts of authors may be affected by publication years; earlier authors tend to receive more co-citations over time

Figure 8 illustrates the authors' co-citation clusters, comprising 828 nodes and 1578 links, highlighting key agritourism topics. The seven main clusters are: #0 rural tourism, #1 rural-based resources, #2 place attachment, #3 sustainable development, #4 heritage tourism, #5 grouping analysis, and #6 multi-group analysis. The main findings include:

(1) Clusters #0 rural tourism, #1 rural-based resources, and #3 sustainable development share similar research themes. For instance, Gursoy D (Washington State University, the USA) is a prominent figure in the #0 cluster and is frequently co-cited regarding residents' perceptions of agritourism (Látková and Vogt, 2012; Rasoolimanesh et al., 2017a). This author's influential study analysed factors affecting tourism through residents' attitudes toward ecology and infrastructure (Gursoy et al., 2002). Tew C (University of Missouri, the USA), representing the #1 cluster on rural-based resources, conducted a widely co-cited study comparing stakeholder perceptions in agritourism (Arroyo et al., 2013), revealing that stakeholders did not consider providing activity venues for agritourism outside an agricultural context. In #3 sustainable development, there is substantial information regarding rural residents' and stakeholders' perceptions of future agritourism development. Evidence suggests that residents' attitudes towards agritourism are unlikely to turn negative despite its rapid growth (Wang and Pfister, 2008; Byrd et al., 2009; Phillip et al., 2010; Látková and Vogt, 2012). That indicates that exploring perceptions of agritourism varies across different study perspectives, making it a significant topic in sustainable agricultural development research. Therefore, scholars should conduct in-depth studies on this subject from various angles or disciplines.

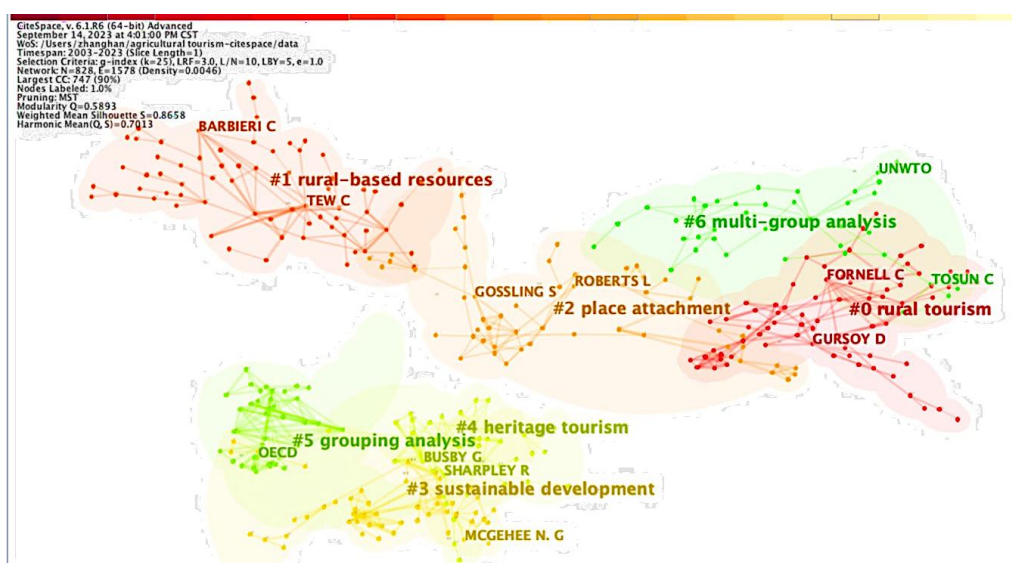


Figure 8. Author co-citation network

(2) A significant trend is emerging to study agritourism from a management perspective. The #4 heritage tourism cluster focuses on the beneficiaries of agritourism and the factors influencing its performance (LaPan and Barbieri, 2014; Khamung, 2015; Cassia et al., 2015; Farsani et al., 2019; Elshaer et al., 2023). Busby G's node at Plymouth University (the UK) highlights related studies. For instance, post-COVID-19, the reciprocity between small rural enterprises and residents enhances agritourism performance (Elshaer et al., 2023). (3) Empirical research utilizing data from various regions is highly focused, which is evidenced by #5 grouping analysis and #6 multi-group analysis. For example, an exploratory comparative study of rural travellers in two border areas of Spain and Portugal (Loureiro and González, 2008), as well as a comparison of urban and rural heritage sites in rural Malaysia versus urban Georgetown, showed no

significant differences in how attachment and environmental attitudes affected residents' perceptions (Rasoolimanesh et al., 2017b). Thus, when reviewing highly co-cited authors, it is essential to consider their research themes and findings critically while exploring more discussion-worthy directions.

Hotspot analysis

Hotspot analysis, namely co-occurrence analysis, illustrates the evolution of topics in this research field, emphasizing dynamic changes among topics and stakeholders. The "Year" in the tables and figures of this section indicates the initial year when objects (e.g., keywords, keyword bursts) began to co-occur.

Keywords co-occurrence

Co-occurrence analysis reveals research progress and emerging hotspots in agritourism research. Co-occurred keywords are central to the thesis, accurately reflecting the themes and focus in this field, as shown in *Table 9*. Common co-occurred keywords include "impact," "model," "management," and "attitude." More informative keywords for discussion are "perception," "community," and "satisfaction." (1) "Rural tourism" serves as a thematic term for agritourism; it has the highest frequency (414) but low centrality (0.01). This low centrality arises because "rural tourism" is a broad subject term used by authors, while more specific terms often play a crucial role in shaping the field.

Table 9. Keywords co-occurrence

Rank	Keyword	Frequency	Centrality	Year
1	Rural tourism	414	0.01	2005
2	Impact	153	0.08	2004
3	Model	108	0.07	2005
4	Management	108	0.09	2007
5	Perception	88	0.03	2005
6	Attitude	77	0.04	2008
7	Area	77	0.02	2006
8	Community	73	0.00	2007
9	Tourism	71	0.09	2005
10	Satisfaction	67	0.06	2009

(2) The co-occurred keyword "perception" stands out with relatively high counts (88), centrality (0.03), and an early co-occurrence year (2005). It highlights that stakeholder perceptions—such as those of residents and tourists—have garnered significant attention. For example, one study indicates that tourists' self-serving bias in agritourism influences their post-purchase behaviours like word-of-mouth and revisit intentions (Li and Li, 2021); another explores villagers' perceptions of agritourism, suggesting that views on increased income motivate participation in local agritourism businesses (Petrović et al., 2017). (3) The latest frequently co-occurred keyword is "satisfaction," indicating a shift in researchers' focus towards consumer perspectives. Recent studies have examined tourist satisfaction to enhance rural tourism's reputation, image, and repeat visitation (Malkanathi and Routray, 2012; Suhartanto et al., 2020; Van Trung and Mohanty, 2021). (4) The keyword "management" is significant despite its commonality, with the highest centrality of 0.09, underscoring its influence. This topic encompasses not only

agritourism operator management but also managing rural enterprises, improving environments, and planning resources effectively (Malkanthy and Routray, 2012; Shumaev et al., 2018; Ispas et al., 2019; Fanelli and Romagnoli, 2020; Kovalenko and Kulik, 2021). Notably, due to COVID-19's impact, recent research has explored innovative strategies and challenges in managing agritourism amid the pandemic (Chin and Pehin Dato Musa, 2021). That reflects that agritourism research remains dynamic as societal conditions evolve.

Figure 9 shows the timeline graph of keyword co-occurrence, illustrating changes in research focus and hotspots in agritourism over time.

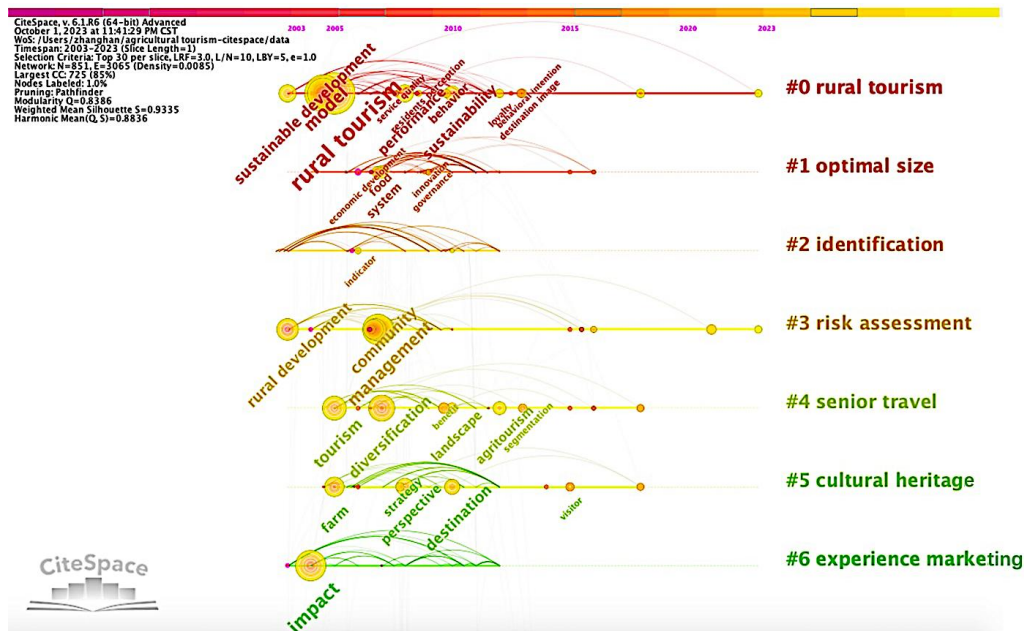


Figure 9. Timeline of keyword co-occurrence

Figure 10 reveals seven clusters of keyword co-occurrence in this field. Our findings are as follows: (1) The earliest clusters are #0 rural tourism and #3 risk assessment, both addressing "development" in 2003. The initial keyword for cluster #0 is "sustainable development." A study from that year highlighted significant sustainability issues in agritourism due to rapid tourism growth leading to soil erosion, underutilization of pasture resources, and reduced landscape diversity (Loureiro and González, 2008). This work established a foundation for sustainable agritourism research, with references to its conclusions continuing until 2023. The latest study in cluster #3 examined how cultural factors and community cooperation significantly influenced agritourism's development stages (Campón-Cerro et al., 2017). In summary, early agritourism research focused on developmental stages and future challenges to support industry advancement. (2) The cluster with the longest co-occurrence is #0 rural tourism. Early research (2003-2005) focused on defining agritourism and future planning with co-occurred keywords like "sustainable development," "model," and "perception." In the middle phase (2006-2009), attention shifted to agritourism quality, highlighted by keywords such as "service quality," "residents' perception," and "performance." It was noted that enhancing destination quality can sustain tourist satisfaction through improved service and infrastructure (Pujiastuti et al., 2017). From 2010 to 2023, the focus turned to consumer

behaviour, featuring keywords like ‘behaviour,’ ‘loyalty,’ ‘behaviour intention,’ and “destination image.” Key factors influencing agritourism loyalty included destination image, service quality, culture, and satisfaction with destination attributes (Choo and Petrick, 2014; Scaglione and Mendola, 2017; Zheng et al., 2023; Priatmoko et al., 2023). (3) The latest co-occurred keywords are “decision-making” and “livelihood.” The “decision-making” node indicates that current research integrates decision-making procedures with consumer behaviour and resource conservation, examines how tourists’ intentions to conserve resources develop in rural tourism contexts, and predicts future behaviours through modelling (Ammirato et al., 2020). In the “livelihood” node, recent studies identify key drivers shaping rural tourism businesses: marketability, participation, crisis mitigation, and sustainability. Findings reveal that sustainability is most closely linked to rural tourism (Kohl, 2006). That highlights the importance of incorporating sustainability into interdisciplinary research and future forecasting.

Top 15 Keywords with the Strongest Citation Bursts

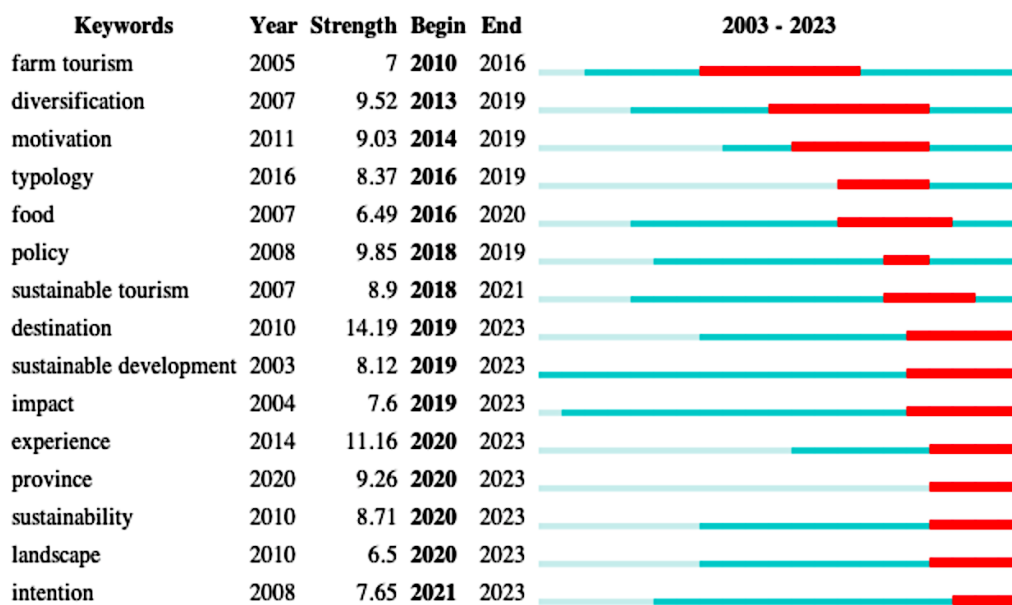


Figure 10. Keyword bursts

Keyword bursts

The significance of keyword bursts lies in visualizing emerging trends in agritourism research. Figure 10 displays the top 15 keywords with the highest bursts. “Year” indicates when a keyword gains attention; “begin” and “end” mark the start and end of its intense burst (when it becomes a hot topic). The evolving hotspots in agritourism research reveal specific findings: (1) The earliest keyword with the highest burst is “farm tourism,” which gained popularity from 2010 to 2016. That suggests that scholars could conduct longitudinal studies on other types of agritourism, such as lake district tourism. (2) The top five keywords with the highest bursts are “destination” (strength of 14.19), “experience” (11.16), “policy” (9.85), “diversification” (9.52), and “province” (9.26). Recent literature has focused on how agritourism destinations directly influence tourist behaviours and experiences, highlighting aspects like place attachment’s indirect effect

on tourists' loyalty (Shen and Wang, 2023). That indicates scholars' keen interest in studying destinations and travellers' experiences while identifying popular topics for further exploration. (3) In 2023, eight keywords are prominent in agritourism research: "intention," "landscape," "sustainability," "province," "experience," "impact," "sustainable development," and "destination." These terms reflect current trends, particularly in sustainable agritourism, where scholars explore various perspectives such as socio-cultural, economic, agricultural, environmental, AI technology, marketing, and planning. Most studies focus on preserving the environmental values of agricultural areas to foster multidimensional development (Abadi and Khakzand, 2022; Solymannejad et al., 2022). Moreover, with advancements in science and technology, researchers are increasingly integrating AI into agritourism development; the modernization and intelligence of agritourism are expected to be a future trend. In addition, the prominence of these keywords may grow as more research emerges over time. In conclusion, this analysis helps researchers quickly grasp the current landscape of research hotspots and future directions for meaningful inquiry.

Discussions

Knowledge framework

The findings of this study indicate that agritourism research encompasses a broad range of topics and research areas. Therefore, it is essential to establish a comprehensive knowledge framework to help scholars better understand the research in this field. We developed this framework based on our analyses, as illustrated in *Figure 11*. The key components include statistical characteristics, collaborative analysis, co-citation analysis, and hotspots, as well as assessments of the knowledge base, correlations, current status, and evolution of agritourism research. This provides a thorough understanding of the area and valuable references for future exploration. The details are as follows.

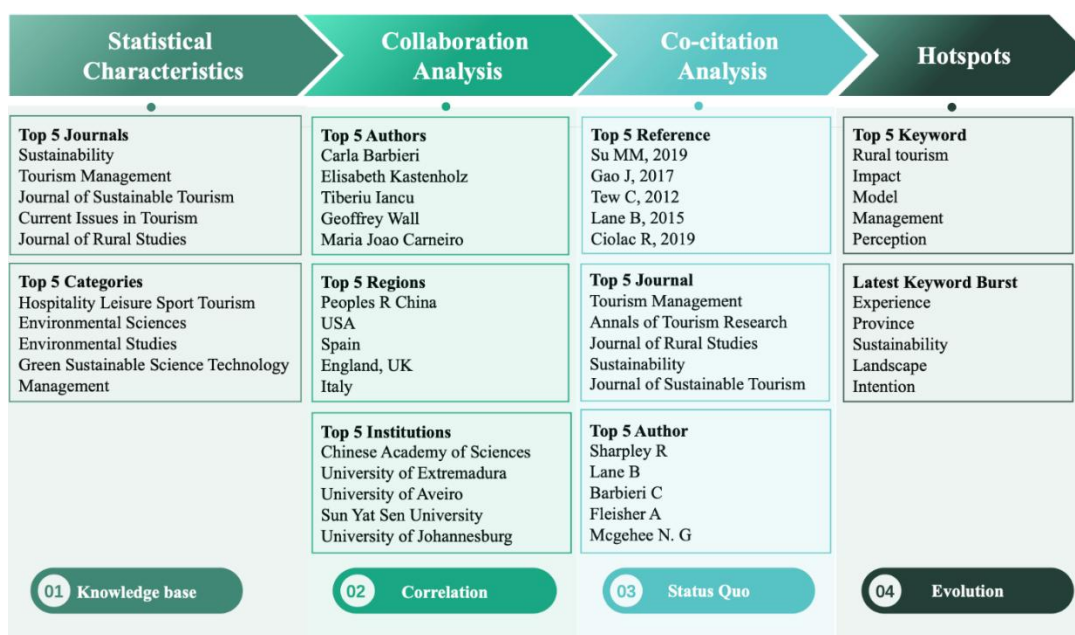


Figure 11. Knowledge framework

(1) Statistical characteristics form the framework's foundation by highlighting the popularity of agritourism research. This section reveals leading journals and research categories within the field. Consequently, these statistics assist scholars in grasping basic information about agritourism research and offer guidance on potential publication avenues. Specifically, Sustainability, Tourism Management, and Journal of Sustainable Tourism are among the most published journals in this domain, while Hospitality Leisure Sport Tourism, Environmental Sciences, Environmental Studies, Green Sustainable Science Technology, and Management rank as popular categories.

(2) Collaboration analysis reveals the knowledge correlation among institutions, regions, and scholars. It highlights how researchers collaborate and interact, offering guidance on finding suitable partners in the field. Notably, Carla Barbieri (North Carolina State University, the USA), Elisabeth Kastenholtz (University of Aveiro, Portugal), and Tiberiu Iancu (West University of Timisoara, Romania) are prominent co-authors. Active collaboration occurs primarily between China, the USA, and Spain. Key contributors include the Chinese Academy of Sciences, the University of Extremadura, and the University of Aveiro.

(3) Co-citation analysis provides insights into knowledge through co-cited journals, references, and authors. It outlines current research trends via knowledge clustering. The field exhibits diverse topics: local community, farm tourism, and social innovation dominate co-cited references; rural tourism, conservation intentions, and rural idyllic appear in co-cited journals, while themes like rural-based resources, place attachment, and sustainable development emerge from co-cited authors.

(4) The hotspot section identifies future research themes that indicate evolutionary paths within the framework. This section forecasts upcoming trends by analyzing the timeline evolution of co-occurred keywords and keyword bursts. Topics such as rural tourism, impact, models, management, and perception have obtained significant attention alongside other informative areas like community, area, and satisfaction. Potential hotspots include experience, provincial analysis, sustainability, landscape, and intention.

Future research characteristics

More disciplines engage in agritourism research, leading to a more diversified field. Future studies on agritourism are expected to feature the following characteristics, offering scholars guidance for meaningful inquiry.

(1) Future research will integrate various subjects. For instance, combining agritourism with economics (Zvavahera and Chigora, 2023), marketing (Geng et al., 2024a), geography (Rodrigues Ferreira et al., 2023), management (Chin and Pehin Dato Musa, 2021; Yusuf and Wulandari, 2023), environmental conservation (Abadi and Khakzand, 2022), sociology (Galluzzo, 2022), planning or strategy (Choo and Park, 2022), and architecture (Oltean et al., 2024) encourages interdisciplinary collaboration. Researchers from tourism and other fields should work together in this field.

(2) Future research will embrace advanced technologies. Intelligent tourism is emerging as a significant trend. Innovations like artificial intelligence, machine learning, big data, and virtual reality are transforming agritourism research into a new era (Geng et al., 2023a). Post-COVID-19 developments have popularized smart agritourism; for example, researchers have implemented intelligent assessments of tourist villages in Romania (Moise et al., 2023). Additionally, incorporating data mining and machine learning methods is recommended for future studies—such as creating intelligent networks for understanding customer satisfaction through big data analysis in agritourism

(Zhang, 2022). Scholars should keep pace with technological advancements by acquiring computer knowledge and algorithms to drive breakthroughs in their research.

(3) Future research will focus on differentiation and consumer experience in agritourism. Researchers are increasingly segmenting agritourism types from the consumers' perspective to achieve sustainable economic benefits and cater to diverse consumer needs. Areas worthy of specific study include differentiated services, personalized tourism, agricultural landscapes, rural cuisine, local culture, and overall agritourism experiences. Key topics for future scholars include differentiated tourist satisfaction, market segmentation, motivations of tourists, and path analysis (Rauniyar et al., 2021; Geng et al., 2024c; Vukolić et al., 2024). For instance, enhancing local gastronomic flavours in Indian agritourism can improve tourist experiences and boost local economies (Dsouza et al., 2023). We encourage scholars to refine their research focus within agritourism by examining differentiated consumer experiences for more meaningful conclusions.

(4) Future research will encompass broader topics while addressing complex sustainability issues. Sustainable development remains a pressing topic, and no definitive solutions have yet been identified. Research could explore determinants (policy, economic factors, ecology) and mediators (such as gender) influencing sustainable agritourism development (Abadi and Khakzand, 2022; Gajić et al., 2024), it should not be limited to environmental aspects but also consider cultural sustainability—encompassing ancient architecture, non-cultural heritage, and local traditions (Pehin Dato Musa and Chin, 2022a,b; Domi and Belletti, 2022; Geng et al., 2024d). Additionally, sustainable development encompasses various directions: environmental sustainability in agritourism, preservation of rural culture alongside sustainable strategies, and the co-sustainable growth of rural economies with tourism.

Conclusions

This study utilizes CiteSpace for a bibliometric analysis of agritourism trends from 2003 to 2023, providing insights into research progress in this field.

The main conclusions are as follows: (1) Agritourism research is rising, with fluctuating growth in studies from 2003 to 2023; however, many current journals lack high authority. (2) Collaborative networks show more intra-team exchanges, but individual collaborations remain relatively independent. China and the United States have invested significantly in agritourism research and maintain closer collaborative ties that influence academia. Enhanced collaboration among teams is encouraged. (3) Co-citation network analyses reveal key findings and status within agritourism research, focusing on future development paths, resource planning efficiency for rural tourism, sustainability issues at destinations, and ecological protection challenges. (4) Hotspot analyses indicate promising future research directions. Sustainability's role in interdisciplinary studies is emerging as a critical topic—particularly regarding sustainable agritourism viewed through socio-cultural, economic, agricultural, environmental, natural, marketing, and planning lenses. Additionally, there will be an increased focus on destination research and travelers' experiences.

The contributions of this paper are as follows: (1) providing a comprehensive overview of agritourism research progress from various perspectives, including key literature, dynamic visualizations, and valuable insights; (2) constructing a knowledge framework for agritourism research to enhance scholars' understanding of the field and facilitate

access to fundamental information; (3) identifying research hotspots and potential features to equip scholars with more explicit techniques and tools for effective further research.

This study has some limitations: (1) The selection of databases is not comprehensive. Only two databases, SCI and SSCI, were used, overlooking other influential journals in agritourism. (2) Data collection focused solely on papers with keywords in the "title" rather than "topic." Future work will expand the database search to include related literature from "topic" for more comprehensive data and scientific results.

Conflict of interest. The authors declare no conflict of interest.

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