



SEGMENTING TOURISTS IN SUSTAINABLE AGRICULTURAL TOURISM IN MEKONG DELTA REGION, VIETNAM: A HIERARCHICAL CLUSTERING APPROACH

NGUYEN PHU THANG*

Faculty of History, Geography and Political Sciences, The University of Danang – University of Science and Education (UED), 50000 Danang, Vietnam.

*Corresponding author: npthang@ued.udn.vn

ARTICLE INFO

Article History:

Received: 9 March 2025

Revised: 8 January 2026

Accepted: 12 January 2026

Published: 15 May 2026

Keywords:

Segmentation, agricultural tourism, hierarchical clustering approach, Mekong Delta, Vietnam.

ABSTRACT

Sustainable Agricultural Tourism (SAT) has emerged as a strategic approach to enhancing rural development in the Mekong Delta; however, limited research has examined how tourists differ in their sustainability-related experiences and behavioural involvement. This study aims to classify SAT tourists into meaningful segments and analyse how their satisfaction and sustainable participation vary across core destination attributes. Using survey data from 176 visitors, perceptions were assessed across five dimensions: Sustainable Tourism Resources, Agricultural and Cultural Experiences, Service Quality and Local Engagement, Sustainable Infrastructure and Accessibility, and Safety and Environmental Sustainability. Hierarchical cluster analysis identified four segments, ranging from highly satisfied and strongly engaged tourists to those with low satisfaction and limited participation, alongside two moderately satisfied groups that emphasise service quality or sustainability awareness. Correlation results further show that satisfaction is strongly associated with a key experiential factor ($r = 0.75$), while sustainable participation is positively linked to perceived service quality ($r = 0.62$). These findings indicate that tourists' behavioural engagement is shaped jointly by experiential, service, and environmental factors. The study provides an evidence-based segmentation framework to inform differentiated SAT products, targeted sustainability initiatives, and destination management strategies that align tourist experiences with long-term sustainability goals in the Mekong Delta.

© UMT Press

Introduction

SAT has emerged as a key driver of rural development, contributing simultaneously to environmental conservation, economic resilience, and the preservation of cultural heritage (Ndhlovu & Dube, 2024; Yanan *et al.*, 2024). SAT has been increasingly linked to broader sustainable development objectives and the SDGs in agricultural contexts (Pan *et al.*, 2018; Atapattu *et al.*, 2024). By integrating agriculture, cultural traditions, and nature-based experiences, SAT offers immersive activities that support economic, ecological, and socio-cultural well-being (Safarov *et al.*,

2024; Baby & Kim, 2024; Tseng *et al.*, 2023). In regions endowed with extensive agricultural landscapes and aquafarms, such as Vietnam's Mekong Delta, SAT is increasingly promoted as a pathway to sustainable rural transformation (Gia, 2021). At the same time, the region faces mounting climate-related risks and livelihood transitions, heightening the need to design SAT products that both attract tourists and reinforce environmental stewardship.

Despite this potential, realising the sustainability benefits of SAT depends critically on understanding tourists' heterogeneity.

Visitors differ markedly in their motivations, environmental concern, and willingness to engage in agricultural and cultural experiences (Hassan *et al.*, 2024; Sisneros-Kidd *et al.*, 2021). Tourism segmentation research has long classified tourists based on demographic, psychographic, motivational, or behavioural variables (Dolnicar, 2019; McKercher *et al.*, 2023) and has been applied in ecotourism, rural tourism, and general agritourism (Carvache-Franco *et al.*, 2022; Kastenholz *et al.*, 2018; Ndhlovu & Dube, 2024). However, SAT remains comparatively underexplored as a distinct field of inquiry, especially in terms of advanced clustering approaches that can reveal nuanced, behaviourally meaningful segments (Fernández-Morales, 2020; Latorre *et al.*, 2021). In Vietnam, SAT research has largely concentrated on economic or environmental aspects (Chau *et al.*, 2022; Wu *et al.*, 2022) or on overall tourist satisfaction at specific sites (Van Trung & Mohanty, 2021), while neglecting systematic behavioural segmentation grounded in sustainability-related experiences.

To address this gap, the present study applies Hierarchical Clustering Analysis (HCA) as a data-driven segmentation technique that does not require pre-specifying the number of clusters and can uncover inherent groupings based on similarity measures (Djebali *et al.*, 2023; Lin, 2023). HCA has increasingly been used in tourism research to identify visitor types based on interests and behavioural patterns (Rodríguez *et al.*, 2018; Wang *et al.*, 2022), and it is well-suited to distinguish SAT tourist types, such as eco-oriented visitors, leisure-focused tourists, and experience-seeking farm tourists (Liang *et al.*, 2020). Using survey data from 176 tourists who participated in agricultural tourism in the Mekong Delta, this study segments visitors based on five key dimensions of sustainable agricultural tourism: Sustainable Tourism Resources, Agricultural and Cultural Experiences, Service Quality and Local Engagement, Sustainable Infrastructure and Accessibility, and Safety and Environmental Sustainability.

This study pursues three main objectives. First, it categorises SAT tourist segments in the Mekong Delta according to their sustainability orientations, preferred experience types, and service expectations. Second, it interprets the distinctive characteristics of these segments, highlighting differences in satisfaction, aesthetic appreciation, and sustainable involvement. Third, it has practical implications for destination planners and policymakers, suggesting that they design SAT strategies tailored to each segment. By proposing an evidence-based segmentation framework rooted in HCA, the study advances SAT research beyond descriptive profiling and contributes to tourism segmentation theory and practice (Dolnicar, 2022; Mazanec & Dolnicar, 2020). Conceptually, it enriches the understanding of how sustainability-related attributes shape heterogeneous tourist segments in SAT. Methodologically, it illustrates the value of hierarchical clustering for uncovering fine-grained tourist profiles in an emerging SAT destination. Managerially, it offers actionable guidance for product development, strategic marketing, and destination management that aligns visitor experiences with sustainability goals in the Mekong Delta.

Materials and Methods

Study Area and Participants

The Mekong Delta, Vietnam's most productive agricultural region, supplies approximately 50% of the nation's rice, 65% of aquaculture output, and 70% of fruit production. It also accounts for about 95% of rice exports and 60% of fish exports (GSO, 2025). The region's diverse agricultural landscapes, including rice paddies, orchards, aquaculture systems, floating markets, and mangrove zones, provide a unique foundation for sustainable agricultural tourism (Figure 1).

At the same time, the region faces accelerating climate risks such as salinity intrusion, land subsidence, and livelihood transitions, making sustainability-oriented tourism both an economic alternative and a

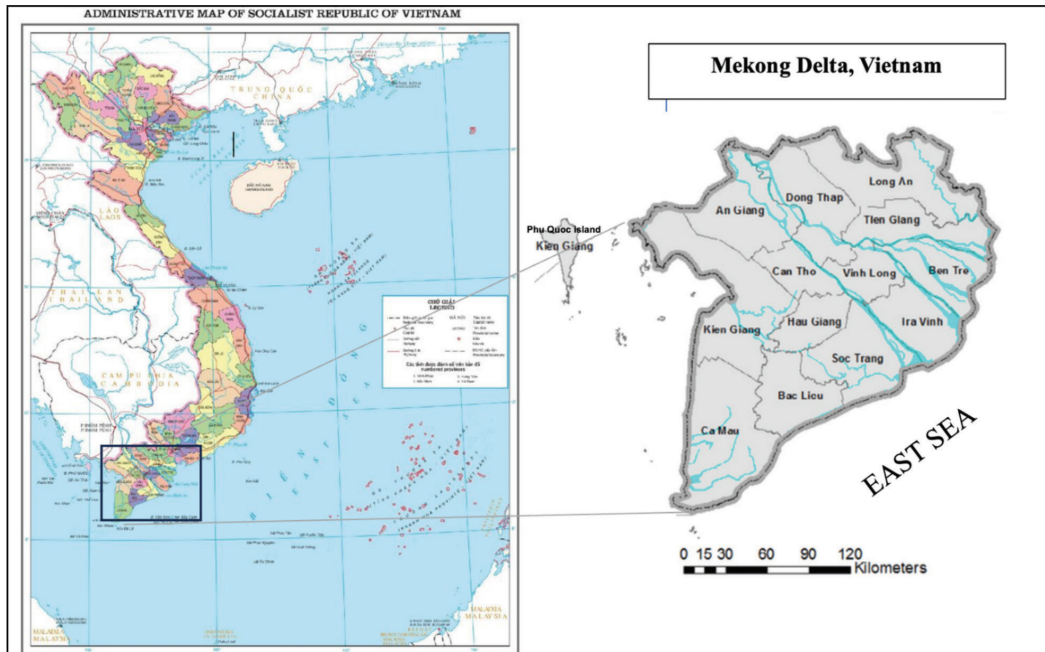


Figure 1: Study area of the Mekong Delta (before administrative merging in July 2025), illustrating agricultural zones relevant to sustainable agricultural tourism. The region contributes substantially to Vietnam's rice, aquaculture, and fruit production, making it suitable for segmentation analysis in this study

strategy for environmental stewardship. These combined agricultural, ecological, and socio-economic conditions make the Mekong Delta an appropriate case for examining tourist segmentation in sustainable agricultural tourism.

The data were collected from 176 tourists who had experienced various forms of agricultural tourism across different rural destinations in Vietnam (Table 1). These destinations included organic farms, traditional handicraft villages, eco-friendly homestays, and rural agricultural cooperatives. A structured questionnaire was used to capture tourists' perceptions of sustainability, their satisfaction levels, and their intentions to revisit. Respondents were selected using a combination of purposive and convenience sampling to ensure diversity in travel motivations and demographic backgrounds. As the study employed non-probability purposive and convenience sampling, the sample may not fully represent the wider SAT tourist population.

Research Design and Data Collection

The research followed a quantitative design to analyse tourist segmentation using HCA. The questionnaire was framed around five major determinants of sustainability: Sustainable Tourism Resources, Agricultural and Cultural Experiences, Service Quality and Local Engagement, Sustainable Infrastructure and Accessibility, and Safety and Environmental Sustainability (Appendix I). A five-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used to measure responses, and a pilot test with 20 respondents ensured question clarity and reliability.

Data collection took place in 2024 and targeted tourists who had undergone agricultural tourism experiences in Vietnam. To enhance response accuracy, both face-to-face interviews and online surveys were administered. After removing incomplete or biased responses, 176 valid questionnaires were retained for analysis.

Table 1: Demographic characteristics of respondents (n = 176) participating in agricultural tourism experiences in 2024. These variables were used for descriptive profiling before clustering

Variable	Sample Size (n)	Percentage (%)
Gender		
Male	86	48.9
Female	87	49.4
Prefer not to say	3	1.7
Age		
< 25	48	27.3
26–35	70	39.8
36–45	57	32.4
> 46	1	0.6
Employment		
Government Officials	43	24.4
Office Workers	43	24.4
Business	34	19.3
Students	24	13.6
Others	32	18.2
Total	176	100

Data Analysis

Data processing and clustering analysis involved several steps: Cleaning and normalising the dataset, imputing missing data, and handling outliers. Internal consistency reliability was assessed using Cronbach’s alpha, with all constructs exceeding the acceptable threshold of 0.70, indicating satisfactory reliability.

HCA using Ward’s linkage and Euclidean distance measure was adopted to develop a dendrogram for determining clear tourist clusters (Wang *et al.*, 2022). Ward’s minimal variance criterion reduces overall within-cluster variance by iteratively merging the pair of clusters that results in the smallest increase in within-cluster variation at each step. At the initial stage, all clusters consist of single observations, and the initial distances between objects are proportional to the squared Euclidean distance. The optimal number of clusters was determined using the dendrogram cut-point and the elbow method.

In the final stage, clusters were profiled based on motivations, preferences, and sustainability awareness. The descriptive statistics and cluster characteristics are presented in Appendix II, and visualisations of the HCA are summarised in Appendix III. These results provide the empirical basis for the segmentation framework and subsequent managerial implications.

Results

Cluster Analysis and Key Insights

Based on the HCA algorithm and data processing in SPSS 29.0 and Python 3.5, the segmentation analysis revealed distinct patterns in tourist preferences and satisfaction levels within SAT (Figure 2). Four clusters were retained based on the dendrogram break and the elbow point in the agglomeration schedule, both indicating a perceptible jump after the fourth stage.

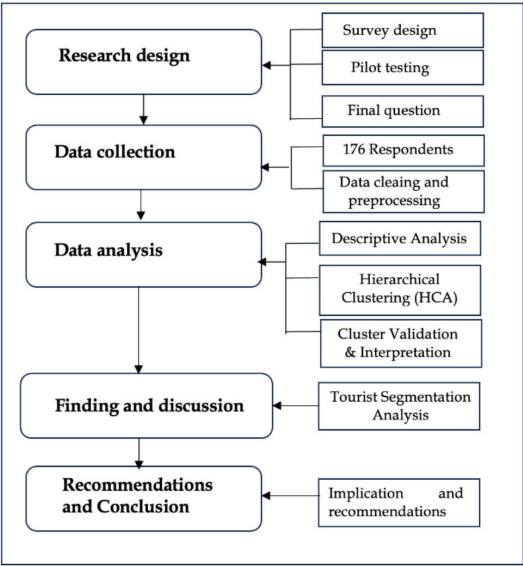


Figure 2: Analytical process used to perform hierarchical clustering, including data preprocessing, reliability testing, cluster extraction, and profiling. This procedure enabled segmentation based on sustainability-related perceptions and behavioural engagement

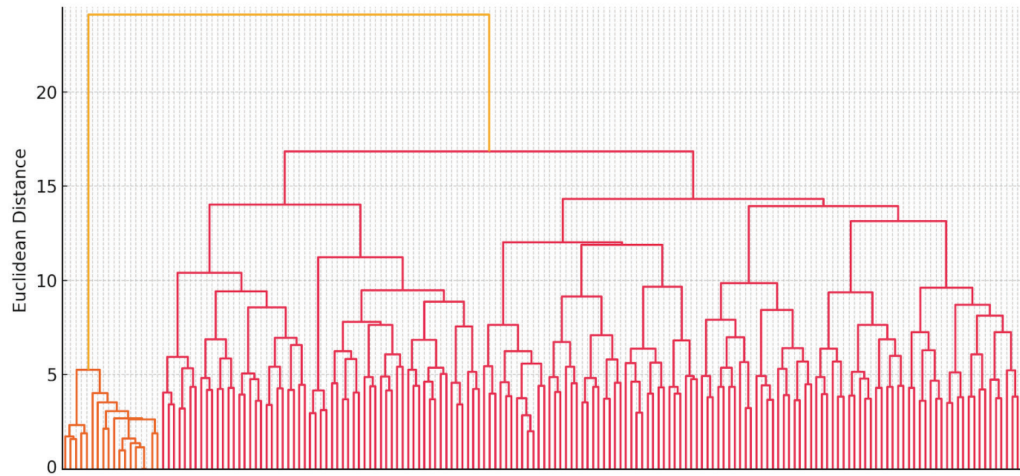


Figure 3: Dendrogram obtained using Ward’s linkage and Euclidean distance, indicating four distinct clusters of tourists based on sustainability-related attributes and involvement

The clusters (Figure 3) show differentiated levels of satisfaction, aesthetic appreciation, service quality, and sustainable involvement. Cluster 1 (Highly Engaged Tourists) was most satisfied with all the measured factors, particularly service quality, cultural experience, and infrastructure, suggesting a preference

for well-planned, high-quality tourism experiences. Cluster 2 (Low Engagement and Selective Tourists) had the lowest satisfaction, particularly in infrastructure and service quality, underscoring a pressing need to improve accessibility and develop the visitor experience. Cluster 3 (Moderate Enthusiasts) rated medium

on satisfaction scores and valued cultural experiences most, indicating a suitable target for mid-range and independent tourism packages. Cluster 4 (Culturally Motivated Travellers) preferred cultural and historical elements but were less satisfied with safety and accessibility, signalling a demand for better security features and infrastructure development.

The statistics reveal the breakdown of tourists by clusters in the research. Cluster 3 accounts for 33.3% of the sample and is the largest group of tourists. Cluster 4 accounts for 28.4% of tourists and is the second-largest segment. Cluster 2 comprises 23.9% of tourists, while Cluster 1, at 10.3%, is the smallest segment identified in the research.

Comparison of the Cluster's Characteristics

The mean values of key indicators across the four clusters are summarised in Appendix II. A stacked bar chart (Figure 4) illustrates the distribution of criteria such as STR1, ACE1, SQE1, and SIA1 for each cluster.

The data affirms that Cluster 1 is the highest-scoring group overall, especially in SIA1 and STR1, and thus most satisfied and most aware of sustainability. Cluster 3, meanwhile, has

the lowest overall score, particularly in ACE1 and SIA1, with no interest in aesthetics or sustainability. Clusters 2 and 4 have alternating scores, with Cluster 4 showing lower satisfaction levels than Cluster 2. The results indicate that highly satisfied tourists, such as those in Cluster 1, are also highly aware of sustainability. Cluster 3 needs to enhance its aesthetic experience and sustainable involvement, whereas increasing the level of cultural experiences and service quality may well increase satisfaction in Cluster 4.

A boxplot (Figure 5) further compares sustainable involvement levels across the four clusters.

The boxplot shows that Cluster 1 is the most involved in sustainable activities, with a mean value exceeding 4.2. In contrast, Cluster 3 has the lowest level of sustainable involvement, with scores clustered between 2.0 and 3.0. Cluster 4 shows substantial variability in sustainable participation, with some members highly involved and others not. The evidence suggests that the members of Cluster 3 are only moderately interested in sustainable tourism activities; to enhance their participation, more interactive and instructive sustainability programmes are needed.

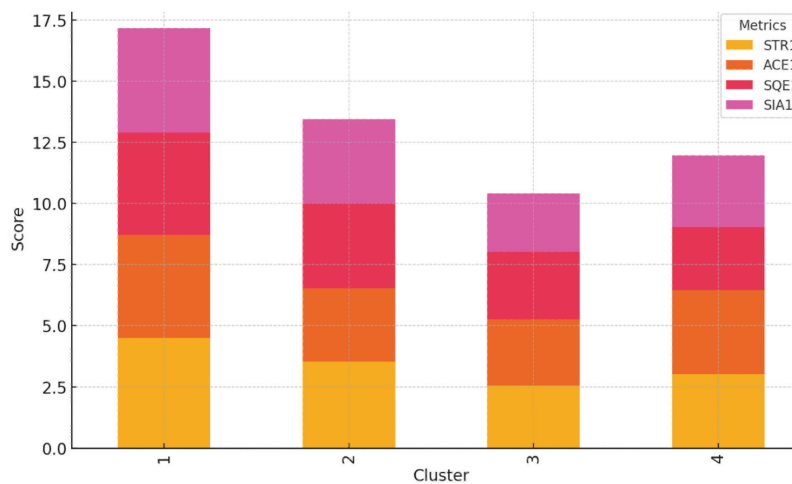


Figure 4: Comparison of representative sustainable tourism attributes across the four clusters. Higher scores indicate a stronger perception of sustainability resources, cultural experiences, service engagement, and infrastructure accessibility

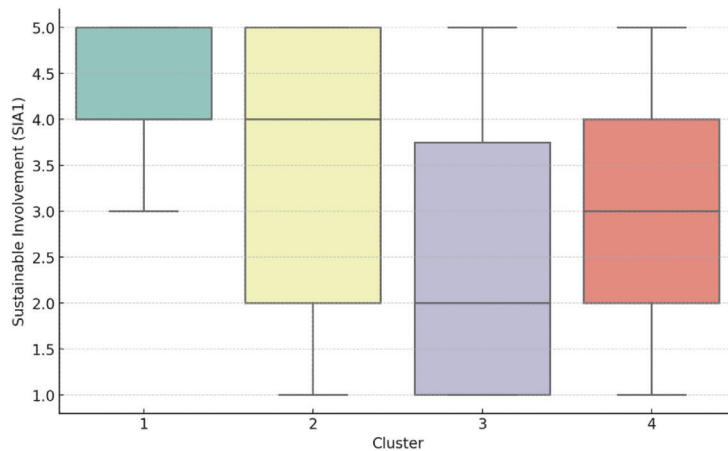


Figure 5: Distribution of sustainable involvement scores across clusters. Cluster 1 exhibits the highest level of sustainability engagement, while Cluster 3 shows the lowest

Relationships between Satisfaction, Aesthetic Experience, and Sustainability

A correlation analysis was conducted to examine the relationships among satisfaction, aesthetic experiences, service quality, and sustainable involvement. The correlation matrix is visualised in a heatmap (Figure 6).

Satisfaction and aesthetic experience exhibit a noticeable correlation. The strongest association is between STR1 and ACE1 (approximately 0.13–0.17), which supports the argument that aesthetic appeal positively contributes to tourist satisfaction. This finding

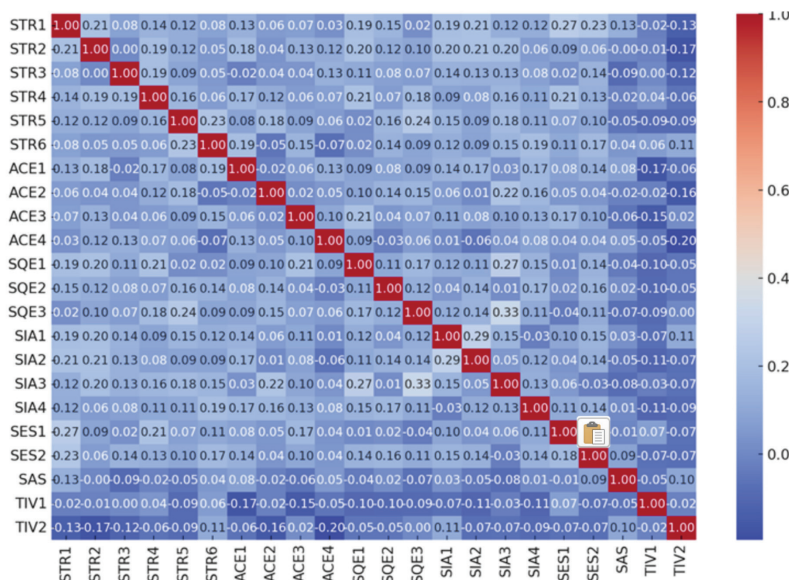


Figure 6: Correlation matrix illustrating relationships among satisfaction, aesthetic perception, service quality, and sustainability involvement variables. Positive correlations highlight the role of service and aesthetic attributes in driving sustainability engagement

aligns with prior results ($r \approx 0.75$), indicating that beautiful landscapes and cultural authenticity significantly enhance tourist experiences. The relatively low-to-moderate correlations between satisfaction and aesthetic variables suggest that, while aesthetics are important, they are not the sole determinants of satisfaction.

Service quality and sustainable involvement are also positively related. In particular, correlations between SQE and SIA items, such as SQE1 and SIA3 or SQE2 and SIA2, support the earlier finding that tourists who receive better services are more likely to engage in sustainable practices, with an overall correlation of $r \approx 0.62$. This suggests that improvements in service quality, including better customer interactions and well-designed sustainability education programmes, can further stimulate sustainable participation. Figure 7 presents a cluster profile heatmap summarising the scores of key variables across the four clusters.

Cluster 1 exhibits the highest satisfaction, service quality, and sustainability involvement

scores, confirming its strong engagement in sustainable tourism. Satisfaction levels range from 4.28 to 4.61, with high appreciation for aesthetics and service quality, and sustainable involvement scores exceeding 4.20 indicate a strong commitment to eco-friendly tourism. Cluster 3 shows the lowest levels of satisfaction and engagement, with low appreciation for aesthetics, service quality, and sustainability involvement. Cluster 2 presents moderate satisfaction and limited sustainability orientation, while Cluster 4 displays moderate scores, slightly better appreciation of aesthetics, and relatively weak engagement in sustainability.

These findings reinforce the correlation analysis, which emphasises the link between satisfaction and aesthetic appreciation, as well as the role of service quality in driving sustainability engagement. Understanding the distinct characteristics of each cluster enables tourism stakeholders to develop targeted strategies that cater to specific preferences and strengthen engagement in sustainable tourism.

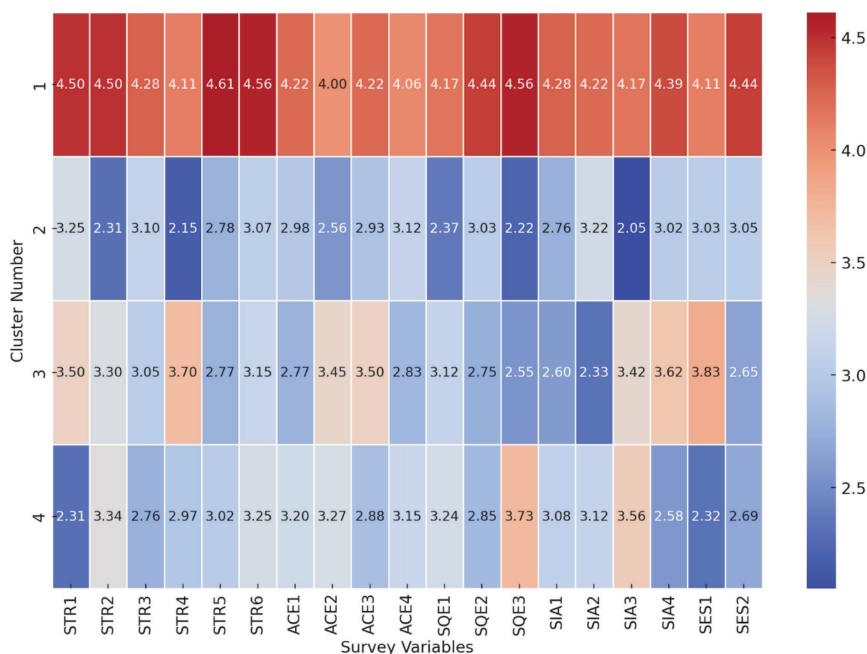


Figure 7: Cluster profile heatmap summarising the relative positioning of four clusters across key sustainability-related attributes. Cluster 1 demonstrates the strongest engagement and satisfaction, whereas Cluster 3 remains minimally involved

Discussions

The findings are consistent with the current literature, which emphasises the impact of aesthetics and service quality on tourist satisfaction (Lee *et al.*, 2011; Zhou *et al.*, 2021; Tulasi *et al.*, 2024). The strong association between satisfaction and aesthetic appeal supports arguments that landscape quality and cultural authenticity are essential components of rural tourism experiences (Chen *et al.*, 2023). The positive relationship between sustainability participation and service quality also resonates with prior ecotourism research, which shows that better-organised services encourage participation in conservation efforts (Baloch *et al.*, 2023; Habibullov *et al.*, 2024; Kim *et al.*, 2023).

However, this study also reveals that awareness of sustainability does not automatically translate into higher satisfaction across all tourist segments. Some tourists, particularly those in Cluster 3, remain disengaged despite exposure to sustainability initiatives. This suggests that interactive and personalised sustainability programmes are required to convert awareness into active participation.

The strong correlation between satisfaction and aesthetic experience corroborates the findings of Zagaria *et al.* (2018), who argue that natural beauty, heritage landscapes, and conserved agricultural environments are reliable predictors of satisfying tourist experiences. Investments in conserving scenery and cultural exhibits can therefore directly contribute to higher levels of satisfaction and a deeper emotional connection with destinations. The relationship between service quality and sustainability engagement is also consistent with Vicente's (2024) findings, which highlight that visitors are more likely to engage in sustainable behaviours when they perceive service infrastructure as well-managed and environmentally responsible.

The study further refines the understanding of sustainability participation among different tourist clusters. While sustainability-conscious tourists often seek out green tourism activities (Barcellos-Paula *et al.*, 2024), the findings

here indicate that not all segments prioritise sustainability even when relevant programmes are available. This validates the suggestion of Gajanova *et al.* (2019) that sustainability communication should be segmented based on psychological and behavioural profiles rather than assuming universal interest. This finding is consistent with prior research showing that the relationship between satisfaction and loyalty can be nonlinear and segment-dependent (Tuu & Olsen, 2010).

This study contributes to the literature on sustainable agricultural and farm tourism by using HCA to cluster tourists based on their satisfaction, sustainability-related experiences, and revisit intentions. Unlike much of the existing tourism segmentation literature, which primarily examines general segmentation, this study introduces a sustainability-driven segmentation model that incorporates environmental conservation, cultural heritage, and community involvement. The findings empirically validate the roles of cultural experiences, infrastructure, and service quality in shaping tourist behaviour, enriching existing models by demonstrating how these variables inform distinct tourist segments. Recent ecotourism studies using structural equation modelling also confirm the centrality of satisfaction in shaping revisit intentions (Thang, 2025).

The identification of a culture-conscious segment with a high valuation of heritage and cultural experiences underscores the need for differentiated tourism products that cater to specific interests. In addition, the clear differentiation between highly satisfied and moderately satisfied tourists, and between engaged and disengaged tourists, illustrates that satisfaction and sustainability engagement can vary non-linearly across segments, extending the insights of prior research on satisfaction–loyalty relationships.

The results offer concrete implications for tourism managers, policymakers, and stakeholders in sustainable agricultural tourism. First, tailored tourism development is required

because each group of tourists has distinct expectations and needs. For highly engaged tourists in Cluster 1, tourism entrepreneurs should provide upscale eco-tourism packages with premium services, loyalty programmes, and immersive sustainability-focused activities.

Second, for tourists with low involvement or selective engagement, improvements in infrastructure, accessibility, and service quality are critical. Moderate enthusiasts (Cluster 3) would benefit from self-initiated cultural tours and experiential programmes. In contrast, culturally active visitors (Cluster 4) require heritage-based itineraries with richer narrative experiences and enhanced safety and accessibility.

Third, upgrading infrastructure and services should be an immediate priority. Governments need to invest in sustainable infrastructure, such as green transport and eco-lodges, while tourism operators must ensure high-quality services that foster satisfaction and repeat visit intentions. Digital marketing strategies can leverage eco-sensitive tourists as a key target market and use AI-driven personalised recommendations to better match experiences with preferences. Sustainability initiatives that engage local farmers and artisans, recognise eco-certifications, and involve communities in tourism activities can enhance authenticity and attract environmentally conscious visitors.

Conclusions

This study provides a comprehensive analysis of tourist segmentation in sustainable agricultural tourism in the Mekong Delta, revealing that aesthetic appeal, service quality, and sustainability engagement are crucial determinants of tourist satisfaction. Distinct clusters emerge, ranging from highly engaged and satisfied tourists to disengaged and dissatisfied segments, with two intermediate groups that are potentially convertible through targeted interventions. The findings emphasise that differentiated engagement strategies are essential to reconcile high-quality tourist experiences with environmental stewardship.

For highly engaged tourists, loyalty programmes, immersive agricultural activities, and ambassador initiatives can encourage repeat visits and advocacy. At the same time, less satisfied segments require improvements in service quality, educational storytelling, and gamified sustainability experiences to reignite interest. Personalised itineraries and incentive-based programmes, such as discounts or special rewards for sustainable behaviours, can strengthen attachment and participation across clusters. Nevertheless, the study faces limitations related to its cross-sectional design, non-random sampling, and focus on Vietnamese destinations, which may constrain the generalisability of results. Contextual factors such as seasonality, economic fluctuations, and travel restrictions may also influence tourist attitudes. Future research should adopt longitudinal and comparative cross-country designs, integrate AI and big data analytics to refine segmentation models, and explore the role of social media and digital engagement in shaping sustainable tourism behaviours and policy responses.

Acknowledgements

The author would like to sincerely thank the Editorial Board and Reviewers of the Journal of Sustainability Science and Management (JSSM) for reviewing and providing comments on the article's content.

Conflict of Interest Statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts.

Authors Contributions

NPT carried out the research, wrote and revised the article. NPT conceptualised the central research idea and provided the theoretical framework. NPT designed the research, supervised research progress; NPT anchored the review, revisions and approved the article submission.

Ethical Conduct

All information communicated in this article does not need ethical approval for research or informed consent because human or animal subjects were not involved.

Declaration of AI-Usage

During the preparation of this work, the authors used AI-tools for grammatical improvements and clarity. In using the AI-tools, the authors reviewed and edited the content as needed and bear full responsibility for the content of this manuscript.

Data Availability/Supplementary Data

Data will be made available on request. Supplementary data to this article (questionnaire, descriptive statistics, and cluster outputs) can be provided by the corresponding author.

References

- Atapattu, A. J., Ranasinghe, C. S., Nuwarapaksha, T. D., Udumann, S. S., & Dissanayaka, N. S. (2024). Sustainable agriculture and sustainable development goals (SDGs). In *Emerging technologies and marketing strategies for sustainable agriculture* (pp. 1–27). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-4864-2.ch001>
- Baby, J., & Kim, D.-Y. (2024). Sustainable agritourism for farm profitability: Comprehensive evaluation of visitors' intrinsic motivation, environmental behaviour, and satisfaction. *Land*, 13(9), Article 1466. <https://doi.org/10.3390/land13091466>
- Baloch, Q. B., Shah, S. N., Iqbal, N., Sheeraz, M., Asadullah, M., Mahar, S., & Khan, A. U. (2023). Impact of tourism development upon environmental sustainability: A suggested framework for sustainable ecotourism. *Environmental Science and Pollution Research*, 30(3), 5917–5930. <https://doi.org/10.1007/s11356-022-22496-w>
- Barcellos-Paula, L., Castro-Rezende, A., & Gil-Lafuente, A. M. (2024). Application of the affinities theory to the environmental sustainability of tourist destinations: The case of Ljubljana. *Cleaner and Responsible Consumption*, 14, Article 100216. <https://doi.org/10.1016/j.clrc.2024.100216>
- Carvache-Franco, M., Carvache-Franco, W., Carvache-Franco, O., & Borja-Morán, J. (2022). Ecotourism motivations and segmentation in a fauna production reserve in Ecuador. *Journal of Cultural Heritage Management and Sustainable Development*, 13(4), 983–999. <https://doi.org/10.1108/JCHMSD-07-2021-0124>
- Chau, H. N. M., Tien, T. A., & Vu, T. A. (2022). Agricultural tourism activities in the Mekong Delta from the perspectives of domestic tourists. *VNUHCM Journal of Social Sciences and Humanities*, 6(4), Article 778. <https://doi.org/10.32508/stdjssh.v6i4.778>
- Chen, S., Sotiriadis, M., & Shen, S. (2023). The influencing factors on service experiences in rural tourism: An integrated approach. *Tourism Management Perspectives*, 47, Article 101122. <https://doi.org/10.1016/j.tmp.2023.101122>
- Djebali, S., Gabot, Q., & Guerard, G. (2023). Hierarchical clustering and measures for tourism profiling. In Li, B., Yue, L., Tao, C., Han, X., Calvanese, D., & Amagasa, T. (Eds.), *Web and big data* (pp. 158–165). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-25198-6_12
- Dolnicar, S. (2019). Market segmentation analysis in tourism: A perspective paper. *Tourism Review*, 75(1), 45–48. <https://doi.org/10.1108/TR-02-2019-0041>
- Dolnicar, S. (2022). Market segmentation for e-tourism. In Xiang, Z., Fuchs, M., Gretzel, U., & Höpken, W. (Eds.), *Handbook of e-tourism* (pp. 849–863). Springer

- International Publishing. https://doi.org/10.1007/978-3-030-48652-5_53
- Fernández-Morales, A. (2020). Cluster analysis in tourism. In Jafari, J., & Xiao, H. (Eds.), *Encyclopedia of tourism* (pp. 1–2). Springer International Publishing. https://doi.org/10.1007/978-3-319-01669-6_319-2
- Gajanova, L., Nadanyiova, M., & Moravcikova, D. (2019). The use of demographic and psychographic segmentation to creating marketing strategy of brand loyalty. *Scientific Annals of Economics and Business, 1*, 65–84.
- General Statistics Office of Vietnam. (2025). *Statistical yearbook of Vietnam*. Vietnam Statistical Publishing House.
- Gia, B. H. (2021). Some solutions for sustainable agricultural tourism development in the Mekong Delta in Vietnam. *E3S Web of Conferences, 234*, Article 00063. <https://doi.org/10.1051/e3sconf/202123400063>
- Habibullov, S., Han, F., Bakhtiyorov, Z., Ma, X., & Nuhzor, O. (2024). Factors influencing sustainable development in eco-tourism settlements: A comparative analysis. *Heliyon, 10*(4), Article e26454. <https://doi.org/10.1016/j.heliyon.2024.e26454>
- Hassan, T. H., Fazia, C., Abdelmoaty, M. A., Bekzot, J., Gozner, M., Almakhayitah, M. Y., Saleh, M. I., Aleedan, M. H., Abdou, A. H., & Salem, A. E. (2024). Sustainable pathways: Understanding the interplay of environmental behaviour, personal values, and tourist outcomes in farm tourism. *Discover Sustainability, 5*(1), Article 153. <https://doi.org/10.1007/s43621-024-00354-8>
- Kastenholz, E., Eusébio, C., & Carneiro, M. J. (2018). Segmenting the rural tourist market by sustainable travel behaviour: Insights from village visitors in Portugal. *Journal of Destination Marketing & Management, 10*, 132–142. <https://doi.org/10.1016/j.jdmm.2018.09.001>
- Kim, K., Wang, Y., Shi, J., Guo, W., Zhou, Z., & Liu, Z. (2023). Structural relationship between ecotourism motivation, satisfaction, place attachment, and environmentally responsible behaviour intention in nature-based camping. *Sustainability, 15*(11), Article 8668. <https://doi.org/10.3390/su15118668>
- Latorre, J., de Frutos, P., de-Magistris, T., & Martinez-Peña, F. (2021). Segmenting tourists by their motivation for an innovative tourism product: Mycotourism. *Journal of Ecotourism, 20*(4), 311–340. <https://doi.org/10.1080/14724049.2021.1892123>
- Lee, S., Jeon, S., & Kim, D. (2011). The impact of tour quality and tourist satisfaction on tourist loyalty: The case of Chinese tourists in Korea. *Tourism Management, 32*(5), 1115–1124. <https://doi.org/10.1016/j.tourman.2010.09.016>
- Liang, A. R.-D., Hsiao, T.-Y., Chen, D.-J., & Lin, J.-H. (2020). Agritourism: Experience design, activities, and revisit intention. *Tourism Review, 76*(5), 1181–1196. <https://doi.org/10.1108/TR-10-2019-0438>
- Lin, J. (2023). Rural tourism feature division method based on hierarchical cluster analysis. In Hung, J. C., Yen, N. Y., & Chang, J.-W. (Eds.), *Frontier computing* (pp. 1680–1686). Springer Nature. https://doi.org/10.1007/978-981-99-1428-9_224
- Mazanec, J. A., & Dolnicar, S. (2020). Segmentation — tourism. In Jafari, J., & Xiao, H. (Eds.), *Encyclopedia of tourism* (pp. 1–4). Springer International Publishing. https://doi.org/10.1007/978-3-319-01669-6_169-3
- McKercher, B., Tolkach, D., Eka Mahadewi, N. M., & Byomantara, D. G. N. (2023). Choosing the optimal segmentation technique to understand tourist behaviour. *Journal of Vacation Marketing, 29*(1), 71–83. <https://doi.org/10.1177/13567667221078240>
- Ndhlovu, E., & Dube, K. (2024). Agritourism and sustainability: A global bibliometric

- analysis of the state of research and dominant issues. *Journal of Outdoor Recreation and Tourism*, 46, Article 100746. <https://doi.org/10.1016/j.jort.2024.100746>
- Pan, S.-Y., Gao, M., Kim, H., Shah, K. J., Pei, S.-L., & Chiang, P.-C. (2018). Advances and challenges in sustainable tourism toward a green economy. *Science of the Total Environment*, 635, 452–469. <https://doi.org/10.1016/j.scitotenv.2018.04.134>
- Rodríguez, J., Semanjski, I., Gautama, S., Van de Weghe, N., & Ochoa, D. (2018). Unsupervised hierarchical clustering approach for tourism market segmentation based on crowdsourced mobile phone data. *Sensors*, 18(9), Article 2972. <https://doi.org/10.3390/s18092972>
- Safarov, B., Amirov, A., Mansurova, N., Hassan, T. H., Hasanov, H., Pereş, A. C., Bilalov, B., & Turdibekov, K. (2024). Prospects of agrotourism development in the region. *Economies*, 12(12), Article 321. <https://doi.org/10.3390/economies12120321>
- Sisneros-Kidd, A. M., D'Antonio, A., Monz, C., & Mitrovich, M. (2021). Improving understanding and management of the complex relationship between visitor motivations and spatial behaviours in parks and protected areas. *Journal of Environmental Management*, 280, Article 111841. <https://doi.org/10.1016/j.jenvman.2020.111841>
- Thang, N. P. (2025). Understanding eco-tourism satisfaction: A structural equation modeling examination of critical determinants. *SAGE Open*, 15(3). <https://doi.org/10.1177/21582440251378061>
- Tseng, S.-C., Wang, D., Shen, C.-C., & Chung, H.-P. (2023). A study on the relationship between tourists' experience and experience value and satisfaction in Taiwan's farmer's markets. *Sustainability*, 15(10), Article 8347. <https://doi.org/10.3390/su15108347>
- Tulasi, E. E., Ashiaby, O. E., Kodua, P., Ahlijah, B., & Agyeman-Duah, M. O. (2024). The role of aesthetics in tourist satisfaction in the Ghanaian hospitality industry. *Heliyon*, 10(12), Article e32944. <https://doi.org/10.1016/j.heliyon.2024.e32944>
- Tuu, H. H., & Olsen, S. O. (2010). Nonlinear effects between satisfaction and loyalty: An empirical study of different conceptual relationships. *Journal of Targeting, Measurement and Analysis for Marketing*, 18(3), 239–251. <https://doi.org/10.1057/jt.2010.19>
- Van Trung, H., & Mohanty, P. P. (2021). Exploring the level of tourist satisfaction in agritourism: A reflection of Tra Que Village, Vietnam. *Journal of Gastronomy and Tourism*, 5(2), 107–116. <https://doi.org/10.3727/216929721X16105303036481>
- Vicente, J. M. (2024). Green tourist behaviour analysis and its relationship with the choice of eco-tourism destination: An empirical study. *International Journal of Geoheritage and Parks*, 12(4), 544–557. <https://doi.org/10.1016/j.ijgeop.2024.11.003>
- Wang, W., Cheng, S., Chen, Z., & Liu, K. (2022). Classification of rural tourism features based on hierarchical clustering analysis knowledge recognition algorithm. *Mathematical Problems in Engineering*, 2022, Article 2956020. <https://doi.org/10.1155/2022/2956020>
- Wu, C. K., Wang, C.-N., Le, T. K. T., & Nhieu, N.-L. (2022). Sustainable agritourism location investigation in Vietnam by a spherical fuzzy extension of integrated decision-making approach. *Sustainability*, 14(17), Article 10555. <https://doi.org/10.3390/su141710555>
- Yanan, L., Ismail, M. A., & Aminuddin, A. (2024). How has rural tourism influenced the sustainable development of traditional villages? A systematic literature review. *Heliyon*, 10(4), Article e25627. <https://doi.org/10.1016/j.heliyon.2024.e25627>

- Zagaria, C., Schulp, C. J. E., Kizos, T., & Verburg, P. H. (2018). Perspectives of farmers and tourists on agricultural abandonment in east Lesvos, Greece. *Regional Environmental Change*, 18(5), 1467–1479. <https://doi.org/10.1007/s10113-017-1276-4>
- Zhou, W., Chen, L.-Y., & Chou, R.-J. (2021). Important factors affecting rural tourists' aesthetic experience: A case study of Zoumatang Village in Ningbo. *Sustainability*, 13(14), Article 7594. <https://doi.org/10.3390/su13147594>

Appendix

Appendix 1: The variable and meaning

Category	Question Content	Code
(I) Sustainable Tourism Resources (STR)	The natural landscapes of rural areas are unique.	STR1
	The natural ecosystems are diverse and distinctive.	STR2
	The historical sites and cultural heritage are valuable.	STR3
	The festivals and traditional customs are attractive and diverse.	STR4
	The local cuisine featuring regional specialties is appealing and diverse.	STR5
	The agricultural products offered are fresh and safe.	STR6
(II) Agricultural and Cultural Experiences (ACE)	Visiting traditional craft villages in the local area is interesting.	ACE1
	Experiencing rural daily life is unique.	ACE2
	Working as a real farmer feels authentic.	ACE3
	Learning local farming and production techniques from local people is useful.	ACE4
(III) Service Quality and Local Engagement (SQE)	The staff are knowledgeable and skilled in communication.	SQE1
	The service provided by the staff is friendly, polite, and professional.	SQE2
	The local people are welcoming and friendly.	SQE3
(IV) Sustainable Infrastructure and Accessibility (SIA)	The transportation system for tourism development and connectivity is well-developed and convenient.	SIA1
	The accommodation services (hotels, guesthouses, etc.) are sufficient and convenient.	SIA2
	Accessing tourism-related information and communication services is easy.	SIA3
	The electricity and water supply system is complete and reliable.	SIA4
(V) Safety and Environmental Sustainability (SES)	The political and social conditions in the region are stable.	SES1
	Security and order at tourist attractions are guaranteed.	SES2
Satisfaction	Feel very satisfied after experiencing agricultural tourism	SAT
Revisit	Will return to visit the area on future trips.	REV

Appendix 2: Cluster Characteristics (4 Clusters)

Variable	Cluster 1	Cluster 2	Cluster 3	Cluster 4
STR1	4.50	3.25	3.50	2.30
STR2	4.50	4.23	3.30	5.08
STR3	4.27	2.88	3.05	4.74
STR4	3.77	1.35	3.70	5.76
STR5	3.77	5.90	2.78	2.71
STR6	3.77	2.30	3.15	3.38
ACE1	4.11	5.08	2.78	3.22
ACE2	1.11	4.74	3.45	1.86
ACE3	1.11	5.76	3.50	4.40
ACE4	1.11	2.71	2.83	6.78
SQE1	4.61	3.10	3.13	2.96
SQE2	1.11	1.69	2.75	2.54
SQE3	1.11	4.23	2.55	2.71
SIA1	4.55	2.15	2.60	2.88
SIA2	5.55	2.54	2.33	3.15
SIA3	5.55	2.37	3.43	2.54
SIA4	5.55	2.88	3.63	2.37
SES1	4.27	1.35	3.83	2.69
SES2	4.22	2.77	2.65	2.54

Note: Values represent mean scores on a 5-point Likert scale

Appendix 3: The visualisations of HCA

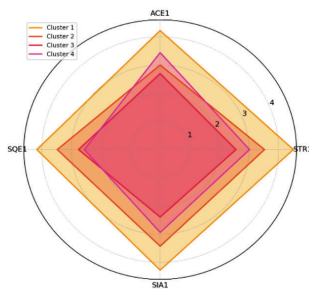


Figure 3.1: Radar chart

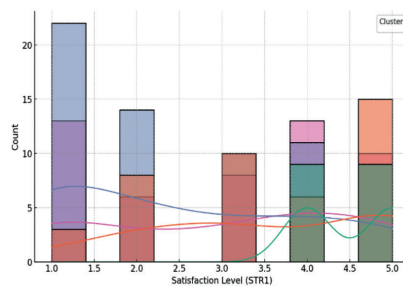


Figure 3.2: Histogram chart

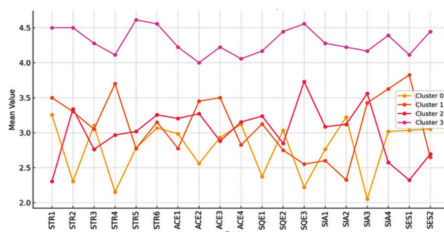


Figure 3.3: Line chart

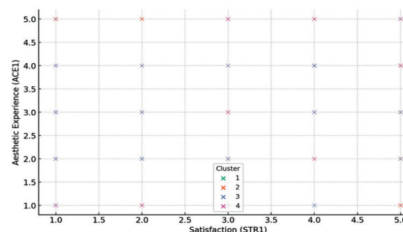


Figure 3.4: Scatter plot chart