

INTEGRATION MODEL OF AGRICULTURE WITH SOCIETY COMMUNITY-BASED TOURISM IN BATUNGSEL VILLAGE, PUPUAN DISTRICT, TABANAN REGENCY, BALI

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Abstract

This study develops an innovative integration model of coffee agriculture with society community-based tourism in Batungsel Village, Tabanan Regency, Bali, Indonesia. Mixed-methods combining Likert-scale surveys and NVivo qualitative analysis based on pentahelix framework dimensions, this research identifies community perceptions and priority themes for sustainable agrotourism development. Results reveal strong support (mean 4.18/5.0) with the highest scores for economic viability (4.35) and community centrality (4.28). Eight priority themes emerged: farmer institutional strengthening, capacity building, experiential coffee tourism, digital marketing, water-based aquaculture diversification, gender inclusion, traditional knowledge integration, and agroforestry conservation. The proposed model comprises pentahelix governance connecting stakeholders, operational mechanisms with benefit-sharing (40%-30%-20%-10%), phased interventions, participatory monitoring across 24 indicators, and sustainability principles. This research contributes through participatory indicator co-production, digital marketing assessment, and gender-disaggregated analysis, addressing identified gaps in coffee agrotourism literature.

Keywords: agrotourism integration, community-based tourism, coffee plantation, sustainable agriculture, pentahelix model, rural development, Batungsel Village, Indonesia

Introduction

The concept of sustainable agriculture represents a critical pillar of Indonesia's national development agenda, particularly reflected in President Prabowo's Asta Cita vision emphasizing "strengthening harmonious alignment of life with environment, nature, and culture, and increasing inter-religious tolerance to achieve a just and prosperous society" (Decree, 2024; Hakim et al., 2022). The second pillar focuses on "building from villages and from below for economic equity and poverty reduction," underscoring the importance of bottom-up, community-centered development approaches (Bappenas, 2024). These dual objectives create a compelling policy framework for integrating agricultural systems with tourism development in rural Indonesia (Lane & Kastenholz, 2015).

Agrotourism, defined as tourism activities that combine agricultural production with visitor experiences (Lane & Kastenholz, 2015), has emerged globally as a promising strategy for rural economic diversification, cultural preservation, and sustainable resource management (Djuwendah et al., 2023; Susila et al., 2023). In Indonesia, particularly in Bali, the integration of agriculture with tourism offers unique opportunities to leverage the island's

established tourism infrastructure while preserving traditional farming systems and local cultural identity (Barbieri & Mshenga, 2008; Hidayat et al., 2023). Coffee plantation tourism, specifically, has demonstrated significant potential for community empowerment, biodiversity conservation, and economic resilience in mountainous regions across Southeast Asia (Hidayat et al., 2023; Jafaruddin et al., 2020; Sumantra et al., 2023).

Batungsel Village, located in Pupuan District, Tabanan Regency, Bali, presents an exemplary case for developing an integrated agriculture-tourism model. The village is characterized by extensive coffee plantations (primarily Arabica varieties), diverse agroforestry systems, abundant natural water resources forming natural reservoirs, and strong cultural traditions rooted in Balinese Hindu philosophy of Tri Hita Karana (harmony between humans, nature, and God) (Sia et al., 2025). Despite these assets, Batungsel faces challenges common to rural agricultural communities: limited market access for coffee products, youth outmigration, infrastructure constraints, and underutilization of tourism potential (Monograph, 2024).

Recent literature on agrotourism integration reveals several critical gaps that this study addresses (Sznajder et al., 2009). First, while numerous studies document single-case agrotourism initiatives, longitudinal impact evaluations measuring economic, social, and environmental outcomes remain scarce (Hidayat et al., 2023). Second, empirical evidence on digitalization effects (Islam, 2022)—specifically online marketing and booking platforms—on smallholder coffee village visitation and revenue is limited (Djuwendah et al., 2023). Third, few studies integrate participatory indicator co-production with quasi-experimental designs to establish causal linkages between interventions and outcomes (Pham, 2024). Fourth, gender-disaggregated outcome data in agrotourism research remain sparse despite recognized importance of women's roles in rural tourism (Pham, 2024).

This research addresses these gaps through three primary objectives: (1) identify local community (farmer) perceptions toward coffee-based agrotourism development using validated perception scales (Pham, 2024); (2) develop a community-based agriculture-tourism integration model appropriate for Batungsel Village context through pentahelix framework analysis (Prihayati & Veriasa, 2021); and (3) identify business diversification opportunities from natural water resources as natural reservoirs. The study's novelty resides in its methodological integration of participatory approaches with sustainability indexing, its focus on digital marketing interventions, its incorporation of agroecological mapping, and its explicit attention to gender and institutional dimensions of community-based tourism development (U.N.W.T.O., 2024).

Literature Review

Agrotourism integration

Agrotourism integration has increasingly been understood as more than adding tourism activities to farming sites; it is a strategic process of connecting agriculture, visitor experience, local institutions, and rural development goals into one sustainable system (Cavalleri et al., 2022; Susila et al., 2023).

Recent Scopus-based studies show that successful agrotourism integration depends on community participation, institutional coordination, and the ability of local actors to combine production, service delivery, and place-based identity in a coherent model (Cavalleri et al., 2022; Susila et al., 2023).

In this sense, agrotourism functions as a bridge between economic diversification and landscape preservation, especially in farming areas that already possess ecological and cultural assets (Djuwendah et al., 2023; Lane & Kastenholz, 2015). The literature also suggests that integration works best when it is designed as a multi-dimensional process rather than a single tourism product (Susila et al., 2023; Jafaruddin et al., 2020). Studies on agrotourism development emphasize the importance of linking agricultural activities with infrastructure, marketing, environmental management, and benefit-sharing mechanisms so that tourism supports rather than disrupts farming livelihoods (Cavalleri et al., 2022; Yanti et al., 2024).

This approach is especially relevant for coffee-based landscapes, where visitors can engage in cultivation, harvesting, processing, and tasting while local communities retain control over the value chain (Jafaruddin et al., 2020; Hidayat et al., 2023). For Batungsel Village, this means that agrotourism integration should be read as a rural transformation strategy that strengthens farmer income, protects agroforestry systems, and creates a more resilient local economy (Martiningsih et al., 2026; Djuwendah et al., 2023).

Society community-based tourism

Society community-based tourism can be understood as a tourism model in which local people are not only beneficiaries but also active planners, managers, and cultural stewards of tourism development (Hidayat et al., 2023; Yanti et al., 2024).

Scopus-indexed literature on community-based tourism consistently highlights social capital, community empowerment, and shared decision-making as core conditions for long-term sustainability (Meutia et al., 2022; Djuwendah et al., 2023). This means tourism development becomes more socially legitimate when it reflects local needs, local knowledge, and local control over resources and benefits (Djuwendah et al., 2023; Pham, 2024). In rural destinations, community-based tourism is also closely tied to social cohesion, cultural continuity, and inclusive participation (Meutia et al., 2022; Saptaningtyas & Kamase, 2022).

Recent studies show that when community members are meaningfully involved, tourism can strengthen local identity, create employment, and widen participation for women, youth, and other underrepresented groups (Meutia et al., 2022; Pham, 2024). At the same time, the literature warns that weak institutions, uneven power relations, and limited coordination can reduce community ownership and weaken sustainability outcomes (Djuwendah et al., 2023; Lane & Kastenholz, 2015). For Batungsel Village, this supports the idea that society community-based tourism should be framed as a participatory governance model that places farmers, customary leaders, youth groups, and village institutions at the center of planning and implementation (Martiningsih et al., 2026; Saptaningtyas & Kamase, 2022).

Taken together, these two bodies of literature support your manuscript's argument that coffee-based rural development should not be treated as a standalone tourism project, but as an integrated community process linking agriculture, culture, governance, and sustainability (Susila et al., 2023; Cavalleri et al., 2022). They also justify the pentahelix orientation in your study, because integration requires collaboration among community, government, business, academia, and supporting institutions (Martiningsih et al., 2026; Susila et al., 2023). In Batungsel Village, this theoretical base strengthens the case for a community-led agrotourism model that preserves coffee landscapes while expanding economic opportunity and social inclusion (Martiningsih et al., 2026; Djuwendah et al., 2023).

Study Area and Methods

Study Area

Batungsel Village is located in Pupuan District, Tabanan Regency, Bali Province, Indonesia (coordinates: 8°20'S, 115°05'E; elevation: 600-900 m above sea level) as Figure 1.

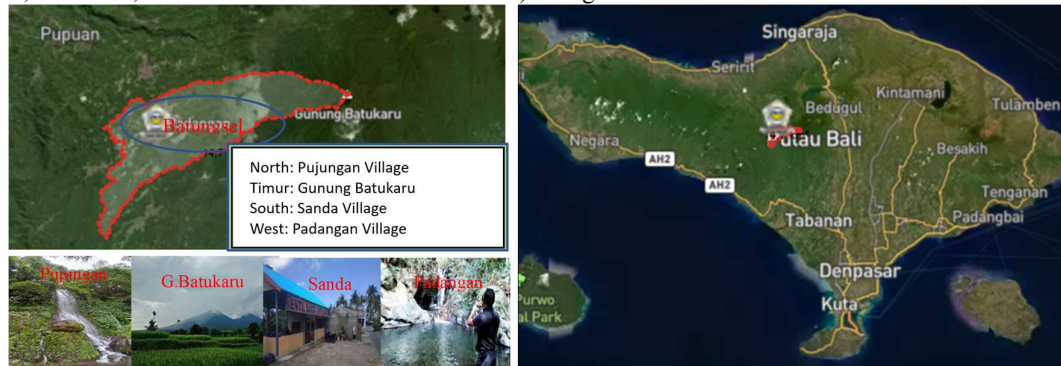


Figure 1. Batungsel Village

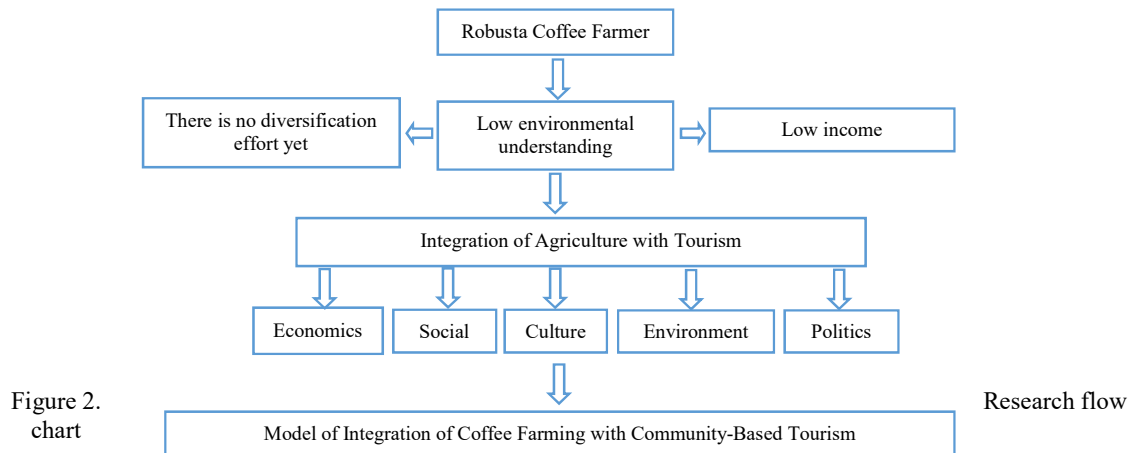
The village covers approximately 485 hectares with a population of 1,847 residents (489 households) as of 2024. The landscape is characterized by mountainous terrain with steep slopes (15-40%), volcanic soils (andosols), high rainfall (2,500-3,500 mm annually), and mean annual temperature of 22-25°C—conditions highly suitable for Arabica coffee cultivation. Coffee production represents the primary economic activity, with approximately 320 hectares under coffee cultivation (predominantly Arabica varieties including Kintamani, Kartika, and local landraces). The village possesses abundant natural water resources, including springs and streams forming natural reservoir systems

Research Design

This study employs a convergent parallel mixed-methods design integrating quantitative perception surveys with qualitative thematic analysis (Braun & Clarke, 2006; Creswell & Plano Clark, 2017). The research was conducted from January to September 2024, encompassing three phases: (1) baseline assessment and perception survey (January-March); (2) qualitative data collection through interviews and focus groups (April-June); and (3) integration and model development (July-September). The theoretical framework combines the pentahelix model with community-based tourism principles, examining six dimensions: (1) local community as development center; (2) economic viability; (3) social equity; (4) political support; (5) cultural preservation; and (6) environmental sustainability (Pham, 2024). Next steps of the research as Figure 2 can be briefly explained as follows: So far, robusta coffee farmers in cultivating their coffee gardens have not implemented commodity diversification so that farmers' income if they only cultivate coffee is still low (Widayati et al., 2024). In addition, the understanding of environmental conservation is still very lacking, especially in the understanding of coffee waste processing. In fact, if product diversification is carried out, production does not only rely on products from coffee but also from other commodities. Related to the understanding of environmental sustainability, this will activate waste processing activities into reusable materials, for example such as compost, will be able to be reused as fertilizer. On the coffee plantation land, the impact in the future will of course be a reduction in fertilizer costs and also the

creation of environmental cleanliness and health. In addition to these efforts in order to reduce the conversion of coffee plantation land to other functions such as housing, villas and others, efforts to integrate tourism with agriculture with the concept of agrotourism are very much needed to be developed, especially since Bali is known as a tourist area that is known nationally and internationally.

In the agro-tourism integration effort, of course, there will be several factors / aspects that affect such as Cultural aspects, Social Aspects, Political Aspects, Economic Aspects and also Environmental Aspects (Jafaruddin et al., 2020). To see how these 5 aspects will affect the integration of agro-tourism in Batungsel Village, a Community-based Agriculture and Tourism Integration Model is needed so that these aspects can collaborate synergistically to achieve the welfare of the community in Batungsel Village, especially Robusta coffee farming.



Data Collection and Analysis

A purposive sampling strategy identified 30 respondents representing key stakeholder groups: 20 coffee farmers, 5 customary leaders, 2 policy makers, and 3 external experts. The perception survey instrument comprised 30 items across six pentahelix dimensions, using 5-point Likert scales (1=strongly disagree to 5=strongly agree). Reliability analysis yielded Cronbach's alpha of 0.87, indicating good internal consistency. Qualitative data collection employed semi-structured interviews (n=15) and focus group discussions (n=3) to explore community perceptions and priority themes. Quantitative data were analyzed using SPSS software (descriptive statistics, t-tests, ANOVA). Qualitative data were analyzed through thematic coding using NVivo software (version 12), following Braun and Clarke's (2006) six-phase thematic analysis procedure.

RESULTS AND DISCUSSION

Community Perceptions of Agrotourism Integration

Quantitative analysis of perception survey data reveals strong overall support for agrotourism integration among Batungsel community members (Saptaningtyas & Kamase, 2022). The mean perception score across all 30 items and 30 respondents was 4.18 (SD=0.52), falling within the positive/favorable range (3.68-5.00). This indicates general agreement that integrating coffee agriculture with tourism development represents a desirable and viable strategy for village development as Table 1.

Table 1. Mean Perception Scores by Pentahelix Dimension

Dimension	Mean	SD	Min	Max	Interpretation
Economic Viability	4.35	0.48	3.40	5.00	Positive
Local Community Centrality	4.28	0.51	3.20	5.00	Positive
Cultural Preservation	4.21	0.55	3.00	5.00	Positive
Environmental Sustainability	4.15	0.58	2.80	5.00	Positive
Social Equity	4.12	0.54	3.00	5.00	Positive
Political Support	4.01	0.61	2.60	5.00	Positive
Overall Mean	4.18	0.52	3.17	5.00	Positive

The highest-scoring dimension—economic viability—reflects community recognition of agrotourism's income diversification potential. Local community centrality, the second-highest dimension, indicates strong

desire for community-led development processes. Cultural preservation scored notably high (4.21), reflecting concerns about maintaining Balinese identity amid tourism development. Political support, while positive (4.01), scored lowest among dimensions, suggesting perceived gaps in governmental commitment and coordination.

Priority Themes from Qualitative Analysis

NVivo-assisted thematic analysis of interview and focus group transcripts identified eight priority themes clustered within pentahelix dimensions. The most frequently coded theme (127 references, 28 sources) emphasized strengthening farmer organizations as foundational for agrotourism success. Respondents consistently identified weak institutional capacity as a primary constraint as Table 2.

Table 2. Priority Themes from Qualitative Analysis

Pentahelix Dimension	Priority Theme	Coding Frequency	Sources
Local Community	Farmer Institutional Strengthening	127	28
Local Community	Capacity Building and Training Needs	98	26
Economic	Experiential Coffee Tourism Products	115	27
Economic	Market Linkages and Digital Marketing	89	24
Economic	Water-Based Aquaculture Diversification	76	22
Social	Gender Inclusion and Youth Engagement	82	25
Cultural	Traditional Knowledge Integration	94	26
Environmental	Agroforestry Conservation and Ecotourism	103	27

Key themes include: (1) Farmer institutional strengthening through formalization of cooperatives with legal status and management systems(Flanigan et al., 2014); (2) Capacity building spanning agricultural, tourism, business, and language domains; (3) Experiential coffee tourism products engaging visitors in authentic production processes; (4) Digital marketing strategies through social media, e-commerce, and booking platforms; (5) Water-based aquaculture diversification leveraging natural springs and streams; (6) Gender inclusion and youth engagement through targeted roles and support mechanisms; (7) Traditional knowledge integration preserving indigenous cultivation practices and cultural rituals; (8) Agroforestry conservation linking biodiversity protection with ecotourism opportunities.

Proposed Integration Model

Synthesis of quantitative perception data, qualitative priority themes, literature review, and stakeholder validation workshops produced a comprehensive integration model comprising five interconnected components as Figure 3:

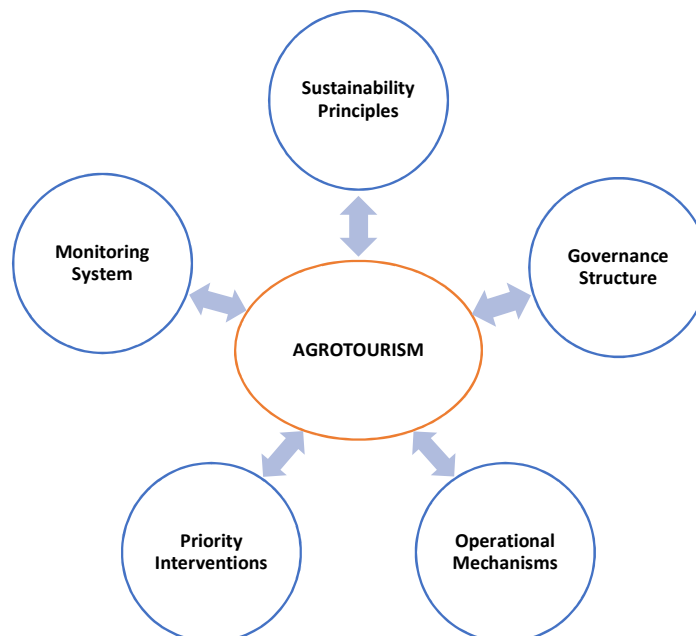


Figure 3. Community-Based Agrotourism Integration Model in Batungsel Village, Bali

- 1. Governance Structure:** Multi-stakeholder coordination body (Batungsel Agrotourism Development Forum) connecting community (farmer cooperatives, women's groups, youth committees, customary institutions), government (village, district tourism and agriculture offices), business (Bumdes, Pokdarwis, tour operators), academic (universities, research institutes), and media sectors in pentahelix configuration (Amloy et al., 2024).
- 2. Operational Mechanisms:** Production systems maintaining agroforestry cultivation; tourism service delivery through Pokdarwis and Bumdes; multi-channel marketing combining digital and traditional approaches; benefit distribution (40% individual providers, 30% cooperative, 20% village enterprises, 10% community development); quality assurance through training and visitor feedback (Bappenas, 2024).
- 3. Priority Interventions:** Five clusters including (a) institutional strengthening (Year 1), (b) infrastructure development (Years 1-2), (c) capacity building (ongoing), (d) product development (Years 1-3), (e) digital marketing systems (Years 1-2).
- 4. Monitoring System:** Participatory indicators across six dimensions tracking farmer membership, income, employment, women's participation, youth retention, cultural practices, agroforestry maintenance, organic certification, and government support.
- 5. Sustainability Principles:** Community centrality, economic viability, social equity, cultural integrity, environmental sustainability, and adaptive management.

Discussion

The strong community support for agrotourism integration (mean perception score 4.18/5.0) aligns with findings from similar Indonesian contexts (Djuwendah et al., 2023; Risvita et al., 2023). The emphasis on economic viability reflects community recognition of income diversification potential, consistent with documented economic empowerment motivations (Jafaruddin et al., 2020). The priority on local community centrality resonates with community-based tourism principles and Indonesia's Asta Cita bottom-up development philosophy (Decree, 2024).

The identified priority themes provide actionable implementation guidance. Farmer institutional strengthening aligns with research demonstrating that strong organizations enhance marketing efficiency and collective bargaining power (Djuwendah et al., 2023). The focus on experiential products reflects global trends toward authentic, participatory agrotourism (Cavalleri et al., 2022). Digital marketing emphasis addresses documented gaps in empirical evidence on digitalization effects (Yanti et al., 2024). Aquaculture diversification extends typical agrotourism models and demonstrates site-specific resource utilization for economic resilience.

This research contributes methodologically through participatory mixed-methods design enabling comprehensive understanding and longitudinal evaluation. The participatory indicator co-production addresses gaps in community-led monitoring systems (Pham, 2024). Substantively, explicit attention to digital platforms, gender inclusion, and agroecological integration addresses identified literature gaps (Creswell & Plano Clark, 2017; Meutia et al., 2022). The pentahelix framework adaptation provides analytical structure for examining multi-dimensional integration challenges.

Strategies to Strengthen Social Capital in Agro-Tourism Development

The Batungsel findings suggest that agrotourism development will be more sustainable when it is anchored in strong social capital, because community trust, shared norms, and collective action shape how local people organize, cooperate, and distribute responsibilities. This aligns with prior studies showing that social capital plays a central role in building sustainable tourism destinations, particularly when local actors collaborate through community-based institutions and participatory decision-making processes (Arifin et al., 2022; Putri et al., 2021). In Batungsel, the positive perception of local community centrality indicates that residents are not merely accepting tourism; they are expecting to be active decision-makers in planning, management, and benefit-sharing, which is an important sign of social readiness for community-based agrotourism.

Strengthening social capital in this context requires more than formal coordination; it also depends on trust-building, intergenerational participation, and the creation of stable local organizations such as farmer groups, women's groups, youth groups, and customary institutions. Previous research on community-based tourism in Indonesia shows that collaboration becomes more effective when the community has a clear organizational structure and shared rules that guide roles, rights, and obligations in tourism management. For Batungsel Village, this means that the proposed agrotourism forum should function not only as an administrative body, but also as a social space where trust, collective learning, and consensus are continuously reinforced.

A similar pattern is visible in studies of coffee-based agrotourism, where local participation, cultural attachment to land, and collaboration among farmers are repeatedly identified as the foundation of successful development. Research on community coffee landscapes in Indonesia shows that agrotourism works best when it preserves farming identity while allowing villagers to participate in tourism through education, interpretation, hospitality, and product promotion. In Batungsel, this suggests that social capital should be strengthened through

training, institutional mentoring, and shared tourism protocols so that the community can manage visitor activities without weakening agricultural routines or cultural values.

Analysis of The Sustainability of The Community-Based Agrotourism Economy

From an economic perspective, the Batungsel results show that the community views agrotourism as a realistic pathway for income diversification rather than as a symbolic development agenda. This is important because community-based agrotourism is often adopted in rural areas precisely when agricultural income alone is insufficient to support household resilience, especially in landscapes where labor, market access, or commodity prices are unstable. Previous studies confirm that agritourism can create economic benefits for local stakeholders by generating revenues from entrance fees, product sales, homestays, food services, and tourism experiences, while also maintaining the agricultural function of the land (Djuwendah et al., 2023). In Batungsel, the high score for economic viability indicates that villagers already understand this diversification logic and see tourism as a complementary income stream.

However, economic sustainability should not be interpreted only as short-term revenue growth, because community-based agrotourism becomes truly sustainable when benefits are distributed fairly and the local production base remains intact. Research on community-based agrotourism sustainability in Waturaka Village found that economic sustainability tends to be stronger when tourism is embedded in local farming systems and managed through collective arrangements that protect farmers' ownership while allowing them to share tourism-related income. This is directly relevant to Batungsel, where the proposed benefit-sharing model and community-controlled governance can help prevent unequal capture of tourism gains while encouraging wider participation across farmer households.

The economic discussion also points to the need for product differentiation, because agrotourism income becomes more resilient when it is supported by multiple value-adding activities rather than a single attraction. Studies on coffee agrotourism show that experiential tourism, digital marketing, and local product branding can improve farm income while expanding the destination's market reach (Jafaruddin et al., 2020; Yanti et al., 2024). At the same time, the literature warns that economic gains may remain limited if infrastructure, marketing capacity, and institutional coordination are weak, which is why community-based models must combine entrepreneurship with collective management. For Batungsel, the implication is clear: economic sustainability will depend on whether local actors can maintain agricultural productivity while developing tourism packages, visitor services, and market linkages that are firmly rooted in the village economy.

Conclusion

This research developed an innovative integration model for coffee agriculture and community-based tourism in Batungsel Village, Bali, Indonesia. Through convergent mixed-methods design, the study identified strong community support (mean perception score 4.18/5.0) with priority themes including farmer institutional strengthening, experiential tourism products, digital marketing, aquaculture diversification, gender and youth inclusion, traditional knowledge integration, and agroforestry conservation. The proposed model comprises pentahelix governance, operational mechanisms, priority interventions, participatory monitoring, and sustainability principles.

Implementation requires coordinated stakeholder action: farmers strengthening institutions and quality production; government investing in infrastructure and policy support; businesses providing market linkages; academia contributing research and training; media supporting promotion. Success depends on balancing economic development with cultural-environmental preservation, ensuring equitable benefit distribution, and adapting strategies based on monitoring evidence. Future research priorities include longitudinal impact evaluation, digital marketing intervention assessment, comparative multi-village analysis, and gender-disaggregated outcome measurement.

Batungsel Village possesses exceptional potential for sustainable agrotourism development given its coffee assets, agroforestry landscapes, water resources, cultural heritage, and community commitment. The integration model provides a roadmap for realizing this potential in ways that empower local communities, preserve cultural and environmental values, and contribute to rural prosperity aligned with Indonesia's Asta Cita vision

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Author Contributions

Conceptualization, Ni Gst.Ag.Gde Eka Martiningsih; *Methodology*, I Made Budiasa; *Formal analysis*, Ni Putu Eka Pratiwi; *Investigation*, Ni Gst.Ag.Gde Eka Martiningsih and Nerilyn J. Victoria.; *Data Curation*, Ni Putu Eka Pratiwi; *Writing – Original draft preparation*, Ni Gst.Ag.Gde Eka Martiningsih and I Made Budiasa; *Writing - Review & Editing* Setya Chendra Wibawa, All authors have read and agreed to the published version of the manuscript.

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