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An ecological approach to sustainable tourism village development: A case study of Kedisan village, Tegallalang, Gianyar

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Abstract - This research aims to analyze the application of an ecological approach to sustainable tourism development at Kedisan Village, Tegallalang, Gianyar, as well as to formulate its development strategies. This study employed a qualitative descriptive method through field observations, in-depth interviews, and documentation studies. The findings indicate that Kedisan Village has implemented several ecological practices, including natural resource preservation, sorted waste management, and environmental education programs involving both local communities and tourists. Nevertheless, key challenges persist, such as the damage to the rice terrace contours due to land cutting, vulnerability to erosion caused by reduced vegetation cover, limited accessibility, and unequal community participation in tourism economic benefits. This study recommends ecological-based strengthening strategies through landscape restoration of the terraces, capacity building of tourism village institutions, development of environmental interpretation-based attractions, and the provision of eco-friendly accessibility.

Keywords: Ecological Approach, Sustainable Tourism, Tourism Village Development, Kedisan Village

1. Introduction

Tourism plays a substantial role in driving economic, social, and cultural development globally, including in Indonesia. As an archipelagic state endowed with rich biodiversity, scenic landscapes, and distinct cultural practices, Indonesia maintains a strong appeal for both domestic and international tourists. However, the rapid expansion of the tourism sector is intrinsically linked to critical sustainability challenges, particularly in maintaining a harmonious balance among economic growth, socio-cultural integrity, and ecological preservation.

Sustainability concerns in tourism emerge primarily from ecological pressures exerted by tourism activities, including pollution, ecosystem degradation, overconsumption of natural resources, and unmonitored spatial transformations. In addressing these challenges, an ecological approach becomes essential. Grounded in ecological principles (Odum, 1971; Odum, 1993), this approach emphasizes maintaining ecosystem equilibrium as the foundation for sustainable tourism management. Disruptions to ecosystem components—such as water quality, soil stability, or vegetation cover—inevitably impact both local host communities and the broader tourism industry.

Bali, as a premier global tourist destination, faces escalating pressures regarding environmental sustainability. Increasing visitor arrivals often generate severe ecological stress, particularly in rural zones transitioning into tourism villages. Gianyar Regency is widely recognized for its cultural heritage and natural landscapes. Within Gianyar, Kedisan Village,

located in Tegallalang District, possesses substantial potential rooted in its pristine geography, agricultural heritage, and cultural arts. Disregarding ecological considerations in such destinations poses severe threats, including over-exploitation, environmental pollution, and uncontrolled land-use conversion.

Recent extreme environmental events in Bali, such as major flooding incidents, highlight the urgent need for climate-resilient spatial governance and ecological accountability. Severe rainfalls trigger widespread inundation not merely as natural disasters, but as systemic consequences of massive land conversion for tourism amenities and residential spaces. The destruction of natural water catchment areas, combined with clogged drainage systems and inadequate waste management, underscores the structural imbalance between rapid tourism development and ecological preservation.

Tourism has become one of the principal drivers of economic growth, employment generation, and socio-cultural development worldwide, including in Indonesia. As an archipelagic country endowed with exceptional biodiversity, diverse cultural traditions, and abundant natural attractions, Indonesia possesses significant comparative advantages in tourism development. Beyond its economic contribution, tourism also serves as an instrument for cultural preservation, rural development, and community empowerment. Nevertheless, the rapid expansion of tourism has generated complex sustainability challenges, particularly in balancing economic growth with environmental conservation and socio-cultural integrity. Consequently, sustainable tourism has become a strategic priority in tourism planning to ensure that economic benefits are achieved without compromising ecological systems or local cultural values.

The urgency of sustainable tourism has become increasingly evident due to the growing environmental pressures associated with tourism development. Uncontrolled tourism expansion frequently contributes to ecosystem degradation, pollution, excessive exploitation of natural resources, biodiversity loss, and land-use transformation. Such environmental changes not only threaten ecological stability but also reduce destination competitiveness and the quality of visitor experiences. These challenges are particularly significant in rural tourism destinations where tourism activities are highly dependent upon the integrity of natural ecosystems. Therefore, sustainable tourism should not merely focus on increasing tourist arrivals but also prioritize environmental resilience, ecosystem conservation, and the long-term welfare of local communities.

The ecological challenges confronting tourism destinations have become increasingly apparent in Bali, one of Indonesia's leading international tourism destinations. While tourism has substantially contributed to regional economic development, rapid infrastructure expansion, intensive land conversion, and increasing visitor numbers have generated considerable ecological pressures. Recent flooding events across several regions of Bali illustrate the environmental consequences of unsustainable spatial development. The conversion of agricultural land and water catchment areas into tourism facilities, inadequate waste management, and declining environmental carrying capacity have intensified flood risks and environmental degradation. These conditions demonstrate that environmental problems are no longer isolated natural phenomena but represent structural consequences of tourism development that has not been fully integrated with ecological sustainability principles.

Among Bali's tourism regions, Gianyar Regency represents an important example of the interaction between tourism growth and environmental conservation. Renowned for its cultural heritage, agricultural landscapes, and artistic traditions, Gianyar has experienced substantial tourism development over the past decade. Within this region, Kedisan Village in Tegallalang District possesses considerable tourism potential through attractions such as the Ulu Petanu Waterfall, traditional rice terraces, and preserved rural landscapes. However, the sustainability of these attractions is highly dependent upon ecosystem integrity. Environmental degradation resulting from soil erosion, declining water quality, vegetation loss, and uncontrolled land-use change threatens both ecological sustainability and the long-term competitiveness of the destination. These circumstances highlight the necessity of adopting tourism management approaches that integrate ecological conservation with local socio-economic development.

The theoretical foundation of this study is grounded in ecological theory, which views ecosystems as interconnected systems whose stability depends upon balanced interactions

among biotic, abiotic, and human components (Odum, 1971; Odum, 1993). From this perspective, tourism constitutes one component within the broader ecosystem and therefore should be managed within the limits of environmental carrying capacity. Sustainable tourism cannot be achieved solely through economic growth but requires maintaining ecosystem resilience, conserving biodiversity, preserving natural resources, and minimizing anthropogenic disturbances. Ecological theory thus provides an appropriate conceptual framework for evaluating the relationship between tourism activities and environmental sustainability.

Complementing the ecological perspective, Community-Based Tourism (CBT) has emerged as one of the most influential paradigms for achieving sustainable tourism development. Unlike conventional tourism models that primarily emphasize economic growth and visitor numbers, CBT positions local communities as the principal actors responsible for planning, managing, and benefiting from tourism development. Consequently, sustainable tourism is increasingly conceptualized as a multidimensional framework integrating community empowerment, equitable economic benefits, environmental conservation, cultural preservation, and institutional governance (Vitasurya, 2016; Arintoko et al., 2020; Priatmoko et al., 2021). The integration of ecological sustainability and community participation therefore provides a comprehensive theoretical foundation for sustainable tourism governance.

Previous studies consistently demonstrate that community participation constitutes a fundamental determinant of sustainable tourism development. Research conducted in Ceking, Tegallalang reveals that active community involvement contributes significantly to destination sustainability, although its effectiveness remains highly dependent upon institutional coordination, stakeholder collaboration, and equitable benefit-sharing mechanisms (Wijaya & Sudarmawan, 2019). Similarly, the implementation of Community-Based Tourism in Batuan Village Temple illustrates that customary institutions can effectively preserve cultural heritage while simultaneously generating socio-economic benefits for local communities (Bali, 2019). However, these studies primarily provide descriptive analyses and offer limited empirical evidence regarding long-term ecological sustainability.

Studies undertaken in other Indonesian tourism villages reinforce the importance of community empowerment and institutional collaboration. Research in the Borobudur Tourism Village identifies stakeholder collaboration, government facilitation, institutional strengthening, and community capacity development as essential determinants of tourism competitiveness (Arintoko et al., 2020). Likewise, research in Pampang Village argues that tourism sustainability should be evaluated from the perspective of local communities rather than tourists, emphasizing that many tourism development programs continue to reflect top-down approaches despite formally adopting Community-Based Tourism principles (Priatmoko et al., 2021). These findings suggest that the implementation of CBT does not automatically guarantee meaningful community participation or sustainable destination governance.

International studies have further broadened the understanding of sustainable rural tourism by emphasizing integrated governance, adaptive institutions, and environmental conservation. A systematic literature review concludes that rural tourism contributes to economic diversification, employment generation, environmental protection, and social cohesion when supported by effective governance and continuous community participation (Yanan et al., 2024). Similar findings have been reported in traditional villages in China, where sustainable tourism integrates ecological conservation, cultural preservation, and local economic development (Mei et al., 2024). Furthermore, research conducted in Mae Kampong Village, Thailand demonstrates that community-based tourism contributes significantly to achieving the Sustainable Development Goals through poverty alleviation, environmental stewardship, and inclusive community development (Rakpathum et al., 2025).

The growing digital transformation of tourism has introduced additional dimensions into sustainable destination management. Tourism villages are increasingly expected to integrate community participation with digital marketing communication to improve destination competitiveness and strengthen stakeholder engagement. Evidence from Sumberbulu Tourism Village indicates that digital marketing enhances destination visibility while facilitating participatory tourism governance (Maulana et al., 2025). In parallel, multidimensional sustainability assessment models employing Multi-Dimensional Scaling (MDS) and the Analytic

Network Process (ANP) have demonstrated that tourism sustainability should be evaluated through integrated economic, environmental, socio-cultural, and institutional indicators rather than economic performance alone (Saputro et al., 2023). Similar conclusions are reported in studies of rural agrotourism, which emphasize balanced interactions among environmental conservation, institutional effectiveness, community welfare, and local economic resilience (Widiyanto et al., 2024).

Within the Balinese context, several destination-specific studies have explored alternative models of sustainable tourism development. Research on Alas Harum Coffee Agrotourism demonstrates that agricultural diversification enhances destination attractiveness while creating additional livelihood opportunities for local communities (Dewi et al., 2023). Likewise, studies of Taro Tourism Village identify eco-spiritual tourism as an innovative strategy integrating Balinese cultural values, environmental sustainability, and religious traditions into tourism experiences (Yudhistira, 2021; Wirawan et al., 2023). Institutional governance has also been recognized as an important determinant of tourism sustainability, where Destination Management Organizations strengthen tourism performance through strategic planning, stakeholder collaboration, and integrated resource management (Hernawati et al., 2025), while collaborative governance and institutional leadership have been identified as prerequisites for sustainable community-based tourism in Guwang Village (Miastra et al., 2024).

Recent studies consistently demonstrate that sustainable tourism village development requires an integrated approach that balances economic growth, environmental conservation, socio-cultural preservation, and institutional governance. Rather than focusing solely on increasing tourist arrivals, contemporary research emphasizes enhancing destination resilience through community participation, collaborative governance, and sustainable resource management (Fafurida et al., 2026; Moon & Saha, 2025; Maryani et al., 2025).

A dominant theme in the literature is the central role of community participation in ensuring tourism sustainability. Community empowerment is widely recognized as a prerequisite for improving local welfare, strengthening social capital, and increasing residents' commitment to environmental conservation. Sustainable tourism initiatives are considered more effective when local communities actively participate in planning, implementation, and decision-making processes rather than merely serving as tourism beneficiaries. Furthermore, meaningful participation enhances local ownership of tourism resources and supports the equitable distribution of economic benefits (Risfandini et al., 2023; Lestari et al., 2025; Sitikarn, 2021; Wibowo & Ronggowulan, 2021).

Another major research theme concerns strategic planning and governance for sustainable tourism village development. Previous studies indicate that successful tourism villages depend on effective institutional coordination, stakeholder collaboration, adaptive governance, and long-term development planning. Integrated tourism planning enables destinations to balance tourism growth with environmental protection while strengthening local economic resilience. In addition, adopting successful practices from well-established tourism villages has been suggested as an effective strategy for improving governance quality and accelerating sustainable destination development (Fafurida et al., 2026; Moon & Saha, 2025; Maryani et al., 2025; Soeswoyo et al., 2022).

Environmental sustainability and ecological conservation have also emerged as important themes in recent tourism research. Scholars increasingly argue that tourism development should be guided by ecological principles that minimize environmental degradation, conserve biodiversity, protect natural resources, and enhance climate resilience. Green tourism practices, environmental ethics, and sustainable livelihood approaches are considered essential for maintaining ecosystem integrity while supporting local economic development. Similarly, green architectural design has been promoted as an effective strategy for integrating tourism infrastructure with environmental sustainability and local cultural identity (Sirait et al., 2025; Diartho et al., 2025; Yuliani & Setyaningsih, 2023).

Infrastructure development constitutes another critical determinant of sustainable tourism performance. Research indicates that improving transportation networks, public facilities, accessibility, and tourism amenities significantly enhances destination competitiveness and visitor satisfaction. However, infrastructure development should be carefully designed to

minimize ecological disturbance and preserve the environmental characteristics of rural tourism destinations. Sustainable infrastructure therefore requires balancing functional improvements with environmental protection and landscape conservation (Arnawati et al., 2023; Soeswoyo et al., 2022).

Several studies further emphasize the importance of innovation, creativity, and local values in strengthening tourism sustainability. The integration of indigenous knowledge, local culture, and creative tourism products has been shown to increase destination uniqueness while supporting long-term economic resilience. Likewise, the implementation of smart tourism concepts combined with local wisdom enables tourism villages to improve destination competitiveness without compromising cultural authenticity or environmental sustainability. Creativity and social entrepreneurship are also recognized as effective mechanisms for generating innovative tourism experiences while empowering local communities (Kusumastuti et al., 2024; Buchari et al., 2024; Wibowo et al., 2021).

Collectively, the existing literature demonstrates that sustainable tourism village development depends upon the integration of community participation, collaborative governance, environmental conservation, sustainable infrastructure, local creativity, and adaptive management. Nevertheless, most previous studies examine these dimensions independently, with relatively limited attention given to integrating ecological principles, environmental carrying capacity, infrastructure sustainability, institutional governance, and community participation within a comprehensive analytical framework. This limitation highlights the need for further research that holistically evaluates ecologically grounded tourism development, particularly in rural destinations experiencing increasing tourism pressure.

Furthermore, integrated destination management models emphasizing environmental conservation, visitor management, and community participation have been proposed for Ceking Terrace (Sukmadiarta & Sunariani, 2023), whereas institutional strengthening and community entrepreneurship have been recommended as key strategies for Kampung Lahang Tourism Village (Hengky et al., 2023). More recently, research conducted in Kampunganyar Tourism Village reaffirmed that community participation remains the principal determinant of sustainable destination management despite persistent challenges related to institutional commitment and equitable benefit distribution (Amelia et al., 2026).

Although previous studies have substantially contributed to understanding sustainable tourism, several important research gaps remain. First, most studies predominantly employ descriptive case-study approaches with limited empirical assessment of ecological sustainability and ecosystem carrying capacity. Second, previous research generally examines community participation, institutional governance, ecological conservation, digital transformation, and destination management separately rather than integrating these dimensions within a comprehensive analytical framework. Third, empirical evidence concerning the application of ecological principles in Bali's tourism villages remains limited, despite increasing environmental pressures associated with tourism expansion. Consequently, there remains a need for integrated research that simultaneously evaluates ecological sustainability, ecosystem resilience, community participation, and governance capacity within tourism destinations.

Based on these research gaps, this study addresses the following research problems: **(1)** How are ecological principles currently implemented in tourism management within Kedisan Village? **(2)** To what extent does the existing tourism development conform to ecological sustainability and environmental carrying capacity? **(3)** What strategic interventions can be formulated to strengthen ecologically sustainable tourism development in Kedisan Village?

Accordingly, this study aims to **(1)** evaluate the implementation of ecological principles in tourism development in Kedisan Village; **(2)** assess the environmental carrying capacity and ecosystem sustainability of the destination; and **(3)** formulate strategic recommendations for developing an ecologically grounded and sustainable tourism management model capable of balancing environmental conservation, community welfare, and long-term destination competitiveness.

In this context, adopting an ecological approach is imperative for destinations relying heavily on natural assets. Kedisan Village, Tegallalang, exemplifies this dynamic, where core attractions include natural features such as the Ulu Petanu Waterfall and traditional rice terraces.

Dependency on natural ecosystems renders such destinations vulnerable to tourist-induced stresses, including soil erosion, water degradation, and vegetation loss. Unless guided by a systematic ecological framework, tourism growth risks eroding environmental quality and diminishing tourist experiences. Consequently, this study evaluates the implementation of ecological principles, assesses ecosystem carrying capacity, and formulates strategic interventions for sustainable, ecologically-grounded tourism development in Kedisan Village.

2. Method

This study adopted a qualitative descriptive research design to evaluate the implementation of ecological approaches in Kedisan Village, Tegallalang, Gianyar. Primary data were gathered through direct field observations, structured environmental assessments, and in-depth interviews with key stakeholders, including the Village Head, Village Secretary, Tourism Awareness Group (Pokdarwis) executives, local entrepreneurs, and community members. Secondary data were retrieved from academic literature, official village reports, promotional documentation, and digital channels.

Data collection instruments comprised observational checklists, interview guides, and digital recording devices. Data collection focused on evaluating ecological practices, identifying environmental degradation points, assessing community involvement, and identifying institutional constraints. The data were systematically organized and analyzed using qualitative descriptive techniques, centering on empirical synthesis, contextual pattern matching, and strategic formulation across economic, socio-cultural, and environmental dimensions.

3. Results and Discussion

3.1 Results

3.1.1 Kedisan Tourism Village

Kedisan Village is located in Tegallalang District, Gianyar Regency, Bali. Geographically characterized by rolling hills and river valleys, the village retains a cool climate and scenic rural landscape. Covering an area of 6.88 km² divided into seven administrative hamlets (banjar), Kedisan's historical roots trace back to the Isaka year 1463 (1541 AD), documented in the Lontar Arya Wang Bang Sidemen.

Kedisan possesses diverse tourist attractions, including Ceking-adjacent rice terraces, Ulu Petanu Waterfall, traditional woodcarvings (specifically Garuda statues), bamboo craftsmanship, hand-blown glass art, and organic farming initiatives. A significant portion of the population engages in organic agriculture, handcrafts, and small-scale commerce. Tourism development managed under Pokdarwis has introduced new employment pathways, such as local guiding, homestay operation, and culinary enterprises.



Figure 1 Tukad Petanu Waterfall

Primary vehicular accessibility to Kedisan Village relies on paved roads connecting to major arterial routes from Denpasar (approximately 40 km, requiring 1.5 to 2 hours travel time). While accessible by two-wheeled vehicles and passenger cars, large tour buses face severe navigation difficulties due to narrow, winding, and steep road segments. Furthermore, localized access to primary attractions like Ulu Petanu Waterfall and internal rice terrace pathways remains restricted, characterized by uneven surfaces, narrow tracks, and limited directional signage.

3.1.2 Evaluation of Ecological Practices and Ecosystem Balance

A. Preservation of Natural Resources

Field findings indicate that local management and Pokdarwis recognize environmental quality as the fundamental asset underpinning Kedisan's tourism value proposition. Key conservation actions include maintaining river flow purity, protecting natural water springs, and enforcing minimal physical intervention within sensitive forest patches along the Ulu Petanu river basin.

"If the natural environment degrades, our tourism will inevitably collapse. Management must be executed through consistent daily habits, such as maintaining cleanliness, protecting natural water springs, and refraining from drastic modifications to the surrounding natural landscape." (In-depth Interview with Pokdarwis Executive, 2025)



Figure 2 In-Depth Interview With Pokdarwis Executive

This perspective illustrates community awareness regarding the direct coupling between ecosystem health and economic sustainability. Maintaining natural vegetation along the ravine slopes leading to the waterfall serves dual functions: preserving scenic aesthetic value and stabilizing soil against landslide risks.

B. Environmental Management and Waste Systems

Environmental management measures in Kedisan encompass routine waste collection, spatial zoning, and sanitation monitoring. At the upper entry area of Ulu Petanu Waterfall, management has installed sorted waste receptacles (organics, plastics, inorganic) to facilitate waste separation. However, field observations reveal that visitor compliance remains inconsistent, leading to occasional littering along descent pathways.

A critical environmental challenge occurs within the rice terrace areas. Rice terraces perform vital ecological functions, including water retention, erosion control, and biodiversity maintenance. Field inspections identified structural alterations, including land cutting (keprasan lahan), modification of natural terrace contours to accommodate commercial viewing platforms and cafes, and localized vegetation clearing. From an ecological standpoint, unmonitored physical alteration of agricultural land contours directly violates sustainable landscape principles and heightens erosion vulnerability.

C. Community-Led Conservation Initiatives

Community participation extends beyond formal tourism roles into informal environmental stewardship. Local residents regularly assist tourists, monitor littering, and clean communal areas. A prominent institutionalized initiative is the River Care Community (Komunitas Peduli Sungai / KPS), formed by Pokdarwis in collaboration with university students and community youth. KPS conducts scheduled river cleanups, springhead maintenance, and public sanitation campaigns, receiving institutional recognition across Gianyar Regency.

D. Environmental Education Initiatives

Kedisan Village actively utilizes outdoor environmental education as an ecological strategy. Pokdarwis conducts weekly outdoor learning sessions inviting local primary school students to explore natural ecosystems, fostering early-childhood environmental awareness. Integrating local youth into conservation activities builds long-term community stewardship. However, these educational activities are currently managed as informal community outreach rather than structured, commercial eco-tourist interpretation packages.

E. Balancing Economic Benefits and Ecological Preservation

Kedisan's management model operates under the guiding principle of prioritizing environmental health prior to commercial monetization ("rawat dulu alamnya, baru bicara hasil"). Tourism revenue generates secondary economic benefits through guided trekking, local parking management, food stalls, and artisan handicraft sales. Additionally, Pokdarwis monetizes recyclable waste (plastic bottles and aluminum cans) collected from sorted bins, generating auxiliary community income while reinforcing waste management compliance.



Figure 3 Land Use Change

3.1.3 Assessment of Sustainable Tourism Pillars

Evaluating Kedisan Village against Bramwell's (1993) sustainable tourism framework reveals distinct outcomes across three core dimensions:

Table 1. Sustainable Tourism Framework

Sustainability Pillar	Observed Achievements	Identified Challenges & Gaps
Economic Sustainability	Creation of local micro-enterprises, homestays, guiding roles, and artisan market opportunities; secondary income from recyclable waste recovery.	Unequal profit distribution; capital-strong entrepreneurs gain faster rewards compared to former agrarian workers struggling to adapt to tourism service standards.

Sustainability Pillar	Observed Achievements	Identified Challenges & Gaps
Socio-Cultural Sustainability	Strong retention of customary Balinese traditions and rituals; active community identity preservation; operational involvement of local youth and Pokdarwis.	Decision-making processes concentrated among select leadership figures; incomplete community-wide representation in strategic planning.
Environmental Sustainability	Routine river cleanups by KPS; sorted waste bin placement; deliberate omission of waste bins in lower waterfall zones encouraging carry-in/carry-out behavior.	Terrace contour damage due to physical land cutting; deforestation/vegetation thinning on steep slopes; lack of formal carrying capacity limits.

3.1.4 Strategic Action Plan for Ecologically-Grounded Tourism Development

The findings indicate that addressing ecological degradation, infrastructure limitations, and socio-economic disparities in Kedisan Village requires an integrated strategic action plan that simultaneously strengthens environmental conservation, destination quality, and community welfare. This strategy is formulated by integrating Cooper's 4A tourism destination framework – Attraction, Accessibility, Amenities, and Ancillary Services – with ecological governance principles to ensure that tourism development remains environmentally sustainable while enhancing the competitiveness of the destination.

From the perspective of tourism attractions, conservation and landscape restoration should become the primary priorities. The degradation of rice terrace landscapes caused by uncontrolled land modification requires immediate intervention through mandatory restoration of damaged terrace contours and stricter regulation of land conversion for commercial development. In addition, bioengineering techniques using indigenous deep-rooted vegetation should be implemented to stabilize erosion-prone slopes and improve ecological resilience. To strengthen the educational value of tourism, environmental interpretation programs should also be developed, including guided eco-trekking, organic farming experiences, and river ecosystem education. These programs not only diversify tourism products but also encourage visitors to appreciate the ecological significance of the destination while fostering environmental awareness.

Regarding accessibility and tourism amenities, infrastructure development should prioritize environmentally friendly approaches that minimize ecological disturbance. Pedestrian pathways leading to the Ulu Petanu Waterfall should be upgraded using permeable natural materials that maintain soil infiltration and reduce surface runoff. Supporting facilities, including safety railings, solar-powered pathway lighting, rest areas, and ecological interpretation signage explaining local biodiversity and conservation practices, should also be provided to improve visitor safety and environmental education. Furthermore, considering the limited capacity of village roads, designated electric shuttle transfer points should be established at the village perimeter to reduce traffic congestion, minimize carbon emissions, and preserve the tranquility of the rural environment.

From the perspective of ancillary services and institutional governance, strengthening community-based management is essential for ensuring long-term sustainability. The existing River Care Community (*Komunitas Peduli Sungai* – KPS) should be institutionalized as an official conservation unit under the village administration and supported through dedicated operational funding. In parallel, the Tourism Awareness Group (*Pokdarwis*) should establish specialized community-based business units, including eco-guiding services, culinary enterprises, handicraft production, and environmental monitoring teams, to broaden local participation and distribute tourism benefits more equitably. Capacity-building programs should also be implemented for farming households seeking to diversify their livelihoods into tourism-related businesses,

thereby enhancing local entrepreneurship while reducing economic dependence on agriculture alone.

Finally, environmental governance and carrying capacity management should become central components of future tourism planning. Scientific assessments of both physical and ecological carrying capacities should be conducted to determine the maximum allowable number of daily visitors in environmentally sensitive areas, particularly the Ulu Petanu Waterfall and the narrow rice terrace pathways. The implementation of an online reservation and visitor management system would enable authorities to regulate tourist flows during peak seasons, thereby preventing overcrowding and minimizing environmental degradation. At the same time, Kedisan Village should reposition its destination branding by emphasizing its commitment to ecological conservation through the development of an "Eco-Village" identity. This branding strategy is expected to attract environmentally responsible tourists whose travel behavior aligns with sustainable tourism principles while strengthening the village's competitiveness in the growing ecotourism market.

These strategic actions demonstrate that ecologically grounded tourism development requires more than environmental conservation alone. It demands the integration of ecosystem restoration, sustainable infrastructure, institutional strengthening, community empowerment, and adaptive governance into a unified management framework. Such an integrated approach is expected to enhance ecological resilience, improve visitor experiences, increase local economic benefits, and ensure the long-term sustainability of tourism development in Kedisan Village.

4. Conclusion

Kedisan Village in Tegallalang, Gianyar, demonstrates significant progress in integrating ecological principles into sustainable rural tourism development. Driven by natural attractions such as the Ulu Petanu Waterfall and agricultural rice terraces, community stakeholders and Pokdarwis have implemented positive environmental practices, including river care monitoring, sorted waste systems, and youth environmental education. Nevertheless, critical vulnerabilities persist, notably landscape degradation from terrace land cutting, slope instability, narrow accessibility infrastructure, and unequal economic distribution among residents.

To secure long-term sustainability, Kedisan Village must transition from passive environmental management to an integrated, ecologically-driven governance model. Key recommendations focus on restoring degraded terrace contours, formalizing environmental interpretation packages, establishing strict carrying capacity limits, upgrading eco-friendly accessibility, and broadening community participation through structured institutional business units. Implementing these strategic measures will protect Kedisan's ecological integrity while fostering equitable economic prosperity and preserving its distinct cultural identity.

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