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Research Article

Transformation of Strawberry Farmers into Agrotourism Operators in Batu City: A Case Study of Lumbung Stroberi Pandanrejo

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Abstract
The transformation of strawberry farmers into agrotourism operators represents a paradigm shift in rural development from pure agriculture to service-based tourism economy. This study analyzes the transformation process of strawberry farmers in Pandanrejo Village, Batu City, East Java, using a qualitative case study approach. Data were collected through in-depth interviews with 18 informants, participatory observation, and document analysis. Results indicate that transformation occurred in three stages: (1) crisis of traditional agriculture due to price fluctuations, (2) BUMDes-based agrotourism initiation in 2018-2019, and (3) institutionalization of sustainable tourism. Key driving factors include economic incentives (40-60% income increase), policy support from Batu City Tourism Office, and social capital of mutual cooperation (Sinoman Batu Association). However, challenges include infrastructure limitations, conflicts with traditional middlemen, and risks of cultural commodification. This study recommends strengthening BUMDes managerial capacity and developing agrotourism zoning regulations to maintain balance between commercialization and sustainability.

Keywords: Agrotourism, Batu City, BUMDes, Farmer Transformation, Sustainability

1. Introduction

Indonesia's tourism sector has demonstrated a significant contribution to the national economy, reaching 5.5% of Gross Domestic Product (GDP) with rapid growth in rural areas (Suastika & Yasa, 2015). In the context of sustainable development, a paradigm shift has occurred from mass tourism toward ecotourism that emphasizes environmental preservation and empowerment of local communities (Sunarti, 2026). One model that has grown rapidly is agrotourism which is the integration of agricultural activities with tourist visits that provide educational and recreational experiences (Oltean et al., 2024; Wardani et al., 2024).

Batu City, located in the highlands of East Java (700-1000 masl) with temperatures of 15-25°C, has developed into a leading agrotourism destination with more than 9 million annual tourist visits (Wibowo, 2026). Among various agricultural commodities, strawberries (Fragaria × ananassa) occupy a strategic position not only because of their high economic value but also due to their short production cycle, high market demand, and strong linkage with agro-tourism activities. Their attractive appearance, distinctive flavor, and suitability for pick-your-own farm experiences make strawberries particularly valuable in tourism-based agricultural development, allowing farmers to generate income from both fresh produce sales and experiential tourism services. The history of strawberry cultivation in Batu dates back to the Dutch colonial era, particularly in Pandanrejo Village, Bumiaji District, which is still known today as a center of premium quality strawberry production (Rahadiantino et al., 2022).

However, the paradox of modern agriculture presents serious challenges for strawberry farmers. Extreme market price fluctuations, dependence on harvest seasons, and the dominance of middlemen in the supply chain create economic uncertainty that threatens the sustainability of traditional livelihoods (Putra & Sanjiwani, 2022). This is where agrotourism emerges as a solution for income diversification, where the functional transformation of 7-8 hectares of agricultural land into a strawberry-picking tourist attraction offers a farm-to-table experience to visitors (Rahadiantino et al., 2022; Suryani et al., 2024).

This transformation process is not merely a change in land function, but rather a complex socio-economic reconstruction. Farmers who were previously oriented toward mass production must adapt to new skills: service management, intercultural communication, digital marketing, and tourist experience management. At the institutional level, the establishment of Village-Owned Enterprises (BUMDes) as agrotourism managers represents an innovation in village economic governance that integrates the individual interests of farmers with the collective welfare of the community (Rahadiantino et al., 2022).

This research is relevant given that academic literature on strawberry agrotourism in Indonesia remains limited, particularly studies that analyze the dimension of farmers' social transformation in depth. Previous studies such as Wahyudi et al. (2024) in Lombok and Sheyoputri et al. (2025) in South Sulawesi focused on macroeconomic aspects, while micro-level dynamics how farmers reconstruct their identity and economic practices remain poorly documented. Using the sustainable livelihood approach framework, this study aims to fill that literature gap.

This study aims to examine the transformation process of strawberry farmers into agrotourism operators in Pandanrejo Village, identify the factors that drive and hinder the transformation, and analyze the socio-economic impact of the transformation on farmers' livelihood resilience.

2. Literature Review

2.1. Agrotourism as a Rural Economic Diversification Strategy

Agrotourism is defined as a form of tourism that integrates the agricultural sector with the tourism industry, aimed at providing educational and recreational experiences for tourists (Oltean et al., 2024). This model is considered capable of adding value to agricultural products and extending the local economic value chain (Nurjati, 2021). In the context of agrarian Indonesia, agrotourism has great potential to alleviate rural poverty while preserving traditional farming practices (Zulgani et al., 2023).

The study of Wahyudi et al. (2024) in Sembalun, Lombok showed that strawberry agrotourism contributes 29.88% to the increase in farmer household income, with 78.57% originating from the development of the strawberry farming business itself. This finding confirms that agrotourism does not replace agriculture, but rather strengthens it through value-added from tourist visits. However, the study also identified that the low education level of household heads (44% only completed elementary school) hinders the optimization of agrotourism benefits, given that jobs emerging after agrotourism tend to be low-skill in nature, such as parking and motorcycle taxi services (Wahyudi et al., 2024).

2.2. Livelihood Transformation Theory

The Sustainable Rural Livelihoods (SRL) framework developed by DFID (Department for International Development) provides an analytical lens for understanding how farmer households manage their portfolio of activities. The transformation from pure agriculture to agrotourism represents a shift from natural capital (land, water) and physical capital (farming tools) toward human capital (service skills) and social capital (tourist networks) (Scoones, 2015). The concept of "activity pluralism"

explains that modern farmers are no longer mono-active but instead develop multiple livelihood strategies. In the context of Pandanrejo, strawberry farmers experience a hybridization of roles: they continue farming but simultaneously become experience curators who design tourist interactions with the agricultural process. The study of Widiyanto et al. (2024) in Karanganyar shows that the sustainability of agrotourism depends on the balance between commercialization and the preservation of agrarian values.

2.3. Local Institutions and Agrotourism Governance

Village-Owned Enterprises (BUMDes) as an instrument of agrotourism management represent an institutional innovation in people's economy. Unlike a purely private model, BUMDes ensures a more equitable distribution of benefits to all members of the village community (Rahadiantino et al., 2022). However, analysis of BUMDes financial performance shows high variability, the net profit margin (NPM) profitability ratio reaches 40%, which is very good, yet asset turnover is only 0.8 times, indicating that efficiency in asset utilization remains low (Rofiah et al., 2022).

The study of Riyanti et al. (2025) in Sembalun identified that the success of strawberry agrotourism depends on the synergy between internal factors (land ownership, capital) and external factors (infrastructure, government promotion). The EFAS (External Factor Analysis Summary) matrix shows a total score of 3.121, indicating that strawberry agrotourism is able to respond to external opportunities but remains vulnerable to threats such as climate change and the emergence of competing destinations (Riyanti et al., 2025).

2.4. Sustainability and Challenges of Agro-Ecotourism

Six dimensions of agrotourism sustainability including economic, social, cultural, ecological, institutional, and technological serve as important evaluation criteria (Suryani et al., 2024). The study of Putra & Sanjiwani (2022) found that Lumbung Stroberi Pandanrejo faces risks of over-tourism that can degrade soil and plant quality. Additionally, the commodification of local culture such as harvest rituals or the Javanese language in tourist interactions requires careful management to avoid staged authenticity that damages cultural integrity (Suryani et al., 2024).

2.5. Hybridity and the Complexity of the New Identity

The concept of the farmer-operator identified in this study reflects a form of hybrid identity, referring to individuals who negotiate multiple social and economic roles simultaneously. In cultural and social theory, hybridity describes the emergence of new identities formed through the interaction of different systems of practice and meaning rather than the replacement of one identity by another. Within rural transformation contexts, hybridity often appears when traditional agricultural actors engage in non-farm or service-based economic activities, creating overlapping professional identities.

In this study, farmer-operators are no longer positioned solely as traditional farmers, yet have not fully transitioned into tourism entrepreneurs. This in-between condition generates role strain, particularly among the senior generation who must adapt to hospitality standards, customer interaction, and service-oriented norms that differ from conventional agricultural work ethics. Nevertheless, hybridity also produces adaptive capacity and resilience. During the pandemic, agricultural competencies supported household survival when tourism activities declined, while tourism-based income compensated for agricultural losses caused by climate variability and harvest failure.

3. Methods

3.1. Design and Approach

This study uses a qualitative method with a case study approach, with the unit of analysis being Pandanrejo Village, Bumiaji District, Batu City. Location selection was based on the following considerations: (1) Pandanrejo is the oldest strawberry cultivation center in Batu with a strong agricultural tradition; (2) there is a clear functional transformation from pure agriculture to agrotourism since 2018; (3) availability of secondary data from previous studies (Putra & Sanjiwani, 2022; Rahadiantino et al., 2022). The research paradigm is interpretive-constructivist, assuming that social reality is constructed through interactions and meanings constructed by actors (Creswell, 2014). The researcher positioned themselves as a participant observer who engaged in the daily activities of agrotourism during the research period. Participants were selected using purposive sampling to capture actors directly involved in the agricultural–tourism transformation process, including farmer-operators, tourism managers, local government representatives, and community members.

3.2. Data Collection Techniques

Primary data were collected through two main methods. First, in-depth interviews were conducted with 18 selected informants using purposive sampling and snowball sampling techniques. These informants consisted of 8 strawberry farmers who had transformed into tourism operators (with the criterion of at least 5 years of farming and 2 years of involvement in agrotourism), 3 administrators of BUMDes Lumbung Stroberi, 4 members of the Women Farmers Group (KWT) who process strawberry products, and 3 representatives from the Batu City Tourism Office and Agriculture Office. The interview guide used was semi-structured and covered several main themes, namely the history of strawberry cultivation, motivation for transformation, role adaptation, socio-economic impacts, and the challenges faced by informants.

Second, participatory observation was conducted over 3 months, specifically during the period of May to July 2025, which coincided with the strawberry harvest season. During this period, the researcher resided in the village and participated directly in various activities, ranging from preparation of tourism land, tourist service, strawberry product processing, to BUMDes coordination meetings. The secondary data used in this study include BUMDes financial reports from 2019 to 2023, tourist visit data sourced from the Batu City Tourism Office, tourism village planning documents, and previous research results relevant to the study topic.

3.3. Data Analysis

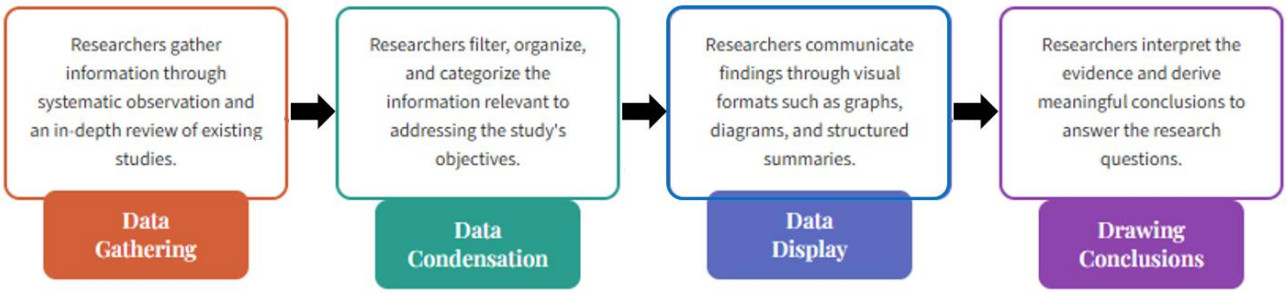

Figure 1. Interactive model by Miles and Huberman

Data were analyzed using the interactive model of Miles and Huberman (1994) in the Figure 1 consisting of some stages. In the data reduction stage, interview transcriptions were manually coded, and then these initial codes were categorized into several main themes, namely transformation

motivation, role adaptation, economic impact, social impact, and challenges faced. The next stage was data display, in which comparative matrices were created to compare narratives across informants. Additionally, process flow diagrams of transformation were constructed to more systematically visualize the stages of change that occurred. Finally, conclusion drawing was conducted inductively using the constant comparative method technique. To ensure the validity of findings, validation was carried out through two forms of triangulation, namely source triangulation involving farmers, managers, and village officials, and method triangulation encompassing interviews, observation, and document analysis.

3.4. Validity and Ethics

Credibility was ensured through triangulation and member checking, where findings were returned to informants for confirmation. Transferability was achieved through rich contextual description (thick description), enabling readers to assess applicability in other contexts. Dependability was maintained through an audit trail documenting the entire analytical decision-making process. Confirmability was achieved through a reflexivity journal recording the researcher's biases and assumptions. Ethical aspects include: written informed consent from all informants, anonymity (informant names were disguised with codes P1-P18), and beneficence where the research is expected to provide concrete recommendations for sustainable agrotourism development.

4. Results and Discussion

4.1. Research Results

4.1.1. Characteristics of Respondents

From the 18 informants, 78% (14 people) were the next generation (aged 35-50 years) who had taken over the gardens from their parents. The average length of experience in strawberry farming was 12.4 years (SD 4.2), while involvement in agrotourism averaged 4.5 years (SD 1.1). Education levels varied: 33% completed junior high school, 44% completed senior high school, and 22% had attended higher education (in agriculture or tourism fields). An interesting finding is that farmers with higher education tended to become early adopters of agrotourism. P1 (Bachelor's in Agriculture, aged 38 years) stated: *"I saw the potential not only in the fruit, but in the experience. Urbanites want to feel the act of picking for themselves, that's something a middleman can't sell."*

4.1.2. Stages of the Transformation Process

Narrative analysis of informants identified three interrelated stages of transformation:

1) Stage 1: Crisis and Reflection (2015-2018)

Before the transformation, farmers faced economic uncertainty due to extreme fluctuations in strawberry prices. Selling prices to middlemen ranged from IDR 15,000–35,000/kg depending on the season and quality. P5 (aged 52 years) described: "*In the rainy season, prices plummet; in the dry season, harvests fail. We could only accept it."* This crisis triggered collective reflection on the sustainability of livelihoods. The younger generation, particularly those with higher education, began searching for income diversification alternatives.

2) Stage 2: Innovation and Experimentation (2018-2019)

The initiation of transformation was triggered by young villagers who visited agrotourism sites in Ciwidey (Bandung) and Lembang. They observed the "u-pick" model that promised higher margins. In 2018, 5 trial farmers opened their land to tourists with an entrance fee of IDR 10,000/person and a strawberry price of IDR 50,000/kg. P3 (initial coordinator) recounted: *"At first, we were laughed at.*

Neighbors said, 'Why bother looking after urbanites, it's better to harvest a lot and sell to the market.' But after seeing our income triple, they began to follow." This stage was marked by the establishment of BUMDes Lumbung Stroberi in 2019, which managed 3 hectares of village land and became the catalyst for the institutionalization of agrotourism (Rahadiantino et al., 2022).

3) Stage 3: Institutionalization and Diversification (2019-Present)

The transformation entered a maturity phase with the diversification of products and services. In addition to strawberry picking, the following were developed: a strawberry café, Instagrammable photo spots, cultivation education for children, and processed products (jam, juice, chips) by the KWT. The Batu City Tourism Office and Agriculture Office played a role in organizing communal labor (gotong royong) for infrastructure development (Putra & Sanjiwani, 2022). Table 1 presents a comparison of economic characteristics before and after the transformation based on BUMDes report data and researcher estimates.

Table 1. Comparison of Farmer Economic Indicators Before and After Transformation

Indicator	Before (2017)	After (2023)	Change (%)
Average income/hectare/year	IDR 45-60 million	IDR 75-120 million	+40-100%
Income stability	Highly fluctuating	Relatively stable	Stabilization
Income sources	Single (fruit sales)	Multiple (tickets, processed products, services)	Diversification
Profit margin	20-30%	40-60%	+100%
Agricultural working hours	8-10 hours/day	6-8 hours/day	-20%
Service working hours	0	4-6 hours/day	New activity
Market access	Middlemen (limited)	Direct to consumers (broad)	Expansion

Source: Processed from interviews and BUMDes Lumbung Stroberi reports (2023)

4.1.3. Driving and Inhibiting Factors of Transformation

1) Driving Factors

a. Strong Economic Incentives

Income increases were the dominant motivation. Data shows an average income increase of 40-60%, consistent with the findings of Wahyudi et al. (2024) in Lombok which reported a 29.88% contribution of agrotourism to total household income. However, what is more significant is income stabilization which is the elimination of price fluctuation risks in the traditional market.

P8 explained:

"Previously, prices were determined by middlemen; now we determine them. Strawberries for tourists are priced at a fixed IDR 50,000/kg throughout the year. What isn't sold to tourists is then sold to the market."

b. Social Capital and Communal Cooperation

The success of the transformation is inseparable from the strength of the village's social capital. The Batu City Tourism Office and Agriculture Office played a crucial role in mobilizing labor for the construction of agrotourism infrastructure, including footpaths, gazebos, and irrigation systems. This gotong royong model reduced infrastructure investment costs that would otherwise have reached hundreds of millions of rupiah.

P12 (PSB member) stated:

"We do communal work every Sunday morning. Those who have gardens provide food, those who have labor provide work. That's what differentiates us from private agrotourism."

c. Policy and Institutional Support

The Batu City Tourism Office provided technical assistance through the "Sustainable Tourism Village" program. The Agriculture Office provided organic cultivation training to ensure food safety for tourists. BUMDes functions as a one-stop service that integrates production, marketing, and service functions.

d. Market Trends and Digitalization

The shift in tourist preferences after the pandemic toward "back to nature" created high demand for agrotourism. The use of social media (Instagram, TikTok) by the village's younger generation became an effective low-cost marketing strategy. Suryani et al. (2024) affirm that the visual construction of "natural beauty" in digital promotion has become the main attraction of strawberry agrotourism.

4.1.4. Inhibiting Factors

1) Conflicts of Interest with Middlemen

The transformation threatened the position of traditional middlemen who lost their supply sources. Several farmers reported psychological pressure and threats of business relationship termination from middlemen.

P7 recounted: *"Our regular middleman was furious. He said we had betrayed him. But over time he came to understand, the market is changing."*

2) Infrastructure and Accessibility Limitations

The remote location of Pandanrejo with narrow roads hinders access for large buses and tourists with limited mobility. Putra and Sanjiwani (2022) noted that this limitation is an external threat in the EFAS matrix with a score of 2.000 (weak).

3) BUMDes Managerial Capacity

Although BUMDes NPM reaches 40%, which is very good, an asset turnover of 0.8 times indicates that efficiency in asset utilization remains low (Rofiah et al., 2022). Insufficiently transparent financial management and internal disputes occurred in 2021, causing a temporary decline in visits.

4) Environmental and Seasonality Risks

Climate change causes uncertainty in harvest seasons. Extreme weather (prolonged drought or excessive rainfall) directly impacts the availability of strawberries for tourists. Additionally, increasing visits without quota management risk soil quality degradation and noise that disturbs the ecosystem (Sunarti, 2026).

4.1.5. Role Adaptation and Identity Reconstruction

The transformation required farmers to develop a fundamentally different set of skills from traditional agricultural competencies. Thematic analysis identified five domains of adaptation:

1) From Producer to Experience Curator

Farmers must design a "stage" of agriculture that is photogenic and interactive. Arranging gardens with photo spots, labeling strawberry varieties with information boards, and demonstrating "Instagrammable" harvesting techniques became part of the daily work.

P4 stated:

"We become small directors. Tourists are the actors, the garden is the stage."

2) Development of Service Competencies

Communication skills, complaint handling, and customer service had to be learned. The Tourism Office provided basic hospitality training, but senior farmers often experienced adaptation difficulties.

P9 (aged 58 years) admitted:

"I'm still awkward talking to tourists. My child is more capable, they're the front liner."

3) Digital Management and Marketing

The younger generation dominates digital marketing functions. They manage the Instagram account @lumbungstroberi, respond to direct messages (DMs), and update content daily. A generational division of labor has occurred: seniors focus on cultivation, juniors focus on marketing and service.

4) Product Diversification and Entrepreneurship

The KWT developed processed strawberry products with high added value. Strawberry jam is sold at IDR 35,000/bottle (200g), equivalent to 0.7 kg of fresh strawberries. This creates an off-season market when the strawberry harvest is scarce.

5) Collective Governance

Farmers joining BUMDes required adaptation from individualism to collectivism. Decisions about ticket prices, operating hours, and revenue sharing must be negotiated democratically. P6 explained:

"Before, we were free, what to plant, who to sell to, it was up to us. Now there are rules of the game, but the profits are larger and more evenly distributed."

4.1.6. Social, Economic, and Cultural Impacts

1) Economic Impact

The average income of agrotourism operator farmers increased by 40-60%, consistent with the study of Wahyudi et al. (2024). However, what is more significant is the multiplier effect which are the creation of jobs for guides, souvenir sellers, and local transportation services. Analysis shows that every 1 hectare of agrotourism creates 3-4 non-agricultural jobs. The elimination of intermediaries (middlemen) enables farmers to set stable prices throughout the year. The "entrance ticket + fruit purchase" model creates a more predictable cash flow.

P10 stated:

"Before, our monthly income was uncertain. Now every week there's money coming in from tickets."

2) Social Impact

Communal cooperation through the PSB is not only for physical infrastructure, but also strengthens community solidarity. However, a new social differentiation has emerged between "farmer-operators" (those who have successfully transformed) and "traditional farmers" (those who still sell to middlemen).

P11 (a traditional farmer) expressed: *"I envy seeing my neighbor visited by many people. But I don't have land large enough for tourism."*

The KWT provides a greater space for women's participation. Of the 4 female informants, all reported an improvement in their economic and social status.

P13 (KWT chairperson) stated:

"Before, we only helped our husbands in the garden. Now we have our own business, our own income."

3) Cultural and Environmental Impacts

The tradition of strawberry cultivation passed down through generations has become a tourist "attraction." However, there is a risk of staged authenticity when agricultural practices are performed more for display than for production. Suryani et al. (2024) warn that the commodification of the Javanese language in tourist interactions can reduce cultural authenticity. The shift toward organic farming (to ensure tourist food safety) has had a positive impact on environmental health. However, the increase in visits (from 2,000 to 5,000+ per month during peak season) has created problems with

plastic waste and water burden. BUMDes has begun implementing a daily visit quota system (maximum 300 people) for mitigation.

4) Post-Pandemic Resilience and Adaptation

The COVID-19 pandemic (2020-2021) became a test of the resilience of the transformation. Tourist visits dropped from 2,000 to 1,000 per month (Putra & Sanjiwani, 2022). However, the structure of income diversification helped farmers survive which is sales of KWT processed products to the local market and delivery of fresh strawberries via online channels compensated for the loss of ticket income. Adaptation strategies developed included: (1) focusing on local tourists (from Surabaya and Malang) who could be reached by private car; (2) strengthening digital marketing through live streaming of strawberry harvests; (3) collaboration with online travel agent (OTA) platforms for scheduled bookings. Post-pandemic recovery occurred in 2022-2023, with visits surpassing pre-pandemic levels.

4.2. Discussion

4.2.1. Transformation as an Evolutionary Process

These findings confirm that the transformation of strawberry farmers is not a big bang event but rather an evolutionary process requiring 4-5 years. The three-stage model including crisis, innovation, institutionalization aligns with transition management theory, which emphasizes the importance of niche innovation that is subsequently scaled through regime change (Geels, 2002).

The role of younger generations as change agents is crucial in the innovation phase. Those with higher education and exposure to other tourist destinations became catalysts for transformation. This is consistent with the findings of Wahyudi et al. (2024), which show that education influences the ability to capture agrotourism opportunities, although in the context of Pandanrejo, formal education is not an absolute prerequisite, openness to innovation and social capital are more determinative.

4.2.2. Hybridity and the Complexity of the New Identity

The concept of "farmer-operator" identified in this study represents a hybrid identity which is a subject who is no longer fully a traditional farmer but has also not yet become fully a tourism entrepreneur. This condition creates role strain, particularly for the senior generation who must adapt to service norms that differ from the agricultural work ethic. However, hybridity also creates resilience. Farmers who master both domains (agriculture and tourism) have a buffer against market shocks. When the tourism sector was paralyzed during the pandemic, agricultural skills enabled survival. When harvests failed due to extreme weather, income from tickets and services compensated.

4.2.3. BUMDes as a Hybrid Institution

BUMDes Lumbung Stroberi exhibits characteristics of a hybrid organization that combines an economic logic (profit) with a social logic (community empowerment). Financial performance analysis shows variable efficiency, an NPM of 40% is very good, but an asset turnover of 0.8 times indicates underutilization of assets (Rofiah et al., 2022). The governance challenges of BUMDes reflect a common phenomenon in community organizations in Indonesia. Strengthening managerial capacity, particularly in accounting and corporate governance, is necessary to ensure institutional sustainability.

4.2.4. Sustainability and Future Challenges

Within the sustainable livelihoods framework, the transformation in Pandanrejo shows improvements across all types of capital: natural capital (crop diversification), physical capital (tourism infrastructure), human capital (new skills), social capital (BUMDes and PSB networks), and financial capital (income increase). However, there are trade-offs that need to be managed. Increased commercialization risks reducing cultural capital which is the values of genuine communal cooperation

may be eroded by the logic of profit. Increased visits without management risk the degradation of natural capital. Therefore, agrotourism zoning regulations that establish ecological and cultural carrying capacity are needed.

5. Conclusion

The transformation of strawberry farmers in Pandanrejo took place in three stages: agricultural crisis, agrotourism innovation, and sustainable institutionalization. Its success was supported by a 40-60% income increase, the strengthening of local institutions (BUMDes and PSB), and the shift in farmers' roles to tourism experience curators. Challenges that remain include conflicts with middlemen, infrastructure limitations, and risks of cultural commodification and environmental degradation. Income diversification and the hybrid identity of farmer-operators have proven to create resilience against external shocks such as the pandemic.

This study contributes to Indonesian agrotourism literature through the concept of the hybrid identity of farmer-operators and the three-stage transformation model, which can serve as a reference for agrotourism studies of other commodities. For the Batu City Government, the following are recommended: the establishment of ecological zoning regulations, improvement of road infrastructure, and a "Sustainable Agrotourism" certification program. For BUMDes and the farmer community, managerial training, diversification of tourism products, and the preservation of authentic traditional farming practices are needed. For future researchers, longitudinal studies, comparative analyses across commodities, and larger-scale quantitative research are suggested.

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