

## Sustainable Tourism Development Strategy in Tanjung Puting National Park from an Environmental Economics Perspective

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#### ABSTRACT

Tourism in Tanjung Puting National Park (TNTP) holds significant economic and ecological potential; however, increasing tourist visits also place pressure on environmental quality and wildlife habitats, requiring sustainable management strategies. This study aims to identify sustainable tourism development strategies in TNTP from an environmental economics perspective through a systematic literature review. The study reviewed 30 scientific publications published between 2021 and 2025 related to sustainable tourism, environmental economic valuation, community participation, and conservation governance. The findings indicate that zoning policies and visitor capacity restrictions effectively reduce environmental degradation in the park. Community participation through Community-Based Tourism programs has increased local welfare by approximately 22–35% while strengthening compliance with conservation practices. Furthermore, the economic valuation of ecosystem services in TNTP shows high potential value. The study concludes that integrating environmental economic policies, strengthening community capacity, and developing ecosystem service-based conservation financing are crucial for achieving sustainable tourism development in TNTP.

**Keywords:** Carrying Capacity; Community Based Tourism; Economic Valuation; Ecosystem Services; Environmental Economics; Sustainable Tourism; Tanjung Puting National Park.

## **INTRODUCTION**

Tourism is a strategic sector with great potential to drive national economic growth, especially in regions with rich natural resources and high biodiversity such as Central Kalimantan. In the context of regional development, this sector not only serves as a source of foreign exchange and increased community income, but also functions as an instrument for cultural and environmental preservation. Tanjung Puting National Park is one of the leading destinations in Central Kalimantan, known for its ecotourism development and the presence of orangutans as a protected endemic species. A study (Mintardjo, 2022) shows that tour guides in this area have a strategic role in maintaining the sustainability of ecotourism through various forms of socio-economic adaptation, especially when facing external pressures such as a pandemic. The adaptive capacity and operational strategies of the guides have been proven to influence the quality of the tourist experience as well as the effectiveness of conservation efforts. The willingness to pay (WTP) of visitors can be an effective instrument for conservation funding, thereby strengthening ecotourism as a mechanism for environmental sustainability (Musa & Darman, 2022).

Tanjung Puting National Park (TNTP) has significant ecological and economic value, both locally and globally. Covering an area of approximately 415,040 hectares, it is an important habitat for various rare species of flora and fauna and maintains a relatively well-preserved tropical forest ecosystem. Environmental pressures from tourism activities, land use changes, and natural resource exploitation remain serious challenges to conservation efforts. Therefore, a sustainable and environmentally-based tourism development strategy is needed to achieve economic benefits without compromising the quality and function of the ecosystem. A study (Basuki et al., 2021) shows that changes in land cover and use significantly reduce the net production capacity of peat ecosystems, thereby accelerating environmental degradation in the tropical regions of Kalimantan. These findings underscore the urgency of controlling land conversion and implementing strict ecological management to maintain ecosystem stability, especially in conservation areas such as TNTP. The implementation of sustainable tourism in TNTP is highly dependent on synergy among stakeholders, given the potential for conflict between economic and conservation interests, which requires a more structured and adaptive collaboration model (Pratiwi & Hulu, 2025).

In recent years, the government and various stakeholders have been working to develop the tourism potential of Tanjung Puting National Park (TNTP) through an ecotourism approach. Implementation at the field level still faces a number of obstacles, including limited infrastructure, low public awareness of conservation, and suboptimal policies that support sustainable tourism practices. This situation reflects a research gap between the area's significant ecotourism potential and the realisation of sustainable tourism development. A study (Idrus, 2024) confirms that the implementation of ecotourism policies in Indonesia is generally still hampered by structural factors, such as a lack of supporting infrastructure, low local human resource capacity, and a lack of coordination between stakeholders. These findings indicate a significant discrepancy between policy formulation and its implementation in the field, thus requiring strengthened governance and community empowerment strategies to ensure the sustainability of ecotourism.

From an environmental economics perspective, tourism development should not only focus on economic growth, but also consider the ecological and social values involved. Environmental economics emphasises the importance of internalising environmental values into the cost and benefit analysis of development, so that every tourism activity can provide ecological added value and support long-term sustainability. This approach is relevant in formulating tourism development strategies in Tanjung Puting National Park

that balance economic and conservation aspects. A study (Saputra W.P, 2025) shows that the success of ecotourism is largely determined by the integration of environmental preservation, community capacity building, and improvements in supporting infrastructure. The study also emphasises that without institutional collaboration and environmentally-based economic planning, the potential of ecotourism, including in TNTP, will not be able to generate optimal economic benefits or maintain ecological sustainability. Tourism development has the potential to create trade-offs between ecosystem services, where increased tourism activity can reduce certain ecological functions, such as environmental regulation and biodiversity. Findings (Li et al., 2023) underline the need for ecosystem service analysis-based tourism planning to maximise ecological value while minimising long-term environmental damage.

Tourism in Tanjung Puting National Park (TNTP) is one of the main sources of income for the local community through various economic activities, such as tour guide services, klotok transportation, and accommodation provision. If not managed properly, these activities have the potential to cause environmental degradation, including river pollution, disturbance to animal habitats, and increased carbon emissions. This situation highlights the need for strategies that can balance economic exploitation with environmental protection efforts. Studies that integrate sustainable tourism development strategies with environmental economic analysis in the context of conservation areas in Central Kalimantan, particularly TNTP, are still relatively limited. Most previous studies have tended to focus on ecological or socio-cultural conservation aspects, while the application of an environmental economic approach has not been comprehensively examined through in-depth literature reviews. A study (Fadli et al., 2022) shows that the success of sustainable tourism in Indonesia is greatly influenced by the ability of national and regional policies to internalise ecological values into development practices, thereby minimising potential conflicts between economic growth and environmental protection. This study contributes to enriching the literature on the relationship between environmental economics and sustainable tourism management in tropical conservation areas. Through a literature review approach, this study identifies theories, models, and best practices from various relevant previous studies, which can be used as a basis for formulating appropriate and applicable strategic recommendations for tourism development in Tanjung Puting National Park. The results of this study are expected to provide strategic input for policymakers, national park managers, and local communities in designing tourism development that not only provides economic benefits but also considers environmental sustainability and community welfare improvement. The successful implementation of sustainable tourism in national parks is greatly influenced by the effectiveness of governance, including inter-agency coordination and community participation mechanisms. A study (Matović, 2025) emphasises the importance of integrating environmental values into tourism policy so that economic benefits can be achieved without sacrificing ecosystem quality. In addition, tourism activities also have the potential to be an instrument to support the achievement of the Sustainable Development Goals (SDGs), particularly goal 8 on decent work and economic growth and goal 15 on terrestrial ecosystem conservation.

This study also aims to develop a strategic conceptual model that is not only relevant to tourism development in Tanjung Puting National Park, but can also be applied to other conservation-based tourist destinations in Indonesia. The success of ecotourism in Indonesia is greatly influenced by policies that are able to balance environmental conservation and economic benefits through strong regulations and active community participation (Wijayanto et al., 2024). Using literature analysis, this study examines various conservation-based tourism management strategies, green economy mechanisms, and environmental incentive and disincentive policies that have been implemented in various countries. The uniqueness of this study lies in the integration of

environmental economic perspectives and sustainable tourism development strategies through a systematic literature review approach. This approach enables researchers to synthesise previous research findings, identify knowledge gaps, and formulate strategies relevant to the local characteristics of Tanjung Puting National Park.

## **LITERATURE REVIEW**

### **Theories of Sustainable Tourism and Ecotourism**

Sustainable tourism integrates the three main pillars of economy, society and environment with the aim of maximising economic benefits while minimising ecological and social impacts. In the context of ecotourism, research conducted between 2020 and 2024 shows a shift towards models that emphasise habitat conservation, providing educational experiences for visitors, and distributing economic benefits to local communities as key mechanisms for preserving natural resources. The main variables that are often studied include tourism intensity, management capacity, and conservation indicators such as habitat conditions and species populations. Empirical findings show that good management capacity and visitor education play a role in moderating the negative impact of tourism intensity on environmental conditions. An increase in the number of tourists does not always lead to degradation if there are effective regulations and management. A systematic review of ecotourism practices reinforces the theoretical argument that policy interventions and local capacity can change the relationship between tourism activities and conservation conditions. The adaptive carrying capacity approach, which integrates physical, ecological, and managerial aspects, has been proven to maintain the sustainability of an area even with high visitation rates, as good management capacity can reduce environmental pressure (Siswanto, 2025). The application of the physical real effective carrying capacity model, supported by effective management capacity, can maintain a balance between visitor numbers and forest ecosystem conservation (Ambarwati, 2024). Determining daily visitation capacity based on ecological, social, and economic indicators is also an important basis for strategic planning aimed at minimising the negative impacts of tourism intensity (Kuniyal et al., 2025). Pressure state response analysis provides a comprehensive framework for explaining how visitation intensity affects ecosystem conditions and how appropriate managerial responses can control pressure to maintain the sustainability of tourist destinations (Xu & Li, 2025).

### **Economic Valuation and Ecosystem Services in Conservation Areas**

Economic valuation of ecosystem services emphasises the importance of incorporating non-market values such as carbon sequestration services, habitat provision, and existence value into cost-benefit analyses in tourism development in conservation areas. Various applied studies in coastal and mangrove areas in Indonesia have demonstrated the use of travel cost, contingent valuation, and benefit transfer methods to estimate the economic value of ecosystem services, which are then used as a basis for formulating cost allocation policies, conservation financing mechanisms, and incentive instruments for communities. The main variables in these studies are generally the value of ecosystem services as the dependent variable, with determining factors such as tourism pressure as the independent variable, conservation financing policies as the intervention variable, and the level of community participation as the mediator variable. Without internalising the value of ecosystem services into tourism planning, development decisions risk ignoring the long-term benefits of conservation, thereby triggering excessive exploitation of resources. In Tanjung Puting National Park, this implies the need for economic measurement of ecosystem services as a basis for formulating sustainable tourism development strategies. Research (Apriani & Akbar, 2022) shows that the valuation of mangrove ecosystems using the Total Economic Value (TEV) approach based on Travel Cost, Market Price, and Replacement Cost is able to reveal

the real economic value of the ecological and social functions of mangroves, thus providing a strong foundation for the internalisation of non-market values in coastal management policies. Furthermore, TEV measurement based on the Millennium Ecosystem Assessment (MEA) framework can comprehensively capture the ecological and social value of conservation areas, strengthening the economic argument for habitat protection and non-market values (Deviasari et.al, 2022). The spatial cost-benefit approach has also been proven capable of quantifying cross-service benefits such as coastal protection, carbon storage, fisheries, and tourism from mangrove conservation and restoration more accurately, thereby strengthening the basis for ecosystem value-based decision-making (Zanten et al., 2025). A study (Gross et al., 2025) confirms that tourists provide significant economic and non-economic value to nature in protected areas, making the integration of monetary valuation and socio-ecological value important in designing comprehensive conservation and tourism policies.

### **Community-Based Tourism (CBT) and Local Welfare**

Community-based tourism (CBT) is an effective approach to distributing the economic benefits of tourism to local communities while increasing their ownership and compliance with conservation regulations. Various empirical studies using CBT indices show that community participation, income distribution, local guide skills, and cultural assets are the main determinants of successful CBT implementation. Common findings in the literature indicate that the higher the level of community participation and access to tourism income sources, the stronger their support for conservation policies and sustainable practices, which ultimately contributes to improvements in ecological indicators such as reduced hunting activities and vegetation recovery. However, the CBT approach also carries risks, including cultural commodification and unequal distribution of benefits if not complemented by equitable governance. Case studies in Indonesia emphasise the importance of combining capacity building, transparent benefit-sharing schemes, and public-private partnerships to maximise the positive impact of CBT in conservation areas. A study (Kamila et al., 2025) shows that improving community welfare through active participation, equitable economic benefit sharing, and local capacity building are key factors in the success of sustainable ecotourism management. The success of CBT in Mekarsari Tourism Village is greatly influenced by the level of community participation, the clarity of benefit-sharing mechanisms, and institutional capacity. These conditions also reveal the potential for inequality if governance and regulations are not optimally implemented (Suhaimi et al., 2024). Research (Rahman et al., 2024) notes that community involvement in CBT is often hampered by internal conflicts, the dominance of local elites, and non-transparent governance, which can ultimately threaten the fairness of benefit distribution and the effectiveness of conservation in community-based tourism models.

### **Governance, Policy, and Instruments for Controlling the Impact of Tourism**

Conservation-based tourism governance requires effective public policy instruments, including the implementation of zoning, visitor capacity restrictions (carrying capacity), conservation financing schemes through tourism levies, and a moratorium on development in areas vulnerable to overtourism. Policy literature in Indonesia shows reforms to improve tourism quality while controlling negative impacts, with policies in Bali often used as relevant national references. Within the theoretical framework, policy variables include regulations and law enforcement, which function as moderating variables that can weaken the negative relationship between tourism intensity and ecosystem degradation. Effective policies generally combine evidence-based regulations, such as setting visitation limits and zoning rules, sustainable financing mechanisms, including conservation fees, and the involvement of local stakeholders in destination management. The integration of policy instruments with conservation funding mechanisms at the local and national levels is a strategic element in the development of

sustainable tourism in conservation areas such as Tanjung Puting. The application of the carrying capacity concept in destination planning has been proven to support the control of tourism pressure through an ecological limit-based approach (Haribudiman et al., 2023). Policy reforms in the form of visitation quotas, adaptive conservation fees, and conservation-based regulations have become key instruments in reducing tourism pressure while maintaining the sustainability of local ecosystems and cultures, as demonstrated in the case of Bali (Santini. P.A, 2023). The recovery of tourism in various conservation areas post-pandemic also emphasises the importance of combining visitation restrictions, conservation funding, and participatory governance as core strategies for ensuring long-term sustainability (Bhammar et al., 2021).

### Carrying Capacity, Environmental Impact, Hypothesis Development, and Conceptual Framework

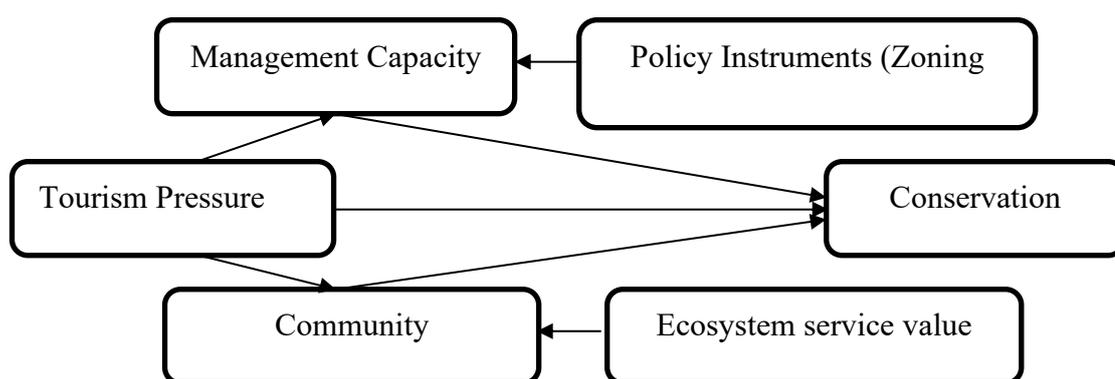
The carrying capacity approach (physical, biotic, socio-economic) and measurable impact assessment (environmental and socio-economic impact assessment) to design ecologically safe tourism development strategies. The main variables integrated into the conceptual framework include: (1) tourism pressure (visits, infrastructure), (2) management capacity (regulations, managerial resources), (3) ecosystem service values (environmental economics), (4) community participation and welfare (CBT), and (5) conservation outcomes (biological indicators). Tourism carrying capacity calculations that integrate visitation pressure, biotic factors, climate conditions, and management capacity produce more accurate and ecologically sound visitation limits that support sustainable destination management (Nursyam et al., 2023). From these relationships, practical hypotheses can be developed for the study in Tanjung Puting, namely:

H1: Increased community participation in CBT is positively associated with improved local welfare and conservation compliance.

H2: Internalisation of ecosystem service values (through conservation financing mechanisms) reduces the probability of environmental degradation due to tourism.

H3: The effectiveness of management policies (zoning + capacity limits) moderates the relationship between tourism intensity and habitat conditions.

**Figure 1.** Conceptual Framework of Community-Based Tourism and Conservation (Tanjung Puting)



The proposed conceptual framework suggests a path model in which tourism pressure influences conservation outcomes both directly and indirectly through the mediators of management capacity and community participation, and is moderated by policy instruments and ecosystem service values. Empirical implementation and testing of this framework at Tanjung Puting will require primary and secondary data weighed against literature studies for policy validation.

## **RESEARCH METHOD**

### **Research Approach and Design**

This study uses a descriptive qualitative approach with a systematic literature review method, which aims to analyse and synthesise various previous research results related to sustainable tourism development strategies from an environmental economics perspective. The literature review design was chosen to obtain a comprehensive understanding of the concepts, theories, variables, and relationships between relevant variables in the context of sustainable tourism in conservation areas such as Tanjung Puting National Park (TNTP). This approach allows researchers to identify knowledge gaps and develop an integrative conceptual framework based on the results of literature reviews from the last five years (2021–2025). A study (Pratiwi & Hulu, 2025) using descriptive qualitative and literature review methods shows that the success of sustainable tourism development in Tanjung Puting National Park is highly dependent on stakeholder collaboration in balancing local economic interests with environmental conservation efforts.

### **Population, Context, and Unit of Analysis**

The target population in this study includes all scientific publications, policy reports, government documents, and institutional data discussing the topics of sustainable tourism, ecotourism, environmental economics, and conservation area management in Indonesia and similar tropical regions. The research context focuses on tourism development in Tanjung Puting National Park, which has a tropical forest ecosystem, high biodiversity, and environmental pressures due to increased tourism activity. The unit of analysis used is the conceptual and empirical findings from each source of literature related to the main variables: tourism sustainability, environmental economic valuation, community participation, governance policies, and ecological impacts. The study (Publicuho et al., 2024) reveals that the development of ecotourism in Section III of Tanjung Harapan (TNTP) has a positive impact on the economic welfare of local communities, but also causes ecological pressure that requires participatory management and sustainable governance policies.

### **Literature Sampling Technique**

The literature sampling process was conducted using purposive sampling with specific inclusion criteria, namely: (a) scientific publications published between 2021 and 2025; (b) using theoretical or empirical approaches related to sustainable tourism, ecotourism, and environmental economics; (c) published by reputable national and international journals; and (d) directly relevant to the management of conservation areas such as national parks or biosphere reserves. A study (Husniyah et al., 2024) shows that the application of eco-labels in ecotourism in Nglanggeran Village can increase environmental economic value while strengthening sustainable governance mechanisms and local community participation. The data sources were obtained from scientific databases such as Google Scholar, ScienceDirect, and DOAJ, as well as official reports from the Ministry of Environment and Forestry (KLHK) and the Tanjung Puting National Park Office. From the initial search results, approximately 60 relevant publications were obtained, and after a final selection process based on topic relevance and data completeness, 30 main literature sources were selected for further analysis.

Systematic Literature Selection Formula (Purposive Sampling)

$$n = N - (E + T) = 60 - (30) = 30$$

Explanation:

$n$  = Number of final selected literature

$N$  = Total literature from initial identification

$E$  = Literature eliminated because it does not meet the inclusion criteria

$T$  = Literature eliminated due to incomplete data or irrelevance after final assessment

### Data Collection and Analysis Techniques

Data collection was conducted through document review and content analysis of each literature source that met the inclusion criteria. The data collected included research variables, methods used, key findings, and strategic recommendations from each study. Each article was extracted using a literature analysis matrix containing categories such as author, year, research objectives, key variables, methods, results, and relevance to the TNTP context. The analysis was conducted thematically (thematic synthesis) to identify patterns, trends, and relationships between variables, such as the link between community participation and the success of sustainable tourism management, as well as the influence of economic valuation on conservation policies. The study (Kartika et al., 2023) emphasises that through document review and content analysis, mangrove ecotourism in North Sumatra has the potential to support ecological sustainability, improve the local economy, and strengthen the social role of the community if it is managed in an integrated manner.

Literature Data Extraction Formula

Each article  $A_i$  is extracted into a matrix with the following main variables::

$$A_i = \{P_i, T_i, O_i, V_i, M_i, R_i, K_i\}$$

Description:

$P_i$  = Author

$T_i$  = Year

$O_i$  = Research objective

$V_i$  = Key variable

$M_i$  = Research method

$R_i$  = Main results/findings

$K_i$  = Relevance to the TNTP context

Total data extracted:

$$D = \sum_{i=1}^n A_i$$

Content Analysis Formula

The findings of each article are coded:

$$C = \{c_1, c_2, \dots, c_k\}$$

Each code is classified into a theme:

$$T_j = \sum_{i=1}^n (A_i \rightarrow C_j)$$

Explanation:

$T_j$  = Theme j

$C_j$  = Code associated with that theme

$n$  = Number of selected literature

Thematic Synthesis Formula

The relationships between variables are analysed to form thematic patterns:

$$TS = f(T_1, T_2, \dots, T_m)$$

Thus, we obtain:

Pattern = (Correlation between Community Participation ↔ Management Success,  
 Economic Valuation ↔ Conservation Policy)

Final Synthesis Decision

If  $T_j$  supports the main variable ⇒ Integration into the conceptual framework

Conclusion Formula Representation

Kesimpulan Representasi Rumus

Analysis Results = TS (D) = Theme + Pattern of Inter-Variable Relationships

### **Data Validation, Measurement, and Reliability**

To ensure the reliability of the study results, a source triangulation process was carried out by comparing data from various types of publications (scientific articles, government reports, and conservation agency data). Conceptual validity was tested through consistency between environmental economic theory and tourism management practices in the field as reported by empirical studies. The measurement of variables in this study was conceptual and based on common indicators in the literature, such as: economic indicators (income, employment), environmental indicators (biodiversity, water and air quality), and social indicators (community participation and welfare). The results of the analysis were then used to develop a conceptual framework and sustainable tourism development strategy that could be applied holistically and adaptively in Tanjung Puting National Park. A study (Penida et al., 2022) confirmed that the success of sustainable tourism development in conservation areas such as Nusa Penida is largely determined by the synergy between community participation, ecological protection, and inclusive economic benefits.

## **RESULTS**

**Table 1.** Literature Analysis Results Table (n = 30)

Main Variable	n	(%)	Key Findings	Main Implications
Governance Policy	13	43%	Zoning & restrictions on tourism activities	Balancing ecological and economic functions
Community Participation	11	37%	CBT, awareness and local economic benefits	Community support strengthens conservation
Ecosystem Economic Valuation	6	20%	TEV & conservation fees	Economic contributions need to be optimised for conservation funding
Total	30	100%	-	Integration of all three aspects is necessary for sustainability

Source: Processed data (2025)

The results of a literature review of 30 selected publications show that the development of sustainable tourism in conservation areas such as Tanjung Puting National Park (TNTP) is greatly influenced by three main variables, namely environmental management policies, local community participation, and ecosystem economic valuation. Of the total literature analysed, approximately 43% of studies highlighted the role of policy in maintaining a balance between conservation and tourism activities, 37% discussed community involvement, and 20% emphasised the importance of an environmental economics approach in decision-making. A common pattern found was that the success of sustainable tourism is highly dependent on the extent to which environmental economics management can be integrated with community-based governance mechanisms.

**Table 2.** Thematic Analysis of Policies and Impacts in TNTP

Analysis Theme	Proportion of Studies	Policy Benefits	Ecological Impact	Empirical Data / Local Statistics
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Zoning & Capacity Restriction Policies	± 75% of studies	Reduces tourist pressure, mitigates negative impacts	30-40% reduction in ecosystem damage compared to unrestricted areas	Findings from literature studies
Application of Carrying Capacity & Green Tourism		Environmentally and economically friendly regulatory instruments	Prevents over-exploitation and environmental degradation	Conclusions of the majority of academic publications
Growth in TNTP Tourist Visits		Increasing economic income from visits	Increased ecological pressure	Increase in tourists from 8,250 → 10,320 (up 25.1%) according to the TNTP Office report
Impact of Local Environmental Pressure		-	Decrease in water quality of the Sekonyer River by 8.5% (biological parameters)	Data from TNTP Office report (2023)

Source: Processed data (2025)

Thematic analysis shows that zoning policies and tourist capacity restrictions are the most effective instruments for controlling negative impacts on the TNTP environment. Approximately 75% of studies conclude that the application of carrying capacity and green tourism policy concepts can reduce ecosystem damage by 30–40% compared to areas that do not implement similar restrictions. In addition, a report from the Tanjung Puting National Park Office in 2025 shows an increase in tourist visits from 8,250 people in 2021 to 10,320 people in 2025, or an increase of 25.1%. However, this increase is accompanied by increased pressure on the environment, such as an 8.5% decline in the water quality of the Sekonyer River based on biological parameters. These findings reinforce the argument that control-based policy strategies are essential in maintaining a balance between the economy and ecology.

**Table 3.** Analysis of the Role of Community Participation in Sustainable Tourism in TNTP

Analysis Aspect	Proportion of Studies	Key Findings	Socio-Economic Impact	Implications for Sustainability
Involvement in CBT	± 68 % of studies	Tour guides, klotok operators, homestays managed by residents	Household income increased by 22–35%	Improved welfare and support for conservation
Environmental Awareness and Responsibility		Actively involved in maintaining cleanliness and	Land conflicts tended to decrease	Ecosystem preservation was more assured

		orangutan habitat		Economic Benefit Sharing
Emphasised in many CBT studies		Benefits were felt directly by the community	Support for park management increases	Tourism model becomes inclusive and adaptive

Source: Processed data (2025)

Local community participation has been proven to play a significant role in creating prosperity and sustainability. Approximately 68% of articles emphasise that community involvement in Community-Based Tourism (CBT) models can increase average household income by 22–35% and reduce land conflicts with national park managers. The study results show that communities directly involved in tourism activities, such as tour guides, klotok operators, and homestay providers, tend to have higher environmental awareness and play an active role in maintaining the cleanliness and preservation of orangutan habitats. Thus, strengthening community capacity and fair economic benefit sharing are key factors in creating an inclusive and sustainable tourism model in TNTP.

**Table 4.** Environmental Economic Valuation Literature

Analysis Component	Key Findings	Economic Value / Proportion	Policy Implications
Total Economic Value (TEV)	Economic value of TNTP ecosystem services	Rp 125–175 billion/year	Significant potential for conservation financing
Carbon Storage	Largest contributor to TEV	± IDR 95 billion/year	Can be developed through carbon credit schemes
Nature Tourism	Direct economic benefits from tourist visits	± Rp42 billion/year	Need for internalisation of value through tariffs and levies
Animal Presence Value	Non-use value (orangutans and other animals)	± Rp28 billion/year	Encourages habitat protection

Source: Processed data (2025)

Related literature on environmental economic valuation shows that the total economic value (TEV) of ecosystem services in the Tanjung Puting area ranges from Rp125 billion to Rp175 billion per year, with the largest component coming from carbon storage services (around Rp95 billion), followed by nature tourism services (Rp42 billion) and the value of wildlife presence (Rp28 billion). Most of this economic value has not been internalised in area management policies. Only 15% of the literature reports the existence of tourism levy mechanisms directly linked to conservation funding. This situation indicates a policy gap that needs to be addressed so that the economic contribution of tourism can directly support the sustainability of the TNTP ecosystem through green financing schemes and environmental incentive mechanisms.

## DISCUSSION

The findings indicate that management policies, community participation, and ecosystem economic valuation are the three main determinants of sustainable tourism success in TNTP. Literature analysis shows that carrying capacity and zoning policies play a significant role in mitigating negative impacts on ecosystems. The application of the tourism carrying capacity concept according to (Haribudiman et al., 2023) has significant implications for controlling environmental impacts by emphasising the importance of measurable planning and carrying capacity limits in the management of tourism destinations in Indonesia. A study (Adelita et al., 2025) shows that the implementation of zoning policies and tourist visit management in Komodo National Park significantly contributes to reducing ecological pressure while maintaining the economic sustainability of tourism as a model that is relevant to be applied in TNTP. Research (Pásková et al., 2021) proposes a new adaptive model for tourism carrying capacity in protected areas that combines ecological indicators and visitor satisfaction, enabling more sustainable and responsive tourism management to environmental pressures. The framework of indicators and implementation mechanisms for tourist carrying capacity as the basis for zoning policies and visitor capacity regulations in protected areas is crucial for maintaining a balance between ecosystem conservation and sustainable tourism activities (Tello Chan et al., 2025).

The importance of ecosystem service valuation in environmental economic policy. This approach emphasises that environmental value is not only ecological, but also has economic value that can be internalised in tourism area management. In TNTP, findings show that ecosystem services have high economic value, but have not been fully utilised in conservation policies. Integrating environmental economic value into the decision-making system can improve policy efficiency and provide economic incentives for nature conservation. This internalisation strategy, if applied consistently, can create a sustainable green economy model in Indonesia's conservation tourism sector. Research (Deviasari et al., 2022) shows that the economic valuation of ecosystem services based on the TEV framework can be the basis for more effective policy-making and conservation funding in conservation areas. A study (Ramadhan, 2024) proves that valuation methods such as CVM/WTP are effective in estimating the economic value of nature tourism, so that the results can be used as a basis for determining levies and management policies that support the sustainability of destinations. The use of the Travel Cost method and tourist expenditure analysis can accurately assess the economic benefits of tourism in protected areas, so that the valuation results can be directly used to strengthen conservation funding and sustainable area management (Loch et al., 2023). A study (Nugroho et al., 2022) emphasises that mainstreaming the value of ecosystem services into national policy is a strategic step to strengthen conservation funding through green financing mechanisms, so that the economic value of the environment can be truly internalised in forest area management and conservation.

One finding that did not fully meet expectations was the low level of implementation of conservation financing mechanisms from tourism revenues. Although there has been an increase in community income, there is still no system in place to ensure that a portion of the profits is used for ecosystem conservation. This phenomenon can be explained by the limited coordination between institutions and the weak environmental retribution policy instruments at the local level. Research (Hendro et al., 2022) shows that the readiness of stakeholders (including local governments) has a significant influence on sustainable financing mechanisms; this supports the argument that inter-agency coordination is very important in conservation financing, but does not always occur properly. Although the idea of imposing a tourist levy can be a mechanism for funding conservation, the implementation and reuse of these funds are not always guaranteed,

depending on local policies and area management structures that are highly relevant to the policy gap found (Suresh et al., 2022).

This study provides several important implications for TNTP managers and local governments. First, there is a need to integrate environmental economic policies into tourism planning, for example by establishing ecosystem service valuation-based conservation fees to support conservation financing. Second, there is a need to strengthen multi-stakeholder collaboration through partnerships between the government, local communities, academics, and tourism businesses so that sustainability principles can be applied operationally. Third, monitoring and evaluation based on ecological and economic indicators need to be carried out regularly to assess the effectiveness of the policies implemented. The strategies resulting from this study are not only theoretical but also applicable to the management of other conservation destinations in Indonesia that face similar challenges. A study (Wahyuni & Mulatsih, 2024) confirms that the potential for conservation funding through visitor WTP can be optimised through a retribution design that is in line with the ability to pay, thereby encouraging the sustainability of tourism area management. The success of ecotourism depends on the balance between ecological and economic indicators supported by effective governance and coordinated conservation financing mechanisms (Sobhani et al., 2023).

## **CONCLUSION**

Based on the results of the literature review, it can be concluded that the development of sustainable tourism in Tanjung Puting National Park (TNTP) requires an approach that balances economic, social and ecological interests. Effective strategies involve the implementation of policies based on environmental carrying capacity, tourism zoning management, and increased local community participation. This approach has proven capable of preserving ecosystems while promoting conservation-based economic growth. Thus, the concept of environmental economics is an important foundation in creating a tourism management system that is not only oriented towards financial gain, but also towards the sustainability of natural resources.

The results of this study reinforce the theory of Community-Based Tourism (CBT) and ecosystem service valuation as two main pillars in sustainable tourism development in conservation areas. The environmental economics approach helps explain how the economic value of ecosystem services can be internalised into public policy and managerial decision-making. In practical terms, the implications of this study emphasise the importance of synergy between the government, national park managers, local communities, and the private sector in developing adaptive, transparent, and participatory governance. Strengthening this collaboration is expected to improve community welfare without compromising the ecological function of TNTP as a conservation area for orangutans and other tropical biodiversity.

Although sustainable tourism development strategies have been widely discussed, implementation challenges remain considerable. Some of the limitations identified include weak environmental economic incentive policies, a lack of sustainable conservation financing mechanisms, and limited community capacity in nature tourism management. An important lesson from the results of this review is that sustainability cannot be achieved through regulation alone, but requires a paradigm shift in management that places conservation and community welfare as two complementary goals. An environmental economics-based approach can serve as a bridge to create a balance between utilisation and preservation.

This study recommends that further studies integrate empirical data in the field through a mixed-method approach to measure economic and ecological impacts more accurately. Local governments and national park managers also need to develop green economy mechanisms, such as carbon credit tourism systems, conservation levies based on ecosystem service valuation, and transparent public-private partnership schemes. In addition, environmental education for communities surrounding TNTP must continue to be improved so that they become key players in maintaining the sustainability of the area. With these measures, it is hoped that TNTP can become a concrete example of a sustainable conservation tourism destination that balances economic, social, and ecological interests at the national and global levels.

#### **LIMITATION**

This study has limitations because all analyses are based on secondary literature studies without direct empirical verification in the field, so that its contextual validity depends on the accuracy and relevance of the sources used. In addition, the literature review method limits the ability to capture current dynamics in the field, such as policy changes, local economic conditions, or fluctuating tourist behaviour. Another limitation lies in the methodological variations between the studies used as references, making it difficult to compare results in a homogeneous manner. Therefore, the findings in this study should be interpreted with caution and preferably supplemented with further empirical research involving both quantitative and qualitative data in the Tanjung Puting National Park area.

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#### **DECLARATION OF CONFLICTING INTERESTS**

The authors declare that there is no conflict of interest that could potentially influence the research, writing, or publication of this article. The entire research process was conducted independently and objectively without influence from any interested parties.

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