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Developing a Mangrove Ecotourism Model through Local Economy: Implications for Ecosystem Sustainability in Urban Coastal Areas

Anggraeny Puspaningtyas, Ghulam Maulana Ilman

Universitas 17 Agustus 1945 Surabaya, Jl. Semolowaru No.45, Semolowaru, Kec. Sukolilo, Kota Surabaya, Jawa Timur 60119. Indonesia

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CORRESPONDENCE

Name: Anggraeny Puspaningtyas
Email: anggraenypuspa@untag-sby.ac.id

A B S T R A C T

Mangrove ecotourism development in urban coastal areas faces complex challenges, including pressures from urbanization and the need for sustainable local economic growth. This study aims to develop a Local Economic Development (LED)-based model for Mangrove Ecotourism in Gunung Anyar Tambak, Surabaya, by applying Blakely's four LED dimensions: locality development, business and economic base development, human resource development, and community economic development. A qualitative descriptive approach was used through field observations, in-depth interviews with key stakeholders, and secondary data analysis, including spatial planning and local development policies. The findings indicate that Gunung Anyar Tambak has strong local characteristics as an urban coastal mangrove ecosystem that provides ecological protection while offering economic potential, but remains vulnerable to urbanization, tidal flooding, and coastal erosion. This study reveals that mangrove ecotourism has generated diverse local economic activities, including tourism services, small businesses, and processed mangrove-based products. However, these remain fragmented and poorly institutionalized. Human resource development and community participation have been initiated through conservation and environmental education programs. Still, their sustainability is constrained by limited capacity-building mechanisms and reliance on government support and corporate social responsibility. This study proposes an integrated LED-based ecotourism model that emphasizes ecological spatial planning, inclusive local business policies, sustainable investment in green human capital, and the strengthening of community economic institutions. The proposed model contributes to the literature by offering a policy-oriented framework for sustainable mangrove ecotourism in an urban coastal context.

INTRODUCTION

Indonesia is an archipelagic country comprising more than 17,000 islands, with the majority of its territory consisting of marine waters. The total marine area of Indonesia is approximately 6,400,000 km², of which 3,250,000 km² comprises archipelagic waters and territorial seas. The national target for marine conservation areas in 2024 was set at 325,000 km² (Coordinating Ministry, 2024). Law No. 32 of 2009 on Environmental Protection and Management provides the overarching legal framework for environmental protection and management, including coastal and marine ecosystems. This law emphasizes sustainable development, ecosystem balance, and the preservation of natural resources. Complementing this framework, Law No. 27 of 2007 on the Management of Coastal Areas and Small Islands explicitly regulates the governance of coastal resources, including mangrove ecosystems, which are vital to local economies and disaster risk mitigation.

Surabaya is one of the regions directly bordering the Madura Strait to the north and east. A substantial number of coastal communities inhabit areas along the shoreline, including Kenjeran, Bulak, Asemrowo, Tandes, Benowo, and Gunung Anyar District. Surabaya's marine products include milkfish, mackerel, scad, tuna, squid, shellfish, shrimp, salted fish products, and fermented shrimp paste (petis). According to Surabaya's Gross Regional Domestic Product (GRDP) data, the Agriculture, Forestry, and Fisheries sector reached IDR 982.82 billion in 2022. It increased to IDR 1,026.19 billion in 2023 (BPS, 2024), with the fisheries subsector contributing more significantly than agriculture and forestry.

In 2024, Surabaya became the site of a National Strategic Project, the Surabaya Waterfront Land, which has raised concerns about the displacement of coastal communities and the degradation of mangrove ecosystems. This coastal development involves the reclamation of 1,084 hectares along Surabaya's eastern coastline, with an estimated investment value of IDR 72 trillion. The project has faced criticism and opposition from various stakeholders. Approximately 27 hectares of coastal areas, including Wonorejo, Medokan Ayu, and Gunung Anyar Tambak (GAT), are directly affected by the Surabaya Waterfront Land project. These areas also represent strategic assets for the development of ecotourism and urban agriculture (Ambrosius Harto Manumoyoso, 2024). The continued decline of mangrove ecosystems has intensified global efforts to advance large-scale restoration initiatives, as reflected in the United Nations Decade on Ecosystem Restoration (2021–2030) and ongoing discussions surrounding the Post-2020 Global Biodiversity Framework, both of which demonstrate a coordinated international commitment to reversing mangrove degradation (Lee & Park, 2023; Yao et al., 2023).

Coastal economic sustainability in Gunung Anyar Tambak District seeks to balance local economic growth, environmental conservation, and improved coastal community welfare. The local coastal economy is mainly dependent on natural resources, including mangrove forests, aquaculture areas, and capture fisheries. This orientation is supported by Surabaya Regional Regulation No. 12 of 2014 on Spatial Planning, which encompasses coastal areas such as Gunung Anyar Tambak and aims to preserve ecosystems while promoting local economic development.

Furthermore, Surabaya Regional Regulation No. 8 of 2018 on the Detailed Spatial Plan and Zoning for 2018–2038 outlines various supporting programs (Surabaya Regional Regulation No. 8/2018). Mangrove areas are designated as protected zones, with programs focused on conservation, the development of

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international-scale mangrove tourism, and educational initiatives. These mangrove areas also function as conservation zones, including mangrove planting efforts to support ecotourism development. The stakeholders involved include the Department of Food Security and Agriculture, the Environmental Agency, the Transportation Agency, the Culture and Tourism Agency, the Housing and Settlement Agency, the Public Works and Spatial Planning Agency, the Water Resources and Highways Agency, the Regional Revenue Agency, and other related institutions. In addition, Gunung Anyar District and Gunung Anyar Tambak Village, tourism awareness groups, local communities, universities, and the private sector play important roles in supporting mangrove ecotourism management.

The Surabaya Mangrove Botanical Garden is the first and only mangrove botanical garden in Indonesia. In addition to being the largest, with a total area of 34 hectares, it is also the only thematic mangrove botanical garden in the country (BPN, 2023). A thorough assessment of the ecological carrying capacity of mangrove ecotourism sites is essential (Díaz-Pérez et al., 2020). Carrying capacity serves as a critical reference for the systematic management of tourism activities, encompassing both the physical conditions of the area and governance capacity (Vasylieva et al., 2020). This assessment is critical when evaluating stakeholders' capacity to effectively manage the Gunung Anyar Tambak (GAT) mangrove area.

The management of this area is overseen by the Mangrove Botanical Garden Technical Implementation Unit (UPTD) under the Surabaya City Office of Food Security and Agriculture, reflecting a strong governmental commitment. The development of mangrove forests as tourism destinations presents a promising solution to environmental degradation (Ge et al., 2023; Fauzi & Oxtavianus, 2014), given the long-established relationship between mangrove tourism and local economic development in the Gunung Anyar Tambak area. The promotion of mangrove-based tourism creates employment opportunities for residents, particularly in tourism-related sectors such as guiding services, local transportation, and facility management. Community involvement, facilitated by the UPTD in mangrove tourism management, also enables residents to gain direct economic benefits, for example, through micro, small, and medium enterprises (MSMEs) that sell local food products.

Urban coastal areas in Gunung Anyar Tambak Sub-district are experiencing multiple pressures arising from urban expansion, environmental degradation, and increasing demands for improving the economic welfare of local communities. Mangrove ecosystems, which provide natural coastal protection, carbon sinks, and critical livelihood support, are increasingly threatened by land-use conversion and unsustainable management practices. In this context, mangrove ecotourism is often promoted as a policy solution that integrates environmental conservation with economic development.

Although numerous studies have examined mangrove ecotourism from conservation or sustainable tourism perspectives, there remains a significant research gap regarding how mangrove ecotourism can be reconceptualized as a local economic development model that simultaneously: (1) generates economic value for local communities, (2) strengthens local government governance capacity, and (3) ensures the long-term sustainability of mangrove ecosystems in urban coastal areas.

The core research problem addressed in this study lies in the absence of an integrated conceptual and empirical model capable of explaining the relationship between mangrove ecotourism–based local economic development and ecosystem sustainability within urban coastal contexts. This study seeks to address this gap by developing a mangrove ecotourism model grounded in a local economic development approach and by analyzing its implications for ecosystem sustainability and urban coastal governance.

The development of mangrove tourism in Gunung Anyar Tambak (GAT) is aligned with the Local Economic Development (LED) framework. Empirical evidence indicates that collaborative management approaches that utilize available local resources have contributed to improved local economic outcomes. This supports the view that LED is a collaborative process involving government, the private sector, and non-governmental organizations to create favourable conditions for economic growth and job creation at the local level (Said, 2020). According to Blakely and Bradshaw, LED is a process in which local governments and community-based organizations work together to stimulate and sustain business activity, thereby generating employment opportunities (Edward J. Blakely, 2002) Helming further emphasises that LED involves partnerships among multiple stakeholders to manage existing resources for job creation and regional economic growth, with a strong emphasis on local control and the optimal utilisation of human, institutional, and physical resources (Leigh & Blakely, 2017).

This study applies four core components of the LED framework; (1) locality, (2) business and economic base development, (3) human resource development, and (4) community development to analyze mangrove tourism development in Gunung Anyar Tambak. The central research question is how implementing an LED approach in tourism development can simultaneously promote economic growth and enhance the sustainability of local mangrove ecosystems. Specifically, the study examines how stakeholders mobilize local resources, build community-based enterprises, and engage local actors to ensure that tourism activities do not undermine environmental integrity. By addressing this question, the study seeks to provide insights into how tourism initiatives can function as instruments for balancing ecological conservation with socio-economic benefits in coastal communities.

Local Economic Development is fundamentally a community- or group-based process of managing a territory in accordance with available resources, to increase local income, regional growth, and employment opportunities. A key element of LED is the emphasis on local characteristics, which reflect the uniqueness of each locality. According to the World Bank, LED is defined as "a process by which public, business, and non-governmental sector partners work collectively to create better conditions for economic growth and employment generation at the local level" (Deng, 2023).

This perspective is consistent with Rogerson's argument that, alongside the restructuring of development planning, local economic development has emerged as a vital new focus, particularly amid broader trends toward decentralization (Rogerson, 2016). That LED strategies represent a necessary and appropriate complement to traditional development strategies in a world radically transformed by parallel processes of economic and political globalization and changes in territorial governance (Ave et al., 2010). Swinburn supports this view by emphasizing that each community possesses a unique set of local conditions that may either enhance or constrain its potential for local economic development, and that these conditions shape a

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locality's relative advantage in attracting, creating, and retaining investment (Swinburn et al., 2006).

Research by Goodwin in the United Kingdom suggests that, to stimulate economic growth and reduce poverty in the tourism sector, a pro-poor tourism approach can be adopted. Pro-poor tourism differs from ecotourism and community-based tourism in that it explicitly positions poor communities as the primary beneficiaries of tourism activities, rather than merely as complementary actors within the tourism value chain (Goodwin, 2008).

This perspective differs from that of Triyanti et al., who argue that villages have increasingly become new focal points for economic growth through the development of village-based tourism. Mangrove forests, which were previously emphasized primarily from a conservation standpoint, are now viewed through an economic lens, particularly as key attractions in coastal village ecotourism. Using the Business Model Canvas (BMC) and SWOT analyses, their study reveals that mangrove-based coastal tourism development faces a range of structural and cultural challenges and opportunities. This strategy is expected to apply to regions in eastern Indonesia (Triyanti et al., 2025).

Lukum highlights the significant role of mangrove forests in driving local economic growth through land-use diversification in the Pentadu Timur and Pentadu Barat villages in Boalemo Regency, Gorontalo Province. These villages have successfully developed mangrove forest potential as tourism attractions, contributing not only to increased community income but also to the creation of new employment opportunities and the stimulation of related economic activities. The study recommends formulating an optimal action plan by establishing village working groups and promoting active dialogue among village governments, local communities, and business actors. Such collaboration is expected to foster more inclusive and sustainable governance while maintaining a balance between economic benefits and mangrove ecosystem conservation as a strategic ecotourism asset (Lukum, 2025)

In parallel with these challenges, the past two decades have witnessed a shift from mass to sustainable tourism, emphasizing a balance among economic, social, and environmental dimensions (Liu et al., 2023; Wegman & Wagner, 2012). This shift is clearly reflected in the evolution of the global tourism literature, where sustainability has increasingly assumed a central position and become closely linked to policy, governance, and economic development. The bibliometric mapping analyzed in this study indicates that the keyword "tourism" functions as a core node connecting multiple thematic clusters, including sustainability, policy, economic development, and community-based tourism. This finding suggests that contemporary tourism discourse is increasingly understood as a multidimensional system rather than merely an economic activity.

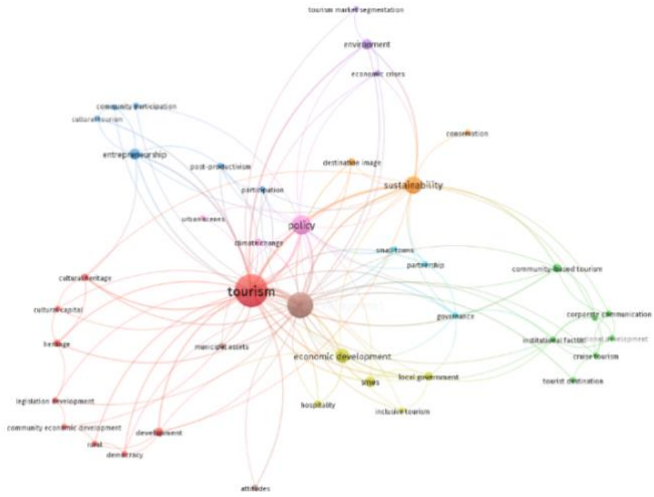

Figure 1. Bibliometric Network Analysis by Vosviewers
Source: Processed by Author, 2025

The literature mapping indicates that the sustainability cluster exhibits strong linkages with environmental issues, conservation, and climate change. This finding is consistent with previous studies emphasizing that tourism sustainability is highly dependent on environmental quality and the capacity of ecosystems to support tourism activities (Clement et al., 2022; Widianingsih, 2024). In coastal contexts, mangrove ecosystems are recognized as critical elements for their roles as natural barriers against coastal erosion and tidal flooding, as carbon sinks, and as providers of high-value ecosystem services (J.He, 2020; Mondal et al., 2023).

Conversely, the clusters related to community participation, entrepreneurship, and community-based tourism in the bibliometric map indicate that local community involvement has become an increasingly central concern in the tourism literature. A substantial body of research suggests that community participation not only enhances social legitimacy and the quality of tourism experiences but also fosters local entrepreneurship and regional economic diversification (Sen, 1999; Crook & Ayee, 2006; Goodwin & Bah, 2012). However, the literature map also reveals that these themes remain relatively disconnected from the policy and economic development clusters, indicating that the relationships among community empowerment, institutional capacity, and regional economic performance have yet to be fully integrated within a unified analytical framework.

The policy cluster occupies a strategic position in the bibliometric map as a connecting node between tourism, sustainability, and economic development. This underscores the critical role of public policy and governance in mediating economic interests and environmental conservation. Previous studies have emphasized that, in the absence of adaptive and collaborative policy frameworks, sustainable tourism development risks failing to achieve its long-term objectives (S. Deng. J et al., 2011; Yang et al., 2023). Nevertheless, the linkages between tourism policy, local fiscal mechanisms such as locally generated revenue (PAD) and disaster mitigation budget allocations remain underexplored, particularly in urban coastal contexts.

In the context of mangrove ecotourism, several studies highlight its significant potential to enhance coastal community incomes while simultaneously strengthening conservation efforts

(Suh et al., 2023; Triyanti et al., 2025). However, much of the existing research remains sectoral and linear, with separate emphases on environmental, economic, or social dimensions. The bibliometric mapping presented in this study reinforces this observation, showing that although economic development and sustainability are interconnected, they are rarely integrated with local governance and fiscal mechanisms within a single systemic model.

International and national literature has demonstrated the potential for mangrove ecotourism to support conservation while providing economic benefits to coastal communities. However, most research remains sectoral—separating environmental, economic, and social dimensions—and thus inadequately elucidates the policy mechanisms that link local economic dynamics, community participation, multi-actor governance, and ecosystems within a single analytical model, particularly in the context of urban coastal areas. This gap is crucial because coastal-urban areas face high urbanization pressures and disaster risks, necessitating more integrated policy design beyond simply promoting destinations. This study addresses these perceptions by positioning the mangrove ecosystem as a system of LEDs and reducing it to a four-dimensional analysis (locality, economic base, human resources, and community economy). Therefore, this study offers a more operational policy framework to balance conservation and strengthening local economies in coastal-urban areas.

Accordingly, this study aims to analyze the development of a mangrove ecotourism model through a local economic development perspective and to examine its implications for ecosystem sustainability in urban coastal areas. The analytical approach is grounded in the Local Economic Development (LED) framework proposed by Blakely. Blakely conceptualises LED as an effort to optimise local resources by involving government, the business sector, local communities, and civil society organisations in fostering regional economic development. LED emphasises the utilisation of locally available resources, including natural resources, human capital, local investment and financial capital, and infrastructure, to stimulate local economic growth. This process is implemented through the identification of leading local commodities, the development of industrial clusters, the strengthening of value chains, the marketing of local products, capacity building of human resources, and the promotion of partnerships and collaborative arrangements among government, the private sector, and communities (Leigh & Blakely, 2017).

This study extends Blakely's Local Economic Development (LED) framework by adapting it to the context of mangrove ecotourism in urban coastal areas, which have fundamentally different characteristics than non-urban areas. While Blakely's LED framework classically emphasizes local economic development through locality, strengthening the economic base, institutional capacity, and the involvement of local actors, this study demonstrates that in the urban coastal context, the dimensions of ecosystem sustainability and urbanization pressures must be positioned as key structural variables, not merely supporting factors. LED is no longer understood as an ecologically neutral territorial economic approach, but as a development process that also heavily relies on the carrying capacity of the coastal environment.

The novelty of this research lies in its Local Economic Development (LED)-based mangrove ecotourism development model, specifically designed to address the challenges of urban coastal areas, where the pressures of urbanization, environmental degradation, and governance complexity are simultaneously occurring. Unlike previous policy approaches that separated local economic development and mangrove conservation agendas, this research integrates both into a single operational policy framework, enabling mangrove ecotourism to function as an instrument for sustainable regional development.

Furthermore, this research enriches the LED approach by incorporating aspects of multi-actor governance, spatial policy integration, and ecosystem protection as determinants of local economic success. The research findings indicate that mangrove ecotourism policies in coastal and urban areas will only be effective if supported by cross-sectoral coordination, strengthening local institutions, and clear ecosystem protection mechanisms. Thus, this research provides a concrete policy contribution in the form of a mangrove ecotourism development model that can be used as a reference for regional policies in urban coastal areas.

The integration of the Local Economic Development (LED) approach with ecosystem sustainability and urban coastal governance yields a key theoretical insight: local economic development in coastal areas cannot be understood as a sectoral or linear process, but rather as a dynamic socio-ecological system. The second theoretical insight is the importance of adaptive and multi-actor governance as a connecting mechanism between economic objectives and ecosystem sustainability. This research demonstrates that in the urban coastal context, the success of LED is largely determined by the ability of policy actors to manage the complex interests of government, local communities, the private sector, and urban communities. The third theoretical insight is the shift in LED orientation from short-term economic growth to long-term economic-ecological resilience. The integration of LED with mangrove ecosystem sustainability demonstrates that the success of local economic development in urban coastal areas cannot be measured solely by increased income or the number of tourist visits, but also by the region's ability to maintain ecosystem functions, reduce coastal disaster risks, and maintain the sustainability of natural resources.

METHOD

This study was conducted in the Lake Maninjau area, Agam Regency, West Sumatra Province, between August and November 2024. The research employs a qualitative case study approach to examine the dynamics of collaborative governance in environmental protection and management. This approach allows for an in-depth understanding of complex governance interactions among multiple stakeholders involved in managing Lake Maninjau. The qualitative case study method was selected because it enables researchers to explore institutional relationships, stakeholder roles, and collaborative processes within a specific environmental governance context. Through this approach, the study seeks to capture the perspectives and experiences of key actors involved in the management of Lake Maninjau.

This study adopts a qualitative research approach to obtain a comprehensive understanding of the social phenomena under investigation (Creswell, 2015). A case study design is employed, focusing on a mangrove ecotourism area within an urban coastal setting. This approach is selected to enable an in-depth exploration of local socio-economic dynamics, governance arrangements, and the relationships between ecotourism-based economic activities and the sustainability of mangrove ecosystems.

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The Local Economic Development (LED) framework was operationalized as a deductive coding scheme to assess how mangrove ecotourism functions as a local economic development system rather than merely a tourism activity. The locality development dimension was examined through the degree of integration with spatial planning policies, carrying-capacity management, and coastal risk governance. The business and economic base dimension was analyzed by identifying the presence of an ecotourism value chain, MSMEs' access to finance and markets, and the design of revenue governance and sustainable partnership arrangements. The human resource development dimension was evaluated through pathways of competency building, continuous training, certification, and resilience capacity. Finally, the community economic development dimension was assessed through the strength of collective economic institutions and benefit-sharing mechanisms, as well as community financing arrangements that reduce dependence on project-based or CSR support.

The scope of the study is limited to the development of a mangrove ecotourism model through a local economic development perspective and its implications for ecosystem sustainability in urban coastal areas. The analytical framework is based on the Local Economic Development (LED) approach, which emphasizes four core dimensions: locality development, business and economic base development, human resource development, and community economic development. This framework allows the study to conceptualize mangrove ecotourism not merely as a tourism activity, but as an integrated local economic development system aligned with environmental conservation objectives.

Data collection was conducted using two primary methods. First, primary data were obtained through semi-structured interviews with key stakeholders involved in mangrove area development (Denzin & Lincoln, 2006). Second, secondary data were collected from relevant literature, including technical management documents, policy papers, peer-reviewed journal articles, and media publications. Informants were selected using purposive sampling. Table 1 presents the list of interviewees, categorized by role and level of involvement.

Table 1. Informants involved in the study

No	Informant Initials	Position/Organization
1	EDP	Head of the Mangrove Botanical Garden UPTD
2	NL	Public Relations Officer of the Mangrove Botanical Garden UPTD
3	KNS	Head of the Environmental Movement Group of Gunung Anyar Tambak
4	SG and RFK	Staff Members of the Mangrove Botanical Garden

Source: Processed by author, 2024

All data used in this study were collected with informed consent obtained from each participant. The research findings were systematically synthesized, and conclusions were derived from the overall research process (Neuman, 2011). The research framework is illustrated in Figure 2. The stages of the research process are explained as follows:

1. Data collection involved gathering narrative data through observations, in-depth interviews, document analysis, and field note-taking.
2. Data condensation is the process of organizing, selecting, and simplifying data to sharpen focus on key findings and enhance interpretability for readers.
3. Data display, which began with the structured presentation of condensed findings from the research site and later took the form of textual narratives, tables, figures, or other visual representations.
4. Conclusion drawing and verification, involving interpreting results and verifying key findings to ensure their credibility and analytical robustness.

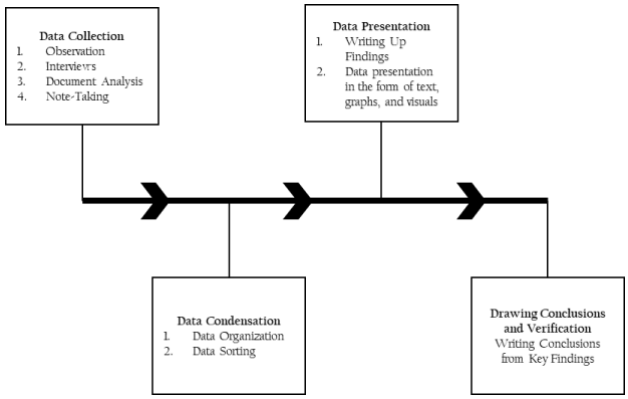

Figure 2. Research Process Framework
Source: **Processed by author, 2025**

Validity and reliability were ensured by safeguarding the quality of the findings through several trustworthiness procedures. First, member checking was conducted by sharing a summary of key findings and preliminary interpretations with key informants to confirm factual accuracy and consistency of meaning. Second, peer debriefing was carried out by discussing the findings and the LED coding structure with fellow researchers to challenge assumptions and minimize interpretive bias. Third, the analysis incorporated negative case analysis by systematically examining evidence that contradicted the dominant pattern of findings, thereby strengthening the robustness and precision of the proposed model.

In this study, the Local Economic Development (LED) framework is not used as a descriptive classification, but rather as a deductive coding scheme to link field data (interviews–observations–documents) to indicators and inferences on the four LED dimensions.

a) Locality Development: Integration of spatial planning policies (RTRW/RDTR/RPJMD); zoning status & ecological functions; carrying capacity management; coastal risk management (rob/abrasion/flooding); framing "mangroves as eco-economic assets";
b) Business & Economic Base Development: Ecotourism value chain structure (tourism services–MSMEs–mangrove derivative products); market access & marketing/tour packages; financing access (microfinance/incubation); tariff/levy design & local MSME incentives; revenue architecture (PAD targets, realization, regional cash deposits); economic facilities (kiosks, space rentals, rides);

c) Human Resource Development: capacity building pathways (green skills, certification, resilience) and sustainability of training mechanisms;
d) Community Economic Development: collective economic institutional strength, benefit sharing mechanisms, and degree of dependence on APBD/CSR.

RESULTS AND DISCUSSION

Development is critically important in both physical and non-physical contexts and is relevant to both developed and developing countries (Mojić & Jovančević, 2020). Ideally, development is understood as a transformative process carried out through deliberate, planned efforts to improve multiple dimensions of societal well-being (Hayter & Nieweler, 2018). According to Blakely and Bradshaw, there are four key components in selecting regional economic development strategies: locality, business and economic base, human resources, and community resources (Edward J. Blakely, 2002). In this context, the discussion of mangrove tourism development in Gunung Anyar Tambak to support local ecosystem sustainability adopts a Local Economic Development (LED) approach.

This study provides a comprehensive framework for understanding how mangrove tourism development is implemented through multi-actor collaboration. Six actors are identified and classified into two categories state actors and non-state actors all of which are actively involved in the development process. Furthermore, it is important to note that implementing the LED approach has had a significant impact on this process. Five major impacts were identified as outcomes of collaborative efforts among multiple stakeholders (Khan, 2004). A detailed illustration of the LED framework in the context of mangrove tourism development is presented in Figure 3.

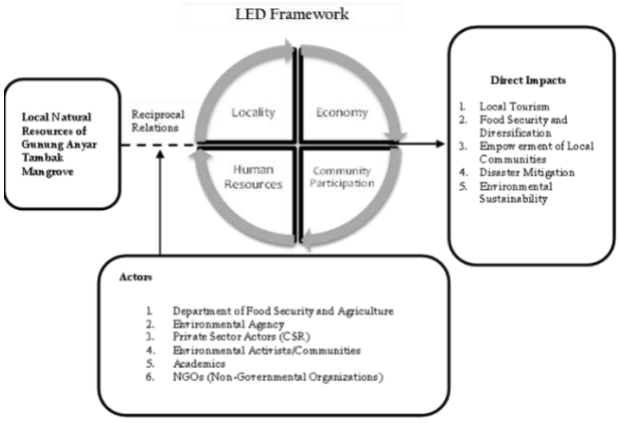

Figure 3. LED Framework for Mangrove Ecotourism Development in Gunung Anyar Tambak
Source: Processed by authors, 2025

Locality-Based Development of Mangrove Ecotourism in Gunung Anyar Tambak

Surabaya City has three government-managed mangrove forests in Gunung Anyar Tambak Village, Medokan Ayu Village, and Wonorejo Village. Among these three sites, the Gunung Anyar Tambak Mangrove Botanical Garden serves as the primary centre for mangrove development. The Gunung Anyar Tambak Mangrove Botanical Garden is an educational tourism destination that was officially opened in 2018, initially operating without an entrance fee or adequate management arrangements. This development aligns with the Mayor's Decree No. 188.45/145/436.1.2/2018 concerning the designation of the Surabaya Mangrove Botanical Garden site. The development of mangrove and coastal areas was carried out through land acquisition from community groups and private individuals, which was subsequently transferred to the Surabaya City Government. The primary objective of developing the Gunung Anyar Tambak Mangrove Botanical Garden is environmental conservation and coastal disaster mitigation.

The Gunung Anyar Tambak Mangrove Ecotourism Area exhibits strong local characteristics, reflected in its location as an urban coastal area in eastern Surabaya that functions ecologically as a buffer against tidal flooding and coastal abrasion. The area also has relatively significant mangrove biodiversity, dominated by true mangrove species and associated vegetation, which play a critical role in maintaining shoreline stability and coastal environmental quality. Secondary data from spatial and environmental planning documents indicate that this area is located in a coastal zone with a high level of vulnerability to land-use change pressures driven by the expansion of urban settlements and infrastructure. As a result, the Gunung Anyar Tambak mangrove ecosystem occupies a strategically important yet environmentally vulnerable position within the dynamics of urban development.

The linkage between this area and Surabaya's spatial planning framework and master plan underscores that mangroves are not positioned solely as protected areas, but also as strategic zones capable of simultaneously supporting ecological, social, and economic functions. Nevertheless, the principal challenge in localities is the intensity of coastal urbanization pressures, which may reduce ecosystem carrying capacity if not addressed through integrated planning. The findings of this study indicate that mangrove ecotourism development should be explicitly incorporated into the Regional Spatial Plan (RTRW), Detailed Spatial Plan (RDTR), and the Regional Medium-Term Development Plan (RPJMD) as an economic–ecological strategic area. Such integration would ensure that local policies do not treat mangroves merely as passive conservation objects, but rather as eco-based local assets capable of stimulating local economic development while safeguarding the sustainability of urban coastal ecosystems.

The Surabaya City Spatial Plan (RTRW) designates the eastern coastal area of Surabaya (Pamurbaya), including Gunung Anyar Tambak Village, as part of a conservation zone and green open space (Ruang Terbuka Hijau/RTH) that must be protected. This provision is stipulated in the Regional Regulation on the RTRW, which serves as the primary guideline for spatial utilization, particularly for safeguarding the ecological functions of mangrove ecosystems, which are essential for coastal protection, water infiltration, and sustainable control of tidal flooding and abrasion. Within the RTRW spatial map, mangrove conservation areas are formally recognized as zones whose existence must be preserved, with land-use activities regulated to support their ecological functions.

In the Surabaya RTRW for the 2014–2034 period, Pamurbaya is classified as green open space (protected area) and identified as a priority zone in spatial planning due to its mangrove ecosystems, which are valuable ecological assets. This status provides a legal foundation for developing activities that integrate conservation objectives with environmentally friendly land use,

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such as ecotourism, provided that these activities do not compromise the area's primary conservation function. Accordingly, mangrove ecotourism development must strictly adhere to the spatial utilization provisions stipulated in the RTRW, which fundamentally positions mangroves as protected areas.

In 2023, the site was officially opened as a tourism area; however, further development was still required, and therefore, no entrance fee was imposed at that time. Beginning in January 2024, an entrance fee of IDR 10,000 was introduced for weekdays and IDR 15,000 for weekends. Following several evaluations conducted by the Department of Food Security and Agriculture, the entrance fee was adjusted in July 2024 to a flat rate of IDR 10,000 for both weekdays and weekends. In 2024, the Surabaya City Government set a revenue target of IDR 100,000,000 from the management of the Gunung Anyar Tambak Mangrove Botanical Garden. Actual revenue collected in 2024 reached IDR 178,269,000, exceeding the target. These figures indicate that the management performance of the Gunung Anyar Tambak Mangrove Botanical Garden successfully achieved—and surpassed—its revenue objectives in 2024.

The development of mangrove tourism in this area is not solely driven by the Department of Food Security and Agriculture and the Mangrove Botanical Garden Management Unit, but also involves a wide range of stakeholders. These include the Surabaya City Department of Food Security and Agriculture, the Environmental Agency, the Transportation Agency, the Culture and Tourism Agency, the Department of Public Housing and Settlement Areas, the Department of Public Works and Spatial Planning, the Department of Water Resources and Road Infrastructure, the Regional Revenue Agency, the Gunung Anyar Tambak Subdistrict and Village administrations, tourism awareness groups, local communities, universities, and corporate partners such as United Tractors, PLN, and Sampoerna. Academic collaboration has also been established with Universitas 17 Agustus 1945 Surabaya, Universitas Airlangga, Universitas Veteran Jawa Timur, and Universitas Negeri Surabaya.

The location referred to in this context encompasses the physical, geographical, demographic, and environmental quality characteristics of the Gunung Anyar Tambak mangrove forest tourism area. Understanding locational characteristics is critical in economic development planning, as these factors influence the types of economic activities that can be developed, the infrastructure required, and the most appropriate policy interventions. This tourism area is vulnerable to tidal flooding and other natural hazards. Disaster risk management, therefore, constitutes a key component of sustainability strategies; however, deficiencies remain in disaster mitigation training and field-based risk assessments within the Gunung Anyar Tambak mangrove tourism area. Disaster mitigation can be strengthened through the development of resilient infrastructure and the continuous planting of mangroves as a natural barrier to protect local livelihoods (Dou et al., 2023).

Mangrove forests in this area function as natural buffers against coastal erosion and storms. Coastal economic sustainability depends heavily on the preservation of mangrove ecosystems, as they provide habitats for fish and other marine life that support local livelihoods. The Gunung Anyar Tambak mangrove tourism area cultivates approximately 60 species of mangrove plants and supports 45 animal species, including birds, fish, monitor lizards, and mangrove cats. Plans for mangrove area expansion are aligned with the Surabaya City master plan and implemented in accordance with budget allocations from the local government (APBD).

Facilities provided at the Gunung Anyar Tambak mangrove forest tourism site include: (a) jogging tracks; (b) an auditorium; (c) a mosque; (d) public toilets and disability-accessible toilets; (e) wheelchairs; (f) Reading corners; (g) gazebos; (h) terrariums; (i) food and beverage stalls; (j) fish therapy ponds; (k) fishing ponds; (l) playgrounds; (m) parking areas; (n) electric bicycles; (o) buggy cars; (p) bicycles; (q) paddle boats; (r) all-terrain vehicles (ATVs); (s) boats; and (t) merchandise shops.

The Gunung Anyar Tambak Mangrove Forest Tourism Area provides opportunities for local communities to engage in environmentally friendly, education-based nature tourism. Educational mangrove tourism and traditional fishing activities offer additional sources of income for residents. To strengthen the local economy, regulations prohibit visitors from bringing food and beverages from outside the area and encourage the use of local MSME food stalls and merchandise shops. Mangrove fruit can also be processed into syrup, flour, and candied products, commonly referred to as Bogem fruit. Training in mangrove fruit processing has been further developed as an alternative form of educational tourism.

In managing environmental risks, the Gunung Anyar Tambak Village Government has emphasized disaster mitigation, including measures to address flooding and sea-level rise. This includes regulating coastal development to prevent mangrove forest degradation. Mangrove tourism management works closely with local communities, particularly RW 1 residents, on waste management initiatives. One environmental activist, Ms Kusniaty, has been promoting environmental cleanliness especially river and marine waste management since 1997. Together with 18 fellow environmental activists, she established a Waste Bank and River School in 2010, supported by corporate social responsibility (CSR) funding from PT PLN. Every Sunday, the Waste School conducts classes from 07:30 to 09:00, focusing on waste recycling, mangrove planting, mangrove seedling propagation, early education on the dangers of waste on land, in rivers, and in marine environments, river exploration, and waste-based raw material management, including the production of ecobricks, mangrove fruit candy, mangrove fruit syrup, and mangrove fruit flour.

Policy-wise, the findings indicate that local development is not simply about "owning mangroves," but rather is shaped through the integration of spatial planning policies and development planning, which provide the legal and institutional basis for mangrove ecotourism as an eco-economic asset in coastal urban areas. This research demonstrates the link between regional development and formal documents (RTRW, RDTR, RPJMD) as the basis for integrated development direction. This places GAT within the public policy domain as a matter of policy coherence and integrated planning.

The need to align tourism development with local ecological characteristics and the issue of tidal flooding as implementation constraints that must be managed. This is supported by research by McNaught (2024) that disaster/climate-resilient local development requires cross-actor collaboration and policy integration to avoid fragmented implementation (Mcnaught, 2024). In the case of urban coastal resilience development, LED is "successful" when the government is able to transform integration documents into operational instruments (activity zoning, SOPs for support capacity, and risk mitigation). This

argument aligns with the collaborative environmental governance literature, which emphasizes that collaborative institutional design and implementation capacity determine the performance of environmental policies at the local level (Bodin, 2017).

Business and Economic Base Development of Mangrove Ecotourism in Gunung Anyar Tambak

The business and economic base encompasses the economic sectors available within the Gunung Anyar Tambak Mangrove Forest Tourism Area that have the potential to serve as centres of economic activity. This economic base includes primary industries, services, trade, tourism, agriculture, and other sectors that influence local economic growth. The mangrove forest performs five main functions: education, research, conservation, tourism, and other supporting services. These functions attract both domestic and international visitors, as the mangrove forest tourism is education-oriented and supported by a range of complementary facilities. The provision of such facilities is intended to stimulate the local economy. An additional function of the Gunung Anyar Tambak Mangrove Tourism Area is the development of alternative food products derived from mangrove resources. Consequently, the management of the Gunung Anyar Tambak Mangrove Forest Tourism Area under the authority of the Department of Food Security and Agriculture differs from that of many other cities or regencies, where mangrove management is typically assigned to the Environmental Agency.

Several facilities function as business bases, including an auditorium, food and beverage stalls, parking areas, electric bicycles, buggy cars, paddle boats, all-terrain vehicles (ATVs), motorized boats, and merchandise shops. In accordance with Regional Regulation (Perda) No. 7 of 2023 on Local Taxes and Retributions of the City of Surabaya, the tariff structure for facilities within the Gunung Anyar Tambak Mangrove Forest Tourism Area is as follows:

a. Paddle boats: IDR 12,000 per person per trip;
b. Aotorized boats: IDR 20,000 per person per trip;
c. ATVs: IDR 50,000 per person per trip;
d. Professional wildlife photography and videography: IDR 50,000 per equipment unit;
e. Thematic photo spots: IDR 10,000 per person;
f. Booth rental: IDR 45,000 per m² per month;
g. Open-area rental: IDR 15,000 per m² per day;
h. Banner or billboard space rental: IDR 50,000 per location per day;
i. Advertising stage rental: IDR 10,000 per m² per day;
j. Incidental land use: IDR 100,000 per day;
k. Lifeboat services: IDR 12,000 per person;
l. Electric bicycles: IDR 50,000 per unit per hour;
m. Eight-seat golf carts: IDR 300,000 per unit per hour;
n. Six-seat golf carts: IDR 250,000 per unit per hour;
o. Four-seat golf carts: IDR 200,000 per unit per hour;
p. Two-seat golf carts: IDR 125,000 per unit per hour;
q. Golf cart routes (one-way): IDR 25,000 per person;
r. Bicycles: IDR 20,000 per unit per hour;
s. Clean water supply: IDR 300,000 per tank; and
t. Auditorium rental: IDR 200,000 per hour.

A total of 20 micro and small enterprises (MSEs) are involved in food and beverage stalls; 26 MSEs operate in trading activities; three local fisher groups provide boat services; 15 farmer group members are engaged in agricultural-related activities; and 64 residents participate in various economic roles. Boat rental services operated by local fishers are distributed through a rotational system, agreed upon mutually. Despite the availability of supporting facilities for tourism-based economic activities, further infrastructure development remains necessary. While souvenir outlets and food and beverage stalls are relatively well organized, additional tables and seating areas are required to accommodate increased visitor numbers, particularly on weekends. Marketing strategies are also needed to attract tourists, including social media, brochures, and partnerships with travel agencies. At present, there are no integrated tourism packages that combine natural experiences with local cultural attractions. Moreover, interviews with food and beverage vendors indicate a lack of microfinance programs to support the development and sustainability of micro, small, and medium enterprises (MSMEs).

From the perspective of business development and the local economic base, mangrove ecotourism in Gunung Anyar Tambak has contributed to the emergence of diverse economic activities derived from the utilization of ecosystem services and the creativity of local communities. These activities include nature-based recreational facility rentals, tourism photography services, food and beverage micro, small, and medium enterprises (MSMEs), tourism merchandise sales, and the processing and marketing of mangrove-derived products such as syrup, candy, and bogem flour, which generate added economic value. Secondary data and institutional documentation indicate that these activities have begun to form a local economic value chain, which, although still operating on a relatively small scale, has the potential to evolve into a core economic base for the area if supported by more targeted policy interventions.

In this context, ecotourism development policies should focus on strengthening mangrove-based local business incubation by enhancing entrepreneurial capacity-building, improving access to finance, and standardizing products (M.R.Zingi. et al., 2022). These efforts should be reinforced by formally institutionalized public–private partnerships (PPPs) to ensure business sustainability and investment certainty. At the same time, the findings suggest that regulations governing tourism service tariffs and business concessions should provide greater space and protection for local MSMEs, so that larger-scale commercial actors do not marginalize them. Stakeholders at the village level and from the Surabaya City Government underscores the importance of a policy shift from a state-led ecotourism approach toward community-based local enterprise development, in which local communities are positioned as the primary actors in the management, utilization, and equitable distribution of economic benefits from mangrove ecotourism in a sustainable manner.

According to the Head of the Mangrove Botanical Garden Technical Implementation Unit (UPT), the Surabaya City Government has established a local revenue (PAD) target for the management of mangrove tourism in Gunung Anyar Tambak. The revenue target for 2024 was set at IDR 100,000,000, while actual revenue collected and recorded in the Surabaya City Regional Revenue in 2024 reached IDR 178,269,000, exceeding the target. A total of 57,622 visitors participated in activities at the Gunung Anyar Tambak Mangrove Botanical Garden between January and November 2024. This indicates performance exceeding expectations and demonstrating ecotourism's potential as a local economic base. Between January and November 2024, the number of visits recorded reached 57,622, confirming that the

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increase in revenue is not isolated but directly related to the dynamics of visitor volume. Analytical, within the LED framework, this pattern demonstrates that the business and economic base is beginning to take shape, not only through the presence of MSMEs and tourism services, but also through the destination's ability to generate revenue streams, which are measured as early indicators of economic viability. Detailed visitor data for the period January to December 2024 is presented in the following section.

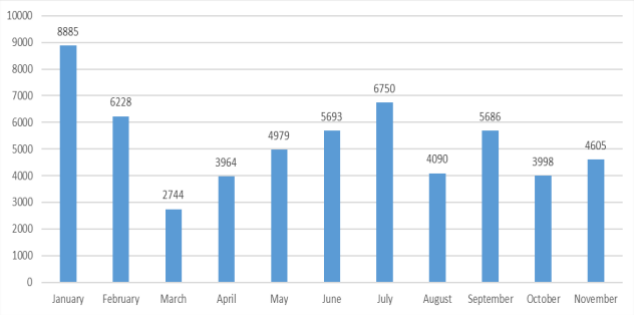

Figure 4. Number of Visitors to the Gunung Anyar Tambak Mangrove Forest Tourism Area in 2024
Source: Gunung Anyar Tambak Mangrove Botanical Garden Technical Implementation Unit (UPT), 2024

Budget allocations for the management and development of tourism are administered directly by the Regional Revenue Agency and the Department of Food Security and Agriculture. Tourism revenues generated from the Gunung Anyar Tambak Mangrove Botanical Garden are transferred to the Regional Treasury. Similarly, parking fee revenues managed by the Transportation Agency are also deposited directly into the Regional Treasury. As a consequence, the Gunung Anyar Tambak Mangrove Botanical Garden Technical Implementation Unit (UPT) lacks financial autonomy in revenue management. The Regional Revenue and Expenditure Budget (APBD), therefore, serves as the primary funding source for tourism management, complemented by support from corporate social responsibility (CSR) programs from United Tractors, PLN, and Sampoerna.

This research finding shows that the economic basis of ecotourism has emerged through the diversification of MSME services and activities, as well as a relatively comprehensive service tariff structure. However, there is still weak integration of the value chain (tour packages, marketing), limited access to financing (microfinance), and the absence of a systemic MSME market strengthening architecture. From a development policy perspective, this condition is usually interpreted as an institutional gap, where economic activity exists, but policies do not yet provide market-supporting institutions.

The largest gap lies in the design of revenue governance and reinvestment. Evidence shows that tourism/parking revenues are deposited into regional coffers, thus preventing the Technical Implementation Unit (UPT) from having revenue autonomy; financing relies on the Regional Budget (APBD) and Corporate Social Responsibility (CSR). Consistent with research by Snyman & Bricker on conservation area development policy, this issue is synonymous with public finance design and benefit-sharing governance: when financial benefits are not "returned" to ecosystem management and local economic strengthening, LEDs tend to be fragile and dependent on budget/project cycles. Global discussions on benefit-sharing from conservation area tourism emphasize that benefit-sharing is not just about "sharing money," but requires fair, transparent, and sustainable governance to maintain social support and conservation outcomes (Snyman & Bricker, 2019).

Human Resource Development in Mangrove Ecotourism in Gunung Anyar Tambak

Human resources refer to the available labour force, skills, education, and training within the Gunung Anyar Tambak mangrove forest tourism area. Human resource analysis is essential for assessing the potential and gaps in the local workforce, as well as identifying training and educational needs required to support economic growth. Investment in human resource development including skills training and higher education can enhance labour productivity and strengthen regional economic competitiveness (Achmad et al., 2023).

The total number of personnel managing the Gunung Anyar Tambak Mangrove Tourism Area under the Technical Implementation Unit (UPT) is 57, comprising the UPT Head, functional staff, and field contract workers. The organizational structure is regulated by Mayor Regulation No. 41 of 2023 (Mayor of Surabaya), with task allocation based on individual capacity and competence under the coordination of the Head of the UPT.

From the perspective of human resource development, mangrove ecotourism in Gunung Anyar Tambak involves local communities as operational workers and facilitators of environmental education activities, including tour guides, attraction operators, and mangrove education facilitators. This involvement reflects an initial effort toward community-based socio-economic empowerment. However, secondary research indicates that capacity building for human resources remains constrained, particularly in coastal disaster mitigation training, adaptation to tidal flooding and coastal abrasion risks, and the strengthening of entrepreneurship and business management skills, which to date have not been systematically and sustainably designed. These limitations have implications for the quality of ecotourism services and the socio-economic resilience of local communities in responding to the dynamic challenges of urban coastal environments.

Accordingly, regional development planning needs to explicitly incorporate continuous and integrated training programs aligned with mangrove ecotourism development agendas. Such programs should be implemented through synergies with higher education institutions, vocational training providers, and corporate social responsibility (CSR) initiatives that are formally institutionalized within local policy frameworks. In addition, the provision of local competency certification schemes for ecotourism workers—covering nature-based tour guiding, environmentally based business management, and conservation education—is considered strategic for enhancing professionalism, improving the competitiveness of the local workforce, and ensuring the long-term sustainability of mangrove ecotourism development in Gunung Anyar Tambak.

In terms of community economic participation, a total of 20 MSMEs are involved in food and beverage provision at the tourism site, while 26 MSMEs engage in merchandise trading activities. Three fisher groups provide river-based tourism services, and 15 farmer groups participate in mangrove cultivation and planting. In addition, 64 residents are directly involved in supporting the development of the tourism area. The Mangrove Tourism UPT has coordinated closely with the Gunung Anyar Subdistrict and Gunung Anyar Tambak Village administrations

to facilitate community participation. These efforts aim to reduce poverty levels and create sustainable employment opportunities. Contract worker recruitment is conducted through professional procedures, with priority given to residents living in proximity to the mangrove tourism area.

The livelihoods of local communities surrounding the Gunung Anyar Tambak mangrove forest tourism area are primarily dependent on shrimp aquaculture, with the average educational attainment being at the elementary school level. Local communities have been involved in various empowerment initiatives, including training in sustainable shrimp farming and fish cultivation, as well as economic diversification programs facilitated by government agencies and non-governmental organizations. These initiatives aim to enhance local economic capacities while simultaneously maintaining the sustainability of natural resources. Sustainable fisheries management can also be integrated into tourism activities and environmentally friendly fish and shrimp farming practices. Such programs seek to maintain ecological balance and ensure the availability of marketable fish and shrimp products in areas surrounding the tourism site.

In addition, the village government actively engages community members through training programs and technical assistance on sustainable pond-based aquaculture and livelihood diversification. Based on field observations and interviews with site managers and visitors at the mangrove tourism area, several programs demonstrating opportunities for human resource development were identified. These programs are presented in Table 2 below.

Table 2. Mangrove Sustainable Tourism Development Program

No	Actions
1	Integrating environmental education in schools.
2	Organizing seminars and workshops on mangroves.
3	Creating videos on pollution dangers.
4	Launching a social media campaign.
5	Organizing regular environmental clean-ups.
6	Developing tools for waste processing.
7	Holding community mangrove planting events.
8	Collaborating with local influencers.
9	Organizing mangrove conservation competitions.
10	Recognizing contributors to environmental conservation.

Source: Interview results processed by author, 2025

Human resource development is designed in a policy manner so that human resource development is not understood as mere participation, but as a policy instrument to improve service quality, MSME competitiveness, and coastal community resilience. This aligns with McNaught's research, which states that implementing cross-issue policies (environment, disaster, and development) requires collaborative capacity (shared goals, cross-unit work procedures, and shared learning) to prevent programs from becoming sporadic activities (Mcnaught, 2024). This is supported by Cox's research, which emphasizes the institutional principles of common-pool resource management, which emphasize clear rules, monitoring, and conflict resolution mechanisms as institutional prerequisites (Cox et al., 2010).

Community Resource Development in Mangrove Ecotourism in Gunung Anyar Tambak

Human resources in this context encompass the labour force population, skills, education, and training available within the Gunung Anyar Tambak Mangrove Tourism Area. Human resource analysis is essential for identifying both the potential and shortcomings of the local workforce, as well as the need for training and educational programs to support economic growth (Puspaningtyas et al., 2016). Investment in human resource development including skills training and higher education can enhance labour productivity and strengthen regional economic competitiveness (Miao et al., 2024).

The total number of personnel involved in the management of the Gunung Anyar Tambak Mangrove Tourism Area under the Technical Implementation Unit (UPT) is 57, comprising the UPT Head, functional staff, and field-based contract workers. The organizational structure is regulated by Surabaya Mayor Regulation No. 41 of 2023. Task distribution is based on individual capacity and competencies and is coordinated by the Head of the UPT. In terms of economic participation, 20 micro and small enterprises (MSEs) operate in food and beverage services, 26 MSEs engage in merchandise trading, three fishers provide river-based tourism services, and 15 farmers are involved in mangrove cultivation and planting activities. In addition, 64 residents participate in supporting the development of the tourism area. The UPT has coordinated with the Gunung Anyar Subdistrict administration and the Gunung Anyar Tambak Village government to ensure active local community involvement. These efforts aim to reduce poverty levels and create sustainable employment opportunities. Contract worker recruitment is conducted through professional procedures, with priority given to residents living near the mangrove tourism area.

The livelihoods of local communities surrounding the Gunung Anyar Tambak Mangrove Forest Tourism Area are primarily dependent on pond-based aquaculture, particularly fish farming, with the average level of education being elementary school completion. Local communities have participated in various empowerment initiatives, including training in sustainable pond management, aquaculture development, and economic diversification programs facilitated by government agencies and non-governmental organizations. These initiatives are designed to enhance local economic capacity while ensuring the sustainability of natural resources. Sustainable fisheries management can also be integrated into environmentally friendly tourism activities and aquaculture practices. Such programs aim to maintain ecological balance and ensure the availability of fish and aquaculture products for trade in areas surrounding the tourism site. The village government also plays an active role in engaging communities through training programs and technical assistance to support sustainable aquaculture and livelihood diversification.

Community resources encompass a wide range of assets, organisations, and networks within the local community that can be mobilised to support economic development (Sebola & Fourie, 2006). These resources include social infrastructure, social capital, and cultural resources. Effective utilization of community resources can strengthen social cohesion, enhance community participation, and support sustainable economic development within the mangrove ecotourism area.

The development of Mangrove Forest Tourism in Gunung Anyar Tambak involves active participation from local communities as boat captains and parking attendants, alongside

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the collaboration of multiple governmental agencies, including the Surabaya City Office of Food Security and Agriculture, the Environmental Agency, the Transportation Agency, the Culture and Tourism Agency, the Housing and Spatial Planning Agency, the Public Works Agency, the Water Resources and Highways Agency, the Surabaya City Revenue Agency, as well as the Gunung Anyar Subdistrict and Gunung Anyar Tambak Village administrations. In addition, tourism awareness groups, local communities, universities, and corporate partners namely United Tractor, PLN, and Sampoerna are also engaged in the development process. Academic institutions involved include Universitas 17 Agustus 1945, Universitas Negeri Surabaya, Universitas Airlangga, and Universitas Veteran Jawa Timur.

The Office of Food Security and Agriculture plays a pivotal role in ensuring that mangrove tourism development is not only environmentally sustainable but also supports the cultivation and diversification of mangrove species. This agency implements agro-tourism and ecotourism programs that integrate plant cultivation with natural resource management, enabling local communities to derive economic benefits from these activities. The Environmental Agency is responsible for safeguarding the sustainability of the mangrove ecosystem. Its functions include issuing permits, monitoring development activities, and ensuring that tourism practices do not degrade environmental quality. Its support for environmental awareness campaigns is essential and is reinforced by local communities and environmental activists operating in and around the mangrove area.

The Transportation Agency oversees transportation management and accessibility to the mangrove forest tourism site, including the regulation of public transport routes, traffic signage, and parking facilities. At the local level, Gunung Anyar Tambak Village serves as an intermediary between the community and government, facilitating community participation in mangrove tourism development and ensuring that economic benefits are distributed to residents. Corporate Social Responsibility (CSR) programs, particularly those implemented by PLN, provide financial and material support for mangrove tourism infrastructure development, including site arrangement and public facilities. These initiatives include establishing waste banks, building river school buildings, and providing seed capital for waste bank operations. Additionally, PLN supports environmental initiatives and raises public awareness of mangrove conservation by providing mangrove seedlings.

From a community economic development perspective, mangrove ecotourism in Gunung Anyar Tambak demonstrates active community engagement in a range of environmentally and economically oriented activities, including integrated waste management, mangrove conservation and rehabilitation, environmental education through waste bank management and river school programs, and livelihood diversification efforts that integrate conservation activities with household income generation. Secondary data from the study indicate that such community involvement strengthens social capital and ecological awareness among coastal communities. However, the sustainability of these initiatives remains highly dependent on local government support and CSR programs, which are often project-based and not always continuous. This condition constrains local communities' economic self-reliance and may lead to structural dependency in mangrove ecotourism governance. Therefore, the findings emphasize the need for policy directions that strengthen local economic institutions by establishing ecotourism cooperatives as collective instruments for managing environment-based enterprises. Furthermore, the development of community-based financing schemes is considered strategic to reduce reliance on regional government budgets and CSR funding, while simultaneously enhancing the long-term sustainability of local economic development in the Gunung Anyar Tambak mangrove ecotourism area.

Budgetary constraints from the regional government budget (APBD) should not be regarded as a justification for the limited development of Mangrove Tourism in Gunung Anyar Tambak. The area possesses a wide range of development opportunities, including those supported through Corporate Social Responsibility (CSR) initiatives. However, securing CSR funding remains a significant challenge. Previous CSR partners are therefore encouraged to re-engage in collaborative efforts. The Mangrove Tourism Management Unit (UPT) of Gunung Anyar Tambak expects the Surabaya City Government to play a facilitating role by establishing a dedicated CSR forum. Such a forum would enable relevant government agencies and potential CSR partners to convene, allowing corporations to identify and select institutions that align with their strategic interests for collaboration. In practice, CSR partners often lack a comprehensive understanding of institutional needs and the long-term sustainability of the programs they support, leading to short-term, fragmented collaborations. This condition underscores the need for an integrated CSR coordination mechanism to ensure continuity, strategic alignment, and sustainable outcomes in mangrove ecotourism development.

Reliance on the regional budget (APBD)/CSR can limit sustainability, therefore, strengthening local economic institutions through the establishment of ecotourism cooperatives and community financing schemes is necessary to reduce dependency. As Datta's research has shown, socio-economic and conservation outcomes are largely determined by the strength of local institutions and mutually agreed-upon rules, not just symbolic participation (Datta et al., 2012). Regarding benefit-sharing, the Kegamba study shows that benefit mechanisms (cash, social services, community projects) must be designed according to local needs/equity to gain legitimacy and encourage support for conservation (Kegamba et al., 2022). Recommendations for mangrove tourism management, cooperatives, revolving funds, or local PES schemes are policy solutions to transform participation into economic independence.

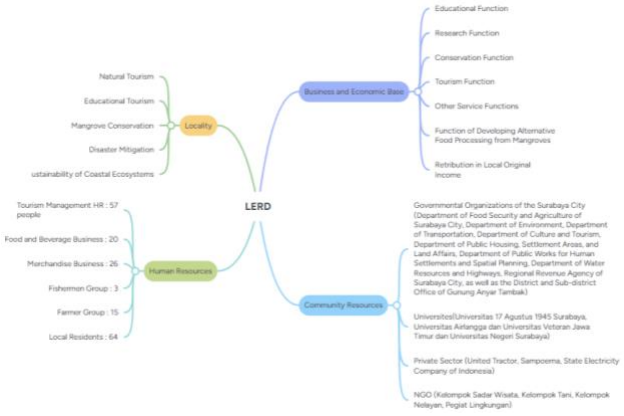

Figure 5. Main Mapping of Local Economic Resources Development at Gunung Anyar Tambak Mangrove Tourism
Source: Processed by the researcher, 2025

Based on Figure 5, the development of mangrove ecotourism is grounded in distinctive and strategically valuable local potentials. Multi-stakeholder support from the Surabaya City Government, Corporate Social Responsibility (CSR) programs, universities, local communities, and surrounding residents has the potential to generate new employment opportunities, particularly in tourism management and the culinary sector. To further enhance economic potential, local economic diversification programs aimed at achieving financial self-reliance are required. Through such initiatives, the Mangrove Tourism Management Unit (UPT) of Gunung Anyar Tambak would not only contribute to regional revenue generation but also gain greater financial flexibility to manage emergency response needs.

The economic development of the Gunung Anyar Mangrove Forest Tourism area is highly dependent on its existing economic structure and available resources. Economic activities in the area encompass education, research, conservation, tourism, and the development of alternative food products derived from mangrove flowers and fruits. Educational activities include field study visits from elementary schools, junior and senior high schools, and universities, which indirectly stimulate additional economic activities within the mangrove tourism area. Research activities are conducted through collaborations with universities and researchers focusing on mangrove-based products and sustainable tourism management.

Infrastructure development and investment play a crucial role in driving local economic growth. In this context, tourism emerges as a significant economic sector, attracting visitors and complementing other local economic activities. However, tourism development requires appropriate management that aligns with local characteristics and ecological potential. These potentials include nature-based tourism, educational tourism, mangrove conservation, and tidal flood mitigation. If tourism is not managed prudently, it may degrade the local resources that constitute the destination's primary attractions. Therefore, human resources and community resources, as key drivers of environmental sustainability, are essential to ensuring the long-term sustainability of economic development in surrounding urban coastal areas. The recommended model of mangrove ecotourism development through a local economic approach, along with its implications for ecosystem sustainability in urban coastal regions, is illustrated in the following figure.

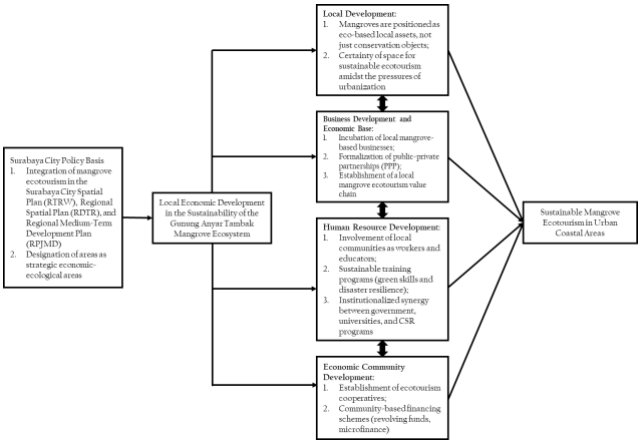

Figure 6. Mangrove Ecotourism Development Model through a Local Economic Approach: Implications for Ecosystem Sustainability in Urban Coastal Areas
Source: Processed by authors, 2025

This recommended model positions Local Economic Development (LED) as the primary strategic framework for bridging mangrove ecosystem conservation objectives with local economic strengthening in the urban coastal area of Gunung Anyar Tambak, Surabaya. LED is conceptualised as a development approach that emphasises the use of local resources, the engagement of local actors, and the strengthening of community-based economic institutions to achieve long-term sustainability. Within this model, urban policy functions as an enabling framework that guides the transformation of mangrove ecotourism from a conservation-oriented activity into an integrated eco-economic development system.

From the policy input perspective, the model is initiated through the City of Surabaya's policy framework, which emphasizes the integration of mangrove ecotourism into formal spatial and development planning documents, namely the Regional Spatial Plan (RTRW), Detailed Spatial Plan (RDTR), and the Medium-Term Regional Development Plan (RPJMD), as well as the designation of mangrove areas as strategic eco-economic zones. This integration provides legal certainty and planning space for sustainable ecotourism development amid increasing coastal urbanization pressures, while simultaneously reinforcing mangroves' position as a core component of environmentally oriented urban development.

The core of the LED model is operationalized through four interrelated pillars that collectively form an integrated development system. The first pillar, locality development, positions mangrove ecosystems as eco-based local assets rather than passive conservation objects. This pillar highlights the importance of ecologically based spatial planning to maintain mangrove ecosystem functions while enabling controlled and adaptive ecotourism activities that are responsive to coastal environmental risks.

The second pillar, business and economic base development, focuses on strengthening mangrove-based local economic activities through business incubation, formalizing public–private partnerships (PPPs), and establishing a local ecotourism value chain. Policy directions within this pillar aim to create an inclusive business environment, particularly for local micro, small, and medium enterprises (MSMEs), ensuring that the economic benefits of mangrove ecotourism are distributed equitably and sustainably.

The third pillar, human resource development, positions local communities as the primary actors in ecotourism through their involvement as operational workers and environmental education facilitators. This pillar underscores the necessity of continuous capacity-building programs encompassing green skills development, entrepreneurship, and coastal disaster resilience, supported by institutionalized synergies among local governments, higher education institutions, and corporate social responsibility (CSR) programs. Consequently, ecotourism development not only generates employment opportunities but also helps build competitive green human capital.

The fourth pillar, community economic development, focuses on strengthening local economic institutions by establishing ecotourism cooperatives and developing community-based financing mechanisms, such as revolving funds and microfinance. This pillar is designed to reduce community dependence on regional government budgets (APBD) and CSR funding, while promoting economic self-reliance and the long-term sustainability of mangrove ecotourism management.

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These four pillars interact synergistically to produce key outcomes, namely the realisation of sustainable mangrove ecotourism in urban coastal areas, characterised by enhanced mangrove ecosystem resilience, inclusive local economic growth, increased community capacity and self-reliance, and collaborative multi-sector governance. Accordingly, this model functions not only as a conceptual framework but also as an operational policy model that can be replicated in the development of mangrove ecotourism in other urban coastal regions.

CONCLUSION

The development of the Gunung Anyar Tambak Mangrove Ecotourism Area in Surabaya has been guided by the Local Economic Development (LED) framework, which emphasises the utilisation of local resources to achieve sustainable, environment-based tourism development. This approach is operationalised through four interrelated dimensions locality development, business and economic base development, human resource development, and community economic development. The findings indicate that the area possesses strong local characteristics as an urban coastal mangrove ecosystem, offering both ecological protection and economic potential. Yet, it remains vulnerable to urbanisation pressures, tidal flooding, and coastal erosion. Consequently, mangrove ecotourism planning must be explicitly integrated into formal regional planning instruments (RTRW, RDTR, and RPJMD) and positioned as an eco-based local asset rather than solely a conservation object. Economically, mangrove ecotourism has generated diverse local activities, including tourism services, MSMEs, and mangrove-based products; however, these remain fragmented and require stronger policy support through local business incubation, inclusive tariff regulations, and the formalisation of public–private partnerships to shift from state-led to community-based local enterprise development.

In terms of human resources and community economic development, local communities are actively involved as workers, environmental educators, and conservation actors, supported by initiatives such as waste banks, river schools, and livelihood diversification programs. Nevertheless, capacity-building efforts remain limited and heavily dependent on government and CSR support, constraining long-term sustainability and local economic autonomy. This study highlights the need for continuous skills training, green human capital investment, competency certification, and institutionalised collaboration with higher education institutions. To strengthen community self-reliance, the establishment of ecotourism cooperatives, green village-owned enterprises (BUMDes), and community-based financing schemes is recommended. Referring to Blakely's LED framework, the study concludes that sustainable mangrove ecotourism in urban coastal areas requires ecologically based spatial planning, inclusive local business policies, sustained investment in human capital, and strengthened local economic institutions. While the findings are context-specific and primarily qualitative, future research should adopt comparative and longitudinal approaches further to assess the sustainability and replicability of the proposed model.

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