

STRENGTHENING LOCAL ECONOMIES THROUGH ECOTOURISM: EVIDENCE FROM BINTANG DISTRICT CENTRAL ACEH PROVINCE, INDONESIA

Imam Hadi SUTRISNO ^{1*}, Madhan ANIS ¹, Okhaifi PRASETYO ¹

¹ Samudra of University-Faculty of Teacher Training and Education-History Education Study Program, Aceh, Indonesia; hadi_sutrisno@unsam.ac.id (I.H.S.); madhan.anis@unsam.ac.id (M.S.); okhaifi.prasetyo@unsam.ac.id (O.P.)

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Abstract: This study investigates the role of ecotourism in strengthening local economies in Bintang District, Central Aceh by identifying key potentials within natural and socio-cultural resources. It explores how assets such as Lake Laut Tawar, agro-based livelihoods, and community enterprises can drive sustainable economic development. The study analyzes stakeholder collaboration, focusing on governance, participation, and community empowerment. It evaluates contributions to income diversification, employment, and micro-enterprise growth while identifying structural and institutional constraints. The research ultimately proposes integrated and sustainable strategies to support resilient, ecotourism-based local economic development. This study employs a mixed methods approach to examine the contribution of ecotourism to local economic strengthening in Bintang District, Central Aceh. Qualitative data were collected through in-depth interviews with key stakeholders to explore governance, collaboration, and community participation. Field observations documented tourism activities, environmental practices, and local economic interactions, with findings analyzed thematically. Quantitative analysis used indicators such as employment, income diversification, enterprise growth, participation rates, and environmental sustainability, supported by secondary data. The integration of these methods ensures triangulation, enhancing validity and providing a comprehensive understanding of ecotourism-driven economic transformation. The findings reveal strong ecotourism potential in Bintang District, particularly around Lake Laut Tawar, supported by rich natural landscapes, biodiversity, agro-tourism, and Gayo cultural heritage. This potential has contributed to emerging income diversification through homestays, culinary enterprises, handicrafts, and local transport services. However, development is constrained by inadequate infrastructure, including accessibility, sanitation, waste management, and digital connectivity. Weak institutional coordination and low community participation further hinder integrated planning and inclusive development. These results highlight the need for improved infrastructure, stronger collaboration, and participatory governance to ensure sustainable local economic transformation. This study concludes that ecotourism in Bintang District, particularly in the Lake Laut Tawar area, holds strong potential to drive local economic strengthening. However, this potential remains underutilized due to inadequate infrastructure and fragmented institutional coordination. Limited community participation further constrains inclusive development and local ownership. The findings highlight the need for integrated strategies combining infrastructure investment, institutional strengthening, and participatory governance. Sustainable ecotourism development requires a balanced approach to economic growth, environmental conservation, and socio-cultural sustainability.

Keywords: local culture, local economy, ecotourism, Bintang District, Aceh Province

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INTRODUCTION

Tourism-especially ecotourism—has increasingly been recognized as a pivotal driver for local economic development, offering pathways for rural and peripheral regions to diversify away from traditional sectors such as agriculture or resource extraction, tourism development is seen as a sustainable way to diversify the economy, with investments in infrastructure and promotion of natural and cultural attractions being key strategies (Salauatova et al., 2024; Shekhar et al., 2025). Globally, ecotourism is framed not only as a tool to stimulate economic activity and employment generation, but also as a vehicle for conserving natural and cultural assets, empowering local communities, and ensuring longer-term regional resilience. The involvement of local communities in conservation activities ensures that ecotourism initiatives are sustainable and effective in protecting natural resources (Erdawati & Ayub, 2024). It aims to minimize negative impacts on the environment, such as wildlife disturbance and habitat degradation, through responsible travel practices (Mudasir et al., 2020; Seervi, 2020).

It creates jobs and supports local businesses, providing economic benefits to communities by attracting tourists interested in nature-based experiences, as They create direct jobs in tourism services such as guiding, hospitality, and transportation, as well as indirect jobs in sectors like agriculture and crafts that supply goods and services to tourists (Gupta et al., 2023; Patil & Pattanshetti, 2024; Salsabila & Wulandari, 2024). Research has shown that destinations that leverage their natural and cultural resources through sustainable tourism frameworks can generate multiplier effects in local economies, including

* Corresponding author

through small business creation, local supply-chain development, and increased household incomes, sustainable tourism has led to job creation and income generation, experiencing a more pronounced economic impact due to its developed tourism infrastructure (Romario De Fretes et al., 2023; Suhel & Bashir, 2018).

In the Indonesian context, ecotourism has emerged as a strategic sector in regional development policy. Ecotourism projects in Indonesia have been instrumental in empowering local communities by providing economic opportunities and fostering community involvement in tourism planning and management. This participatory approach ensures that the benefits of tourism are equitably distributed among local populations (Aqilah & Islam, 2024; Awaluddin et al., 2024).

With Indonesia's abundant biodiversity, forested and coastal landscapes, and rich cultural heritage, the promotion of ecotourism aligns with national objectives to promote economic growth while preserving environmental integrity and encouraging inclusive community participation. The strategic location of ecotourism sites, offers opportunities to develop unique cultural, educational, and adventure tourism products, further boosting economic growth (La Hatani et al., 2024). For example, studies in Indonesia show that local community involvement is critical for ecotourism-based development to translate into real local economic benefits (Kia, 2021). The Indonesian government's policies and strategic plans increasingly emphasize tourism as a lever for regional growth, and ecotourism in particular is positioned as a modality to integrate environmental sustainability with economic opportunity (Dharmawan et al., 2025).

Against this backdrop, the case of Bintang sub-District in Central Aceh Province offers an instructive example of a locale with considerable ecotourism potential but with under-realised economic returns. The formation of Tourism Awareness Groups (POKDARWIS) can facilitate community engagement and help in promoting local cultural and natural resources as tourist attractions (Hardyanti et al., 2024). The district is endowed with notable natural assets such as Lake Lut Tawar, highland landscapes and forest ecosystems, and is enriched by the traditional cultural heritage of the Gayo people (Wulandari et al., 2025). These represent distinctive endowments that could support ecotourism offerings—nature-based recreation, cultural tourism, agro-ecotourism, and community-led tourism ventures (Dorobantu, 2012). However, despite this favorable asset base, the local economy of Bintang District remains modest in its growth trajectory. This discrepancy suggests that simply having ecotourism-amenable natural and cultural resources is not sufficient; rather, effective local economic development (LED) strategies are required to convert potential into realised outcomes (Fang et al., 2023).

Local economic development (LED) is a concept emphasising endogenous growth—whereby local governments, communities, and private stakeholders jointly mobilise and deploy local resources (natural, human, social, institutional) to stimulate economic activity, employment, and improved quality of life (Blakely & Leigh, 2010). In the context of ecotourism, LED implies that stakeholder collaboration, capacity building, infrastructure investment, and institutional governance arrangements are vital to harnessing tourism potential for broader economic benefits (Adu-Ampong, 2019).

Studies in Indonesia reveal that ecotourism can only contribute significantly to economic empowerment when community participation is high, benefit-sharing mechanisms are equitable, and support from local institutions exists (Irmawati & Hasnawati, 2024; Soenarto et al., 2019). Thus, the challenge is not solely in developing tourist attractions, but in orchestrating a development ecosystem in which ecotourism becomes a vehicle for local entrepreneurship, livelihood diversification, and inclusive growth. Trisoko et al. argue that leveraging local cultural strengths can enhance tourism's impact on economic growth. By offering unique cultural experiences, regions can attract more visitors and stimulate local economies (Trisoko et al., 2024). In Bintang sub-District, the modest pace of economic growth in spite of ecotourism-favourable conditions points to specific inhibiting factors (Wang et al., 2026). These may include limited infrastructure (transport, connectivity, amenities), weak institutional coordination among government, private sector and community actors, low capacity (skills, management) in local tourism enterprise development, limited marketing or branding of the destination beyond the local market, and environmental or cultural sustainability constraints.

Such obstacles have been documented in many Indonesian contexts—for instance, research in the Mandailing Natal community found that successful ecotourism-LED strategies required systematic stakeholder engagement, local capacity strengthening, and strategic prioritisation using tools like QSPM (Quantitative Strategic Planning Matrix) to identify feasible interventions (Lubis et al., 2023; Krasniqi & Elezaj, 2023; Nurairin & Orgianus, 2022). In addition, evidence shows that tourism-led economic growth is mediated by factors such as government tourism spending and governance quality, as well as the 'readiness' of local communities to participate (Suhel & Bashir, 2018).

Given these conditions, there is a clear need for strategic intervention in Bintang District. The framing of this research emerges from the view that ecotourism should not be treated as a passive by-product of natural endowments, but rather as an intentionally managed development pathway embedded in LED frameworks (Zingi et al., 2022).

By aligning tourism development with local economic development strategies, the potential exists to increase local value creation, generate employment and entrepreneurial opportunities for residents, diversify local income sources, and enhance local capabilities so that tourism becomes more inclusive and sustainable (Taneja, 2025).

For instance, community-based ecotourism models in Indonesia have demonstrated that when local people are active agents in destination management, and not merely passive participants, positive economic impacts follow (Irmawati & Hasnawati, 2024; Kia, 2021). In particular, the research seeks to address three interlinked questions: (a) "What are the current economic and ecotourism conditions in Bintang sub-District?"—this assesses the baseline of local economy, tourism assets, infrastructure, stakeholder involvement, and community livelihoods; (b) "What challenges and opportunities exist for local economic development?"—this examines both internal (strengths and weaknesses) and external (opportunities and threats) factors that influence how ecotourism may drive LED; and (c) "What strategies can be applied to strengthen sustainable economic growth in the ecotourism sector?"—this seeks to propose actionable strategic interventions rooted in LED theory and adapted to the local context.

The ultimate objective of this study is twofold. First, it aims to contribute to the theoretical understanding of how Local Economic Development (LED) and ecotourism interact in rural contexts, particularly within Indonesian tourism destinations. Although ecotourism has often been promoted as a tool for sustainable development, empirical evidence explaining how tourism activities translate into measurable economic benefits for rural communities remains uneven across regions. Second, the study seeks to generate practical policy insights for policymakers, local governments, community organizations, and private stakeholders involved in tourism development in Bintang District and comparable rural regions. By examining the existing structure of tourism activities, identifying institutional and economic constraints, and assessing opportunities for community participation, the research aims to provide actionable recommendations for strengthening local economic linkages.

More specifically, this study aims to:

- (1) assess the current role of ecotourism in supporting local economic activities in Bintang District;
- (2) identify structural factors that influence the effectiveness of ecotourism-led local economic development; and
- (3) propose an integrated LED–ecotourism framework that can enhance inclusive, sustainable economic growth.

Through this approach, the study seeks to ensure that ecotourism in Bintang District evolves from a largely underutilized natural resource base into a strategic catalyst for long-term community prosperity. Recent studies increasingly highlight ecotourism as an important strategy for promoting local economic development (LED) in rural areas.

Ecotourism integrates environmental conservation with economic opportunities for local communities, making it particularly relevant in regions where employment and income sources are limited. Through tourism activities, rural communities can develop various supporting services such as accommodation, transportation, guiding, food production, and handicraft industries. These activities stimulate local entrepreneurship and generate employment opportunities, thereby strengthening rural economies while maintaining environmental sustainability (Novalita et al., 2026). Consequently, ecotourism is widely considered a development approach that balances ecological protection with improvements in community welfare (Santosa, 2025).

Empirical research also demonstrates that ecotourism can stimulate rural microenterprises and diversify household income. In their study of rural tourism in Taiwan, Lee & Jan (2025) found that tourism development encouraged households to establish small businesses such as homestays, guiding services, traditional food production, and handicraft enterprises. These activities provide additional income streams and reduce reliance on agriculture, which is often vulnerable to seasonal fluctuations and environmental risks.

However, the study also shows that the benefits of ecotourism are not always distributed evenly. Households lacking financial capital, training, or marketing networks often face difficulties in accessing tourism markets, resulting in unequal participation and benefits. This highlights the need for institutional support, capacity building, and equitable access to tourism opportunities (Velmurugan et al., 2025).

Ecotourism can also enhance rural economic resilience when tourism revenues circulate within local communities. Nonthasorn (2025) emphasize that locally owned tourism enterprises help retain economic benefits within the destination area. When local residents manage accommodation, restaurants, and tour services, tourism income supports employment, stimulates local economic activities, and improves community welfare. However, many rural destinations struggle with economic leakage because tourism infrastructure is often dominated by external investors, reducing the benefits received by local communities (Nonthasorn et al., 2025).

Furthermore Wijijayanti (2025) the paper emphasizes that green tourism can revitalize local economies and enhance sustainable economic resilience in rural areas. It highlights the importance of community engagement and effective policy frameworks to mitigate challenges such as environmental disruption and cultural dilution. While it aligns with the notion that local entrepreneurship and infrastructure are vital, the paper specifically focuses on green tourism's role in diversifying livelihoods and reducing reliance on traditional industries, rather than detailing the broader aspects of ecotourism governance and integration (Wijijayanti et al., 2025).

MATERIALS AND METHODS

This study employs a mixed-method research design that integrates both qualitative and quantitative approaches to comprehensively analyze local economic development (LED) strategies for enhancing economic growth in the ecotourism sector of Bintang District, Central Aceh Province (Creswell & Plano Clark, 2018). The mixed-method approach was selected to obtain an in-depth understanding of the socio-economic, institutional, and environmental dimensions of ecotourism development while ensuring analytical validity through quantitative support, offering a model for sustainable economic development in developing countries (Surya, 2024).

Research Approach

The qualitative component focuses on exploring stakeholders' perceptions, institutional roles, and policy frameworks that influence local economic development in the ecotourism sector (Yin, 2018). Meanwhile, the quantitative component examines statistical data related to economic growth, employment, and tourism performance indicators (Hair et al., 2019). Combining both approaches enables triangulation of data and a more holistic interpretation of the research findings (Flick, 2014). Triangulation augments the validity and reliability of research outcomes by corroborating findings through various independent metrics. This methodology assists in mitigating the biases inherent in single-method investigations and offers a more comprehensive interpretation of the phenomena being examined (Meydan, & Akkaş, 2024; Noble & Heale, 2019). Triangulation is employed to authenticate quantitative methodologies and

behavioral variables, thereby enhancing the validity, thoroughness, and confidence in the results while reducing the limitations associated with single-method strategies (Dewasiri et al., 2018).

Research Location and Participants

The study was conducted in Bintang District (Figure 1), an area characterized by its prominent natural attraction, Lake Lut Tawar, and its surrounding highland ecosystems (BPS, 2023). Key participants included local government officials, tourism entrepreneurs, community leaders, and representatives of tourism-related organizations. A purposive sampling methodology was utilized to select participants possessing pertinent expertise and experience in ecotourism and local economic development. The study was executed employing purposive sampling to identify informants capable of enhancing comprehension of the participatory communication model rooted in indigenous knowledge. This approach enabled the systematic gathering of data from individuals who are actively engaged in the planning and development of ecotourism, thereby guaranteeing that the outcomes were anchored in empirical experience (Murtiningsih et al., 2024).

This purposive sampling facilitated the identification of rural tourism's potential as a strategy for local economic development. The investigation underscored challenges such as funding constraints and the necessity for human capital development, while providing recommendations for a systematic enhancement of knowledge and skills (Ramukumba, 2024).

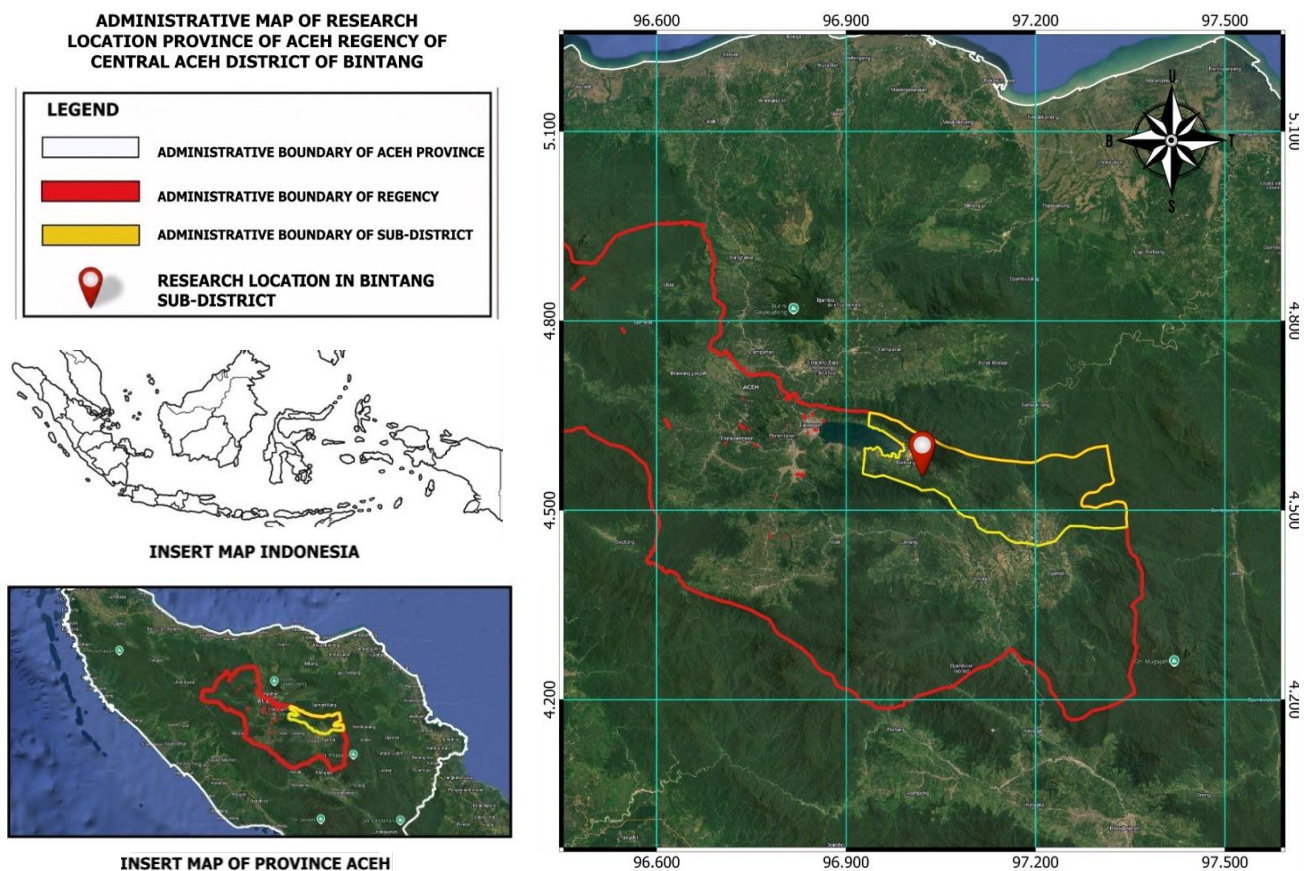


Figure 1. Research Location (★)

Data Collection Methods

Data were collected through semi-structured interviews, field observations, and document analysis of local development plans, tourism reports, and statistical data from government institutions (Creswell & Plano Clark, 2014). Quantitative data were obtained from official sources such as the Central Bureau of Statistics (BPS) and the Central Aceh Tourism Office (Badan Pusat Statistik Aceh Tengah, 2023). For the purpose of data acquisition, the investigators employed the following methodologies: Semi-Structured Interviews: This approach is frequently utilized to obtain comprehensive insights from principal stakeholders, including representatives from tourism offices, proprietors of local businesses, and visitors. Interviews were executed with delegates from the Central Aceh Tourism Office and tourists to evaluate communication strategies and promotional efforts related to tourism, particularly within the Bintang District of Central Aceh Regency (Fachri & Teniro, 2023; Yuli, 2025). Field Observations: Methodologies for observation were employed to gain an empirical understanding of the dynamics pertaining to community activities and the associated tourism infrastructure. This methodological approach facilitates the evaluation of the execution of tourism strategies and the nature of interactions between tourists and local communities, with a particular emphasis on the Bintang District within the Central Aceh Regency (Mopili et al., 2025; Sandewa & Windyarti, 2024).

Document Analysis: The examination of regional development frameworks, tourism-related reports, and quantitative data sourced from governmental institutions yields a holistic comprehension of the tourism milieu, specifically within the

context of Bintang District, Central Aceh Regency. This analytical approach is essential for assessing the ramifications of policies and strategies on the evolution of tourism (Fachri & Teniro, 2023; Sarmila & Furqan, 2023).

Let us refer to Figure 2, which illustrates the logical flowchart and sequence of methodological steps used in this study. The research begins with problem identification and a review of relevant literature to establish a conceptual foundation linking ecotourism development with the strengthening of local economies. This initial stage helps to clarify the analytical framework used to examine tourism-based local economic development.

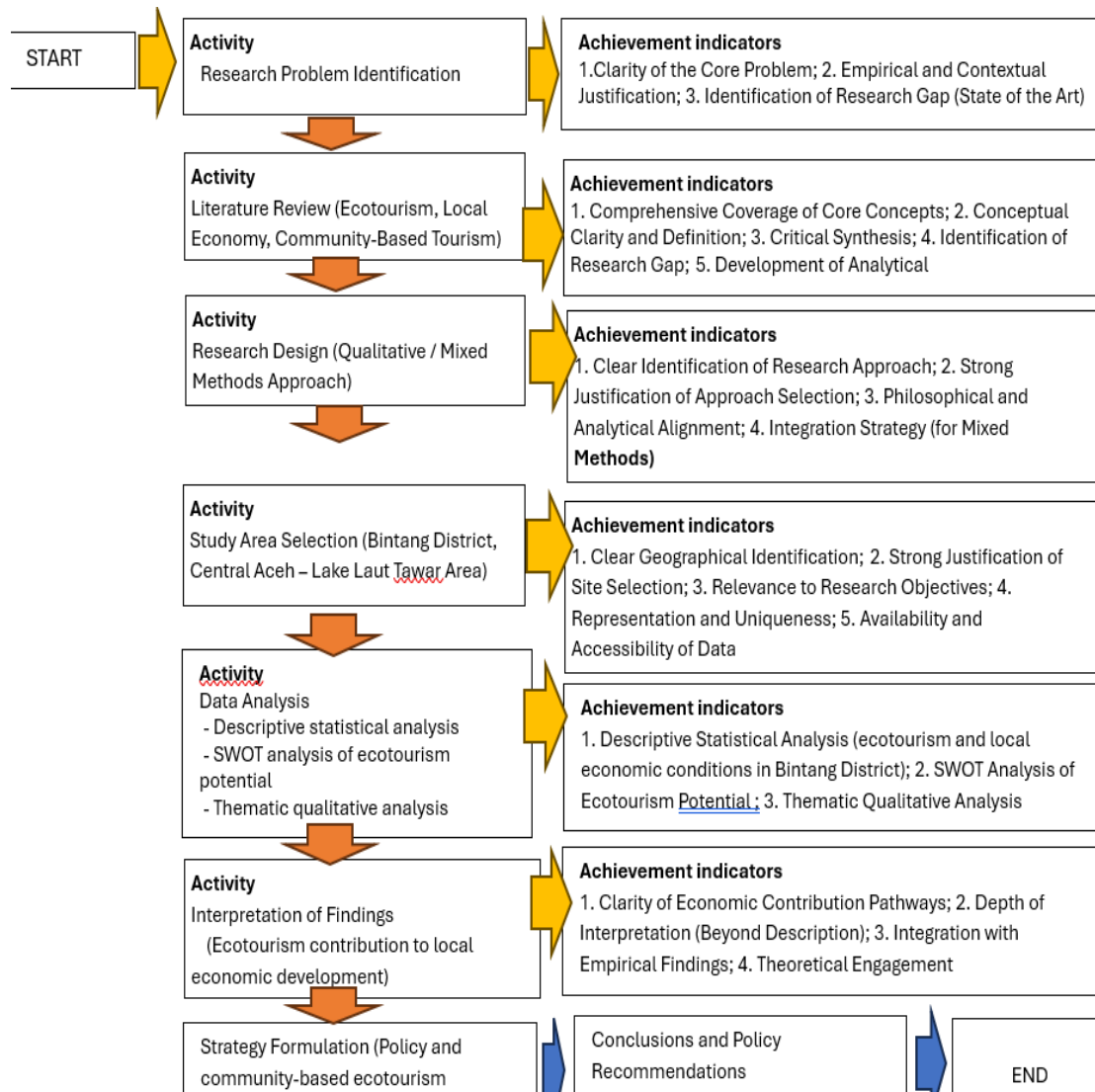


Figure 2. Research Method

Subsequently, the study adopts a case study approach in Bintang District, Central Aceh Province, focusing on ecotourism activities surrounding Lake Lut Tawar and the adjacent rural communities. Data were collected through multiple methods, including field observations, interviews with key stakeholders, questionnaires administered to local actors and visitors, and the review of secondary data obtained from government reports and official documents.

Finally, the collected data were analyzed using a combination of descriptive analysis, SWOT analysis, and qualitative thematic interpretation. These analytical techniques were employed to identify existing opportunities and constraints, as well as to formulate strategic recommendations for strengthening the local economy through sustainable ecotourism development

Data Analysis

Qualitative data were analyzed using thematic analysis to identify key issues, patterns, and strategies related to ecotourism-based LED. Quantitative data were analyzed using descriptive statistics and correlation analysis to examine relationships between tourism development variables and local economic growth. Effective governance and strategic policy measures are essential to mitigate challenges such as governance instability and to optimize the economic advantages of the tourism sector. Particularly in developing economies, it is imperative to implement comprehensive policies that fully leverage the potential of tourism as a catalyst for economic development (Mahwish et al., 2023). Data triangulation was applied to ensure validity and reliability of findings. Data were analyzed using SWOT (Strengths, Weaknesses, Opportunities, Threats) and Analytical Hierarchy Process (AHP) to determine strategic priorities.

Ethical Considerations

Ethical research principles were strictly followed. All participants provided informed consent, and confidentiality was maintained throughout the research process. The study also adhered to the ethical standards required by higher education research guidelines and the publication ethics of JIP.

RESULTS AND DISCUSSION

Although existing scholarship widely acknowledges the potential of ecotourism to promote local economic development (LED) in rural areas, several important gaps remain in the current body of knowledge. Previous studies primarily demonstrate that ecotourism can generate employment, diversify rural livelihoods, and support micro-enterprises such as homestays, guiding services, and handicraft production (Velmurugan et al., 2025). However, these studies also reveal that the economic benefits of tourism are often unevenly distributed due to limited access to capital, marketing networks, and tourism-related skills among local communities. While this research highlights the economic potential of ecotourism, it provides limited explanation of how local economic development strategies can be effectively designed to ensure more inclusive and equitable outcomes at the community level.

Furthermore, research on tourism economic circulation emphasizes the importance of locally owned tourism enterprises in reducing economic leakage and strengthening community welfare. Nevertheless, many studies focus primarily on the role of local ownership without sufficiently examining the broader institutional and governance conditions required to ensure that tourism revenues remain within local economies. As a result, the mechanisms through which governance structures, local institutions, and policy frameworks influence ecotourism-based local economic development remain insufficiently explored (Mena & Villamejor-Mendoza, 2024).

Studies on community-based ecotourism also underline the importance of community participation in tourism planning and management (Stronza et al., 2021). Although these studies suggest that community-managed tourism initiatives can improve household income and encourage environmental conservation, they also reveal that participation often remains limited or symbolic. Many communities still have minimal influence over decision-making processes due to the dominance of government agencies, external investors, or local elites. Consequently, the relationship between community participation, institutional arrangements, and local economic outcomes in ecotourism development requires further investigation. In the context of developing countries, research on community-based tourism in Indonesia indicates that tourism can support cultural preservation and improve rural livelihoods (Dolezal & Novelli, 2022).

However, these studies also identify governance challenges such as elite capture, uneven participation, and weak institutional coordination, which may undermine the long-term sustainability of tourism initiatives. Despite these insights, empirical studies examining how ecotourism can systematically strengthen local economic development at the district or sub-district level remain relatively limited.

Moreover, broader research on sustainable rural tourism suggests that tourism diversification can enhance economic resilience in rural regions (Lane & Kastenzholz, 2022). Yet much of this literature is based on European contexts, where institutional capacity, infrastructure, and tourism markets differ significantly from those found in many developing regions. Similarly, recent macro-level studies emphasize the importance of integrated planning and environmental policies for achieving sustainable tourism development (Nguyen et al., 2025), but these analyses often rely on regional datasets and provide limited insight into the micro-level dynamics through which tourism activities translate into tangible economic opportunities for local communities. Therefore, despite the growing recognition of ecotourism as a tool for rural development, there remains a limited empirical understanding of how ecotourism can be strategically leveraged to strengthen local economic development at the sub-district level, particularly in emerging ecotourism destinations in Indonesia. In particular, little research has examined how local economic conditions, institutional arrangements, and tourism resources interact to shape development strategies in specific local contexts.

To address this gap, this study focuses on Bintang Sub-District in Central Aceh Province, a region with significant ecotourism potential centered around Lake Lut Tawar. By analyzing current economic conditions, identifying internal and external factors affecting tourism development, and formulating strategic interventions for strengthening ecotourism-based local economic development, this research aims to contribute to a more context-sensitive understanding of how ecotourism can support sustainable rural economic growth.

Current Ecotourism Conditions

Bintang District's tourism is centered on Lake Lut Tawar, eco-lodges, and cultural attractions. However, the sector's contribution to the local economy remains limited due to inadequate infrastructure, weak promotion, and minimal investment. The analysis can be seen in Table 1 below.

Table 1. SWOT Analysis Summary

Internal Factors	Strengths	Weaknesses
Economic	Rich natural resources; cultural diversity	Limited local entrepreneurship; inadequate funding
Institutional	Local government commitment	Weak coordination and planning
Environmental	High ecotourism potential	Environmental degradation risk
External Factors	Opportunities	Threats
Market	Growing interest in eco-destinations	Competition with other provinces
Policy	Supportive national tourism policies	Policy inconsistency

SWOT Matrix

The SWOT matrix is a crucial matching tool that aids businesses in creating four different strategies: SO (strength of opportunity), WO (weakness of opportunity), ST (strength of threat), and WT (weakness of threat).

To create a SWOT matrix, a company's: Principal external opportunities, principal external threats, principal internal strengths, and principal internal weaknesses.

To match internal strengths with external opportunities, document the outcomes in a SO strategy; weaknesses with external opportunities, document the outcomes in a WO strategy; strengths with external threats, document the outcomes in a ST strategy; and weaknesses with external threats, document the outcomes in a WT strategy.

IFE Matrix

The IFE Matrix was developed through a series of interviews conducted with various pertinent governmental agencies, academic experts, and local inhabitants. The process of weighting involved a comparative analysis of each internal ecotourism variable to ascertain their respective priorities.

Subsequently, a ranking procedure was employed to assess the current state of ecotourism potential, thereby identifying critical strengths and weaknesses within the ecotourism development sector. The strengths and weaknesses associated with ecotourism development exceed the average benchmark of 2.50. Table 2 illustrates that its primary strength lies in its strategically advantageous geographic location, evidenced by a score of 0.535.

Table 2. IFE Matrix (Source: Authors)

NO	Internal Factor		Value	Rating	Score
1	Highly strategic geographical location	Strengths	0.16	5	0.54
2	Appropriate workforce		0.04	5	0.35
3	Age		0.06	4	0.19
4	Level of education		0.05	3	0.24
5	Perseverance/Motivation		0.05	4	0.46
6	Broad Marketing aspects		0.18	4	0.40
7	There is no adequate information system in public severses	Weaknesses	0.10	4	0.25
8	Government support that is not well-direct		0.16	5	0.25
9	Lack of local labor absorption		0.23	5	0.15
10	Lack of planning and business development actions that have potential economic value		0.02	3	0.14
11	Poor waste management		0.01	4	0.14
Total			1.00		2.81 (x)

EFE Matrix

The EFE matrix is constructed through the synthesis of qualitative data obtained from interviews with a range of pertinent governmental entities, academic scholars, and local inhabitants. The prioritization process is executed through a comparative analysis of each external factor to delineate relative significance. The evaluation is conducted by assessing the potential responses to ecotourism development in relation to the existing or anticipated opportunities and threats.

Table 3 illustrates that the principal opportunity factor for the advancement of ecotourism lies in its promising future potential, evidenced by a score of 0.821. Conversely, the predominant threat is identified as the insufficient public interest in business expansion, reflected by a score of 0.205. Local associations, notably including agricultural stakeholders involved in ecotourism, play a crucial role in the participatory planning process, thereby facilitating the generation of appropriate support across diverse interests. The aggregate score for the external factors collectively amounts to 2.833. In addressing the opportunities and threats, this can be interpreted positively, as it surpasses the average benchmark of 2.50.

Tables 2 and 3 elucidate the matrix of critical strategies pertinent to the advancement of a local agribusiness/agroindustry-oriented economy. In this context, the objective is to cultivate ecotourism within the Java regencies via the SWOT analysis quadrant. The Internal Factors Evaluation (IFE) value (1.40) denotes the measurement along the x-axis, while the External Factors Evaluation (EFE) value (1.42) signifies the measurement along the y-axis (Figure 1). From the analysis presented in Figure 1, it can be inferred that the enhancement of ecotourism is situated within quadrant 1. This indicates that the progression of ecotourism is characterized by significant strengths and opportunities.

Table 3. EFE Matrix (Source: Authors)

No	External Factor		Value	Rating	Score
1	Prospects for ecotourism development	Opportunities	0.13	4	0.82
2	Supporting natural resources		0.04	5	0.40
3	Rich in superior Product		0.06	4	0.28
4	A vast market opportunity remains		0.05	4	0.52
5	Prospects for Community-Based Tourism		0.06	4	0.26
6	Low public interest business development	Threats	0.09	1	0.21
7	Society's stigma about the importance of education		0.10	2	0.11
8	Many are unemployed at working age		0.16	4	0.12
9	Garbage and waste have not been managed properly		0.33	5	0.12
Total			1.00		2.83 (y)

IFE matrix

The total weighting result of the IFE matrix is 2.81, and for the EFE matrix, 2.83. These results are mapped onto the IE matrix where the x-axis is the total value of the IFE matrix, and the y-axis is the total value of the EFE matrix. Thus, the IE matrix is obtained (Figure 3).

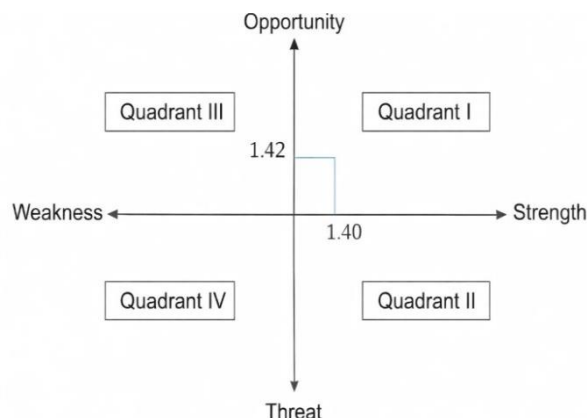


Figure 3. SWOT Matrix (Source: Authors)

Strategic Recommendations

Based on analysis, the following LED strategies are proposed:

a. **Capacity Building:** Strengthening local capacity should begin with the establishment of community-based tourism cooperatives to collectively manage local tourism assets. Through a cooperative structure, community members can pool their skills and resources, reduce individual marketing and procurement costs, and enhance their bargaining power when engaging with suppliers and external intermediaries. Cooperatives also allow communities to make shared investments in tourism assets that are often too costly for individual households, such as boats, homestay facilities, or interpretation equipment. Collective ownership not only expands the scale of available services but also improves their quality, thereby increasing the competitiveness and professionalism of the destination (Mironov, 2025). However, the effectiveness of tourism cooperatives depends heavily on sound institutional design. Their establishment should therefore be accompanied by structured capacity-building programs, including training in hospitality management, financial literacy, bookkeeping, and digital marketing, to ensure long-term business sustainability (Pamungkas et al., 2025). Without adequate capacity development, cooperatives risk becoming symbolic institutions rather than functioning as effective economic actors.

In addition, transparent governance mechanisms are essential to prevent elite capture and internal conflicts. These mechanisms should include clear membership criteria, fair profit-sharing arrangements, leadership rotation systems, and regular financial reporting. Such governance practices are best supported through facilitation by local governments or neutral civil society organizations to ensure accountability and community trust.

b. **Infrastructure Improvement:** Infrastructure development plays a fundamental role in strengthening ecotourism-based local economic development. Improved road access reduces travel time and transportation costs, making destinations more accessible and attractive to visitors while also facilitating the movement of goods and services required by tourism-related businesses (Andrianto et al., 2024). The provision of basic public services—such as sanitation facilities, clean water supply, and public toilets—is equally important. Adequate basic infrastructure not only improves public health conditions but also enhances visitor comfort and satisfaction. Destinations that provide reliable facilities generally experience longer visitor stays and higher rates of repeat visitation (Fahimah et al., 2025). Another crucial component is the development of community-scale waste management systems. Early investment in waste segregation, collection points, composting programs, and recycling partnerships is necessary to protect natural attractions from environmental degradation. Without proper waste management, environmental damage can quickly undermine the long-term sustainability of ecotourism destinations (Shukla et al., 2024). In addition, digital infrastructure has become increasingly important for tourism development. Expanding internet access and strengthening digital literacy enable local micro, small, and medium enterprises (MSMEs) to utilize online booking platforms, social media promotion, and e-commerce channels. These tools help broaden market reach, increase profit margins, and diversify revenue sources beyond walk-in visitors (Xojamuratova, 2025).

c. **Entrepreneurship Development:** Local economic development through ecotourism depends strongly on the vitality and competitiveness of micro, small, and medium enterprises (MSMEs). Integrated support programs that combine microfinance, technical training, and market linkage assistance can substantially improve product quality, service standards, and overall business performance (Lumbi Salazar et al., 2025). Capacity-building initiatives focusing on food hygiene, packaging quality, product design, and customer service enable local entrepreneurs to reach higher-value market segments rather than relying solely on short-term or low-spending visitors. In addition, access to microcredit allows entrepreneurs to invest in better equipment and upgrade their business operations. Formalization of MSMEs also plays a critical role in strengthening local entrepreneurship. Legal registration, tax literacy, and basic licensing improve the legitimacy of local businesses and increase their eligibility for government assistance programs, financial support schemes, and formal supply contracts. These measures help reduce dependence on informal economic arrangements while minimizing economic leakage to external providers. As a result, a greater share of tourism-related revenue can remain

within the local economy (Chasanah et al., 2025). Business incubation programs further accelerate entrepreneurship development, particularly when experienced mentors guide emerging entrepreneurs, including women and youth. Through mentorship, new business owners can learn effective pricing strategies, basic bookkeeping practices, and professional service standards that support long-term financial sustainability (Balakrishnan & Sinha, 2025). Moreover, linking MSMEs to cooperative procurement systems and shared marketing platforms can strengthen local value chains and improve market access. Such integration ensures that a larger proportion of high-value tourism activities remains within the community, thereby reinforcing the economic benefits of ecotourism development (Balakrishnan & Sinha, 2025).

d. **Institutional Strengthening:** Institutional coordination is essential for transforming fragmented tourism initiatives into a coherent and sustainable development strategy. One practical approach is the establishment of a multi-stakeholder Ecotourism Development Board that serves as a formal platform for dialogue, joint planning, and conflict resolution among government agencies, private investors, and community representatives (Taufik et al., 2023). Through such a mechanism, stakeholders can align development priorities and ensure that ecotourism initiatives are implemented in a coordinated and integrated manner. The Ecotourism Development Board can also clarify roles and responsibilities related to environmental monitoring, licensing of tourism operators, infrastructure development, and destination marketing strategies. Clear institutional arrangements help reduce administrative overlap, strengthen accountability among implementing actors, and create a more predictable governance environment that increases investor confidence (Sari, 2024). To ensure its effectiveness, the board should adopt measurable performance indicators, including visitor carrying capacity limits, local procurement ratios, employment generation targets, and waste reduction benchmarks.

Inclusive representation is equally important for strengthening the legitimacy of the coordination mechanism. Ensuring participation from women, civil society organizations, and marginalized community groups enhances transparency and encourages broader community ownership of tourism development. In addition, providing the board with a modest operational budget or permanent secretariat can help move the institution beyond periodic coordination meetings toward consistent implementation and monitoring of ecotourism programs (Sumandi et al., 2025).

e. **Sustainability Practices:** The long-term success of ecotourism depends largely on maintaining environmental quality within tourism destinations. Environmental education programs targeting both local residents and visitors can play an important role in fostering responsible behavior, reducing littering, and protecting sensitive ecosystems from gradual degradation (Lau, 2025). By increasing awareness of environmental conservation, such programs help ensure that tourism development does not compromise the natural resources that attract visitors in the first place.

Another important strategy is the implementation of green certification schemes, either through nationally recognized standards or locally developed initiatives. These certification systems encourage tourism operators to adopt environmentally responsible practices, including waste reduction, energy efficiency, and water conservation. In addition to improving environmental management, certification functions as a market signal that enhances the credibility of destinations among environmentally conscious tourists. Tiered certification systems are particularly suitable for rural ecotourism contexts. Entry-level certification allows small tourism operators to participate without facing excessive compliance costs, while higher certification levels encourage gradual improvement in environmental performance over time. To accelerate adoption, certification initiatives should be linked to incentives such as small grants, technical assistance, or inclusion in promotional campaigns. Such financial and technical support helps reduce initial investment barriers and ensures that sustainability standards remain achievable rather than burdensome for local tourism businesses.

CONCLUSION

This study demonstrates that ecotourism in Bintang District, Central Aceh Province, holds substantial potential to strengthen local economic development (LED). The findings indicate that ecotourism can stimulate local economic growth, generate employment, and foster the expansion of community-based enterprises when supported by effective planning and inclusive governance. However, this potential remains contingent upon the adoption of integrated and participatory development strategies. A sustainable ecotourism-based LED approach should position local communities as central actors. Strengthening community capacity—through entrepreneurship development, tourism management skills, and support for small-scale businesses such as homestays, local culinary services, handicrafts, and guiding services—can enhance participation and promote a more equitable distribution of economic benefits.

Equally important is the role of institutional coordination. Strong collaboration among local governments, tourism stakeholders, community organizations, and the private sector is essential to ensure coherent planning, efficient resource management, and long-term sustainability of ecotourism initiatives. In addition, improving supporting infrastructure—including transportation access, sanitation, visitor facilities, and digital promotion—remains a critical factor in increasing destination competitiveness. When these elements are developed in an integrated manner, ecotourism can function not only as a driver of local economic growth but also as a mechanism for preserving natural and cultural resources. Overall, this study highlights that a well-coordinated, community-centered, and infrastructure-supported ecotourism strategy can promote inclusive economic growth, enhance community welfare, and contribute to sustainable regional development.

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Institutional Review Board Statement: This study strictly adheres to rigorous research ethics principles and complies with the ethical standards mandated by higher education research guidelines and publication ethics. The study protocol, which involves data collection from human participants such as local government officials, tourism entrepreneurs, and community leaders via interviews and questionnaires, has been reviewed and approved by the Ethics Committee (or Institutional Review Board) of Samudra University (Reference No.: 175/UN54.6/TU/2024, dated July 2, 2024). All data collection procedures were conducted with a commitment to safeguarding the rights and well-being of human subjects, in accordance with established standards, including the principles of the Declaration of Helsinki.

Informed Consent Statement: We formally obtained informed consent from all participants before they took part in data collection activities, whether through interviews or field observations. Each research subject received a clear explanation of the study's objectives, and we strictly maintained their identity and data privacy throughout the research process. These measures ensured that community and stakeholder participation was entirely voluntary and free from coercion.

Data Availability Statement: The data presented and analysed in this study are not publicly available to protect the confidentiality and privacy of the research participants. However, the corresponding author can provide the supporting data upon reasonable request for clearly defined academic purposes.

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