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Development of Community-Based Mangrove Educational Tourism through Mangrove Coffee Innovation in Tiwoho Village

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ABSTRACT

The development of mangrove educational tourism in Tiwoho Village integrates the potential of the mangrove area, local product innovation, and community institutional capacity. This study aims to analyze the potential of the mangrove area, examine mangrove coffee as a local product with potential as an educational tourism component, analyze community institutional capacity, and formulate development strategies appropriate to local conditions. A qualitative field study with a descriptive-analytical approach was conducted from January to April 2026 through observation, semi-structured in-depth interviews, documentation, and a review of written sources. The data were analyzed through organization, reduction, coding, categorization, cross-source comparison, interpretation, synthesis, and SWOT analysis. The findings show that the mangrove area and mangrove coffee processing can support the development of educational tourism activities. The Rhizophora Karya Muda Group, the Tiwoho Village Youth Organization, and the Tiwoho Village Government constitute the local institutional structure, while direct community involvement remains concentrated among a segment of residents. The development strategies include integrating the mangrove area and mangrove coffee into educational activities, strengthening institutional capacity and facilities, differentiating the destination through digital communication, and strengthening resource management and collaboration. Tiwoho's distinctive character comes from integrating mangrove resources, mangrove coffee innovation, and local institutional capacity to develop community-based mangrove educational tourism.

Keywords: Community-Based Tourism; Educational Tourism; Institutional Capacity; Mangrove Coffee; Mangrove Tourism.

INTRODUCTION

Mangrove ecosystems play an important role in coastal tourism development because they support recreation, environmental education, community activities, and local livelihoods. Globally, mangrove areas have become part of nature-based recreation and tourism activities (Spalding & Parrett, 2019). In Southeast Asia, mangrove ecotourism development is associated with ecological conditions, accessibility, infrastructure, community involvement, environmental education, and the governance of resource use (Blanton et al., 2024). The relationship among ecotourism, livelihoods, and conservation is also influenced by local conditions and management structures (Samal & Dash, 2023). Integrating ecological functions, socioeconomic interests, and resource management is therefore important for mangrove tourism development that reflects local characteristics.

Education provides a more specific function for using mangrove areas in tourism activities. Natural environments serve as learning resources when environmental objects, knowledge, and visitor activities are systematically organized through interpretation. Effective interpretation requires a clear theme, systematic content organization, relevance to visitors, and presentation that supports an understanding of tourism resources (Ham, 2013). Mangrove education is associated with increased knowledge, awareness, and conservation orientation (Gunawan et al., 2025). Environmental education outcomes can be assessed through changes among participants after educational activities (Tagulao et al., 2022). Mangrove educational

tourism therefore involves connections among learning resources, interpretive content, visitor activities, and tourism activity design.

Tourism development also occurs within the social context of communities that directly interact with coastal resources. Community-based tourism (CBT) encompasses local capacity, community initiatives, decision-making, local benefits, and the compatibility of tourism activities with local community life (Murphy, 1985). The concept also includes governance, stakeholder involvement, equity, and community support (Dangi & Jamal, 2016). Empowerment includes economic, psychological, social, and political dimensions, which link participation to community positions in decision-making and benefit distribution (Scheyvens, 2002). Community-based tourism therefore encompasses institutional capacity, relationships among institutional actors, levels of participation, and community positions in tourism management.

Tiwoho Village, Wori District, North Minahasa Regency, has been a site of mangrove tourism development and research on community-based management. Previous research examined the role of community groups in planning, implementing, and using the Mangrove Trail Tiwoho (Runtunuwu et al., 2022). In surrounding areas, CBT implementation has been examined in Budo Village (Navratilova et al., 2023), while the biophysical conditions of the Budo mangrove area have been assessed through tourism suitability and carrying capacity indices (Tambunan et al., 2023). Research on Darunu Mangrove Park used SWOT analysis to formulate ecotourism strategies (Hutabarat et al., 2024). The development of Mangrove Park Palaes has also been examined in relation to destination potential, facilities, community institutions, strategies, and digital marketing (Kondo et al., 2025). Community management, area conditions, facilities, strategies, and promotion have thus become important research themes in Tiwoho and neighboring mangrove destinations.

Mangrove resources have also been used as raw materials for local products, including mangrove coffee. The processing of *Rhizophora apiculata* fruit into mangrove coffee has been implemented on Maitara Island through training and demonstration activities (Abubakar et al., 2023). Mangrove coffee processing has also been used to transfer knowledge to communities in North Gorontalo (Hasan et al., 2022). The use of *Rhizophora mucronata* through socialization and practical processing activities has also been implemented in West Lombok (Suyantri et al., 2024). These studies demonstrate the development of mangrove coffee as a processed product associated with community knowledge and skills. In tourism activities, such local products can be connected to the environment from which the raw materials originate, processing practices, community knowledge, and visitor activities.

The integration of environment, education, local products, and communities has been addressed in previous research. A community-based edu-ecotourism model integrates education, mangrove restoration, livelihoods, institutions, and local

enterprises (Puspitaloka et al., 2025). Local knowledge-based storytelling is also associated with place identity and community involvement as knowledge providers (Rahayu et al., 2026). From an institutional perspective, relationships among actors, local leadership, and institutional capacity are associated with the ability to manage ecotourism (Nurlukman et al., 2025; Asril et al., 2026). The current state of research can be organized into three main areas: mangrove destination development, mangrove coffee innovation, and community-based education. Further analysis is needed to integrate area potential, local product innovation as an educational component, and community institutional capacity within a single destination context.

The novelty of this study lies in integrating the analysis of mangrove tourism potential, mangrove coffee innovation as a local product with potential as an educational component, and community institutional capacity in formulating mangrove educational tourism development strategies for Tiwoho Village. Mangrove coffee contributes to destination differentiation through its connection with the mangrove area, local production, and community activities. The community-based orientation encompasses institutional capacity, relationships among institutional actors, and community participation. The educational dimension includes interpretive activities that connect the mangrove area with product processing. These three dimensions form an analytical framework covering tourism resources, management actors, and development strategies.

This study aims to analyze the development of community-based mangrove educational tourism in Tiwoho Village through the qualitative identification of mangrove area potential, an examination of mangrove coffee innovation as a local product with potential as an educational tourism component, and an analysis of community institutional capacity in destination management. These three dimensions are used to formulate development strategies appropriate to Tiwoho Village's conditions. Academically, the study extends the discussion of relationships among area potential, local product innovation, environmental interpretation, and community institutional capacity. Practically, the findings provide a basis for local actors to formulate development strategies that correspond to the characteristics of local resources and village institutions.

METHOD

This qualitative field study employed a descriptive-analytical approach to examine three interrelated dimensions (Creswell & Poth, 2018): the potential of the mangrove area, mangrove coffee innovation as a local product with potential as an educational tourism component, and community institutional capacity. The study was conducted in Tiwoho Village, Wori District, North Minahasa Regency, from January to April 2026. Interviews were conducted in February 2026. Data collection focused on

the mangrove area and the mangrove coffee processing site, covering area conditions, product processing, institutional relationships, and community involvement.

Informants were selected purposively based on their positions, involvement, and knowledge related to the research object (Spradley, 2016). The informants consisted of a Tiwoho Village Government official, a representative of the Tiwoho Village Youth Organization, and the Head of the Rhizophora Karya Muda Group. The interviews addressed relationships among institutional actors, group activities, mangrove coffee processing, community involvement, management conditions, and development needs and opportunities. Information jointly provided by more than one informant was analyzed as combined information.

Data were collected through observation, semi-structured in-depth interviews, documentation, and a review of written sources. Observations were conducted in the mangrove area and at the mangrove coffee processing site. The observed aspects included area conditions, vegetation visually identified at the genus level as *Rhizophora* based on documented characteristics, mangrove fruit, conditions at the production site, and the sequence of collecting and processing the raw material into coffee. Documentation covered the condition of the area, the processing site, production activities, and product forms. The review of written sources provided additional information on mangrove tourism development, community-based tourism, mangrove coffee innovation, environmental education, and external conditions relevant to strategy formulation.

Data analysis involved organizing, reducing, coding, forming categories, cross-source comparison, interpretation, and synthesis. Coding covered mangrove area potential, mangrove coffee innovation, and community institutional capacity. Relationships among categories informed development strategies. SWOT analysis, covering strengths, weaknesses, opportunities, and threats, was applied qualitatively without numerical weighting. Strengths and weaknesses represented Tiwoho's internal conditions, while opportunities and threats represented relevant external conditions. The factor combinations produced SO, WO, ST, and WT strategies.

Data credibility was examined through source triangulation and method triangulation (Miles et al., 2014). Information on the same theme was compared across multiple sources. Interview findings were compared with observation and documentation for aspects examined through more than one data collection technique. Informants were identified according to their institutional positions: a Tiwoho Village Government official, a representative of the Tiwoho Village Youth Organization, and the Head of the Rhizophora Karya Muda Group.

RESULTS AND DISCUSSION

A. Mangrove Area and Mangrove Coffee as Components of Educational Tourism in Tiwoho Village

Field observations identified mangrove vegetation in the coastal area of Tiwoho Village as a resource for developing mangrove educational tourism. Vegetation visually identified at the genus level as *Rhizophora* was supported by documentation of area conditions and leaf characteristics during the study. The vegetation provides environmental objects for introducing visitors to the coastal environment and local community life. More broadly, mangroves support recreational and nature-based tourism. Mangrove ecotourism development in Southeast Asia is also associated with ecological conditions, community involvement, accessibility, infrastructure, and environmental education (Spalding & Parrett, 2019; Blanton et al., 2024). The Tiwoho mangrove area therefore provides interpretive content related to mangroves, the coastal environment, and community activities.



Figure 1. Mangrove Area Conditions in Tiwoho Village (Author Documentation, February 2026).



Figure 2. Rhizophora Mangrove Leaves in Tiwoho Village (Author Documentation, February 2026).

Comparison with mangrove tourism development at the same site and in surrounding areas places Tiwoho within a broader regional context. Mangrove Trail Tiwoho previously involved community groups in tourism planning, implementation, and utilization ([Runtunuwu et al., 2022](#)). In Wori District, the Budo Village mangrove area was assessed using bioecological parameters, tourism suitability, and carrying capacity ([Tambunan et al., 2023](#)). Darunu Mangrove Park was examined in relation to its potential and ecotourism development strategies ([Hutabarat et al., 2024](#)). The development of Mangrove Park Palaes also encompasses attractions, facilities, institutions, and destination marketing ([Kondo et al., 2025](#)). The presence of similar mangrove resources at several regional destinations increases the importance of differentiating Tiwoho through interpreting local resources and their connection with community activities.

The area's educational potential comes from environmental objects organized into clearly themed knowledge content. Mangrove vegetation, *Rhizophora* characteristics, mangrove fruit, the coastal environment, and relationships between resources and community activities provide interpretive content when presented systematically and in ways relevant to visitors ([Ham, 2013](#)). Mangrove education is associated with increased knowledge and conservation awareness. Educational outcomes are also assessed through changes among participants ([Tagulao et al., 2022](#); [Gunawan et al., 2025](#)). In Tiwoho, vegetation, ecosystem functions, resource use, and community life provide content for developing educational tourism activities.

Mangrove coffee adds a relevant component to educational tourism development in Tiwoho. Field observations included searching for mangrove fruit, visiting the processing site, observing the collection and processing of raw materials, and tasting the product. According to an interview with the Head of the *Rhizophora* Karya Muda Group in February 2026, processing and sales were conducted at the same site. The Head of the Group also reported that the business held a Home Industry Food Production Certificate and a Business Identification Number and produced packages ranging from 25 grams to 1,000 grams. These data demonstrate the relationship among raw materials, processing, and the final product. Raw materials originating from the mangrove environment are processed by local actors into a product associated with the group's economic activities. This processing sequence provides additional content for educational tourism activities.

The processing of mangrove fruit into coffee has been implemented in several locations. These practices include using *Rhizophora apiculata* on Maitara Island, knowledge-transfer activities related to mangrove coffee in North Gorontalo, and processing *Rhizophora mucronata* in West Lombok ([Hasan et al., 2022](#); [Abubakar](#)

et al., 2023; Suyantri et al., 2024). In Tiwoho, local production connects the mangrove area, tourism activities, and coastal community life. Mangrove coffee therefore functions as interpretive content related to the processing of local resources based on community knowledge and skills.

Integrating the mangrove area and mangrove coffee generates three types of knowledge within educational tourism activities. The mangrove area provides ecological knowledge about the origin of the resources. The processing activities provide practical knowledge about resource use. Local group activities provide information about the actors involved in processing, organizing activities, and developing product identity. Local knowledge-based storytelling is associated with stronger place identity and a greater community role in providing knowledge (Rahayu et al., 2026). The integration of education, mangrove ecosystems, local enterprises, and institutions has also been applied in community-based ecotourism in other contexts (Puspitaloka et al., 2025). This combination of the three knowledge types is a distinguishing feature of Tiwoho's educational tourism activities.

Product development is related to resource use, conservation, and economic activities. Mangrove management requires information on ecosystem conditions, resource-use pressures, and management responses appropriate to local characteristics (Quevedo et al., 2023). The relationship among ecotourism, livelihoods, and conservation is influenced by governance structures. Ecotourism activities are also associated with both benefits and pressures on natural resources (Samal & Dash, 2023; Blanton et al., 2024). Data from Tiwoho indicate production and sales activities, reported business documentation, and variation in product packaging. These activities demonstrate group-level economic activity and opportunities to create added value by integrating the product into tourism activities. Increased activity intensity requires ecological information on site suitability and carrying capacity as part of mangrove tourism management (Tambunan et al., 2023; Prihadi et al., 2024).

Tiwoho's educational tourism potential consists of mangrove resources, mangrove coffee processing, and community activities. Integrating these three elements creates tourism activities that encompass environmental observation, resource use, and knowledge of local community life. Tiwoho's differentiation comes from combining these three elements in educational tourism activities. Developing this potential requires local capacity to manage knowledge, products, services, and community involvement. Institutional capacity therefore determines local actors' ability to manage community-based tourism activities.

B. Institutional Capacity and Community Participation in Mangrove Educational Tourism Management

Local institutional arrangements involve the Tiwoho Village Government, the Tiwoho Village Youth Organization, and the Rhizophora Karya Muda Group. According to an interview with the Head of the Rhizophora Karya Muda Group in February 2026, the group was established by the Head of the Tiwoho Village Youth Organization together with the Tiwoho Village Government and operates under the Youth Organization. The group carries out mangrove coffee processing activities related to educational tourism development. These institutional arrangements involve the village government, a youth organization, and a local community group in mangrove coffee activities. Community capacity and initiative are key to linking destination development with local social conditions ([Murphy, 1985](#)).

The organizational capacity of the Rhizophora Karya Muda Group is reflected in its 20-member structure, consisting of an advisor, chair, deputy chair, secretary, treasurer, and 15 members assigned to three divisions. Processing and sales activities use a building owned by a resident without rental fees, according to the Head of the Group. The organizational structure indicates a division of responsibilities in implementing group activities, while the use of a resident-owned building reflects local resource support. Reliance on a borrowed building also indicates that group activities depend on access to community-owned facilities. Institutional capacity encompasses organizational structure, division of responsibilities, facilities, skills, networks, and the continuity of activities ([Nurlukman et al., 2025](#)).

The existence of a local organization indicates group capacity, while community involvement encompasses broader forms of participation. A joint interview with a village government official and a local tourism stakeholder in February 2026 indicated community support for educational tourism development. Direct involvement remained concentrated among a segment of residents. These conditions distinguish community acceptance of tourism development from participation in implementation and management. In CBT, participation is associated with governance, involvement in development processes, and community positions in decision-making ([Dangi & Jamal, 2016](#)). Empowerment is also associated with community capacity to participate and with community support for tourism development ([Khalid et al., 2019](#)). Strengthening participation therefore encompasses activity implementation, management, and decision-making.

Tiwoho's institutional capacity also shows temporal development. Previous research on Mangrove Trail management documented community group involvement in planning, implementation, utilization, maintenance, and supervision of tourism activities ([Runtunuwu et al., 2022](#)). In 2026, relationships

among the Tiwoho Village Government, the Tiwoho Village Youth Organization, and the Rhizophora Karya Muda Group were associated with mangrove coffee activities and educational tourism development. The two periods reflect local organizational experience with different activity focuses and actor configurations. Earlier tourism management experience provides information on local capacity, while the 2026 conditions show institutional arrangements associated with local product innovation. Different forms of tourism activities therefore generate different institutional requirements.

A community-based orientation depends on local actors' capacity to coordinate organizational roles, participation, decision-making, benefit arrangements, and destination management. Experience in Budo Village demonstrates the importance of community positions as primary actors in community-based destination management. The development of Mangrove Park Palaes also demonstrates the relevance of institutional strengthening and community participation in ecotourism management ([Navratilova et al., 2023](#); [Kondo et al., 2025](#)). Tiwoho has a local organization associated with mangrove coffee innovation and institutional relationships among the Rhizophora Karya Muda Group, the Tiwoho Village Youth Organization, and the Tiwoho Village Government. Capacity strengthening includes assigning roles in product management, tourism activities, interpretation, tourism services, and community participation.

Institutional capacity is also associated with community empowerment. Empowerment encompasses economic, psychological, social, and political dimensions related to benefits, sense of ownership, social cohesion, and community positions in decision-making ([Scheyvens, 2002](#)). Mangrove coffee production in Tiwoho represents a group-level economic activity. Benefit distribution is related to governance and community positions in the development process. Participation in activities and participation in decision-making represent distinct dimensions of community involvement. The relationship among participation, institutions, and management sustainability is therefore important in CBT, particularly for destinations associated with conservation and community livelihoods ([Samal & Dash, 2023](#); [Blanton et al., 2024](#); [Nurlukman et al., 2025](#)).

Overall, Tiwoho's institutional capacity comprises local organizations, institutional relationships among the Rhizophora Karya Muda Group, the Tiwoho Village Youth Organization, and the Tiwoho Village Government, and community acceptance of educational tourism development. Institutional capacity, collective knowledge, and management orientation are important elements of community-based edu-ecotourism. Coordination among institutional actors is also associated with local actors' ability to manage activities consistently ([Puspitaloka et al., 2025](#); [Asril et al., 2026](#)). Capacity strengthening encompasses local product management, interpretation, tourism services, participation, conservation, facilities, and

coordination. These institutional findings are integrated with the potential of the mangrove area and mangrove coffee in formulating development strategies.

C. Community-Based Mangrove Educational Tourism Development Strategies in Tiwoho Village

Strategy formulation covers the mangrove area, mangrove coffee innovation, local organizational capacity, community involvement, activity facilities, and external conditions. SWOT analysis integrates internal and external factors to formulate development strategies. Using SWOT analysis in ecotourism development integrates environmental, social, and economic dimensions. Applying it alongside other frameworks in different contexts also supports analysis of conditions, stakeholders, and management responses (Swangjang & Kornpiphat, 2021; Sumarmi et al., 2022). Tiwoho's internal factors include area conditions, products, institutions, facilities, and participation identified through field data. External factors include opportunities and threats associated with destination development conditions.

Internal strengths consist of the mangrove area as an environmental resource and source of interpretive content, mangrove coffee as a local product with processing and sales activities, and local organizations linking the Tiwoho Village Government, the Tiwoho Village Youth Organization, and the Rhizophora Karya Muda Group. Weaknesses include using a borrowed building for processing and sales and direct community involvement that remains concentrated among a segment of residents. External conditions offer opportunities to use digital media to communicate destination identity and local products. Digital marketing is associated with destination image, visit decisions, and communicating local attributes to prospective visitors (Widiantoro et al., 2024; Amperawati et al., 2026). Collaboration in education, conservation, capacity building, and marketing also represents an external development opportunity. Mangrove destinations in Budo, Darunu, and Palaes have similar attraction themes (Navratilova et al., 2023; Hutabarat et al., 2024; Kondojo et al., 2025). This similarity increases the risk of destination identity homogenization and the need for Tiwoho to establish clearer differentiation.

Table 1. Strategic Factors for Community-Based Mangrove Educational Tourism Development in Tiwoho Village

Kode	Strategic Factor
S1	The mangrove area provides environmental objects and interpretive content
S2	Mangrove coffee is a local product supported by processing and sales activities
S3	Local organizations connect the Tiwoho Village Government, the Tiwoho Village Youth Organization, and the Rhizophora Karya Muda Group
W1	Processing and sales activities continue to use a resident-owned borrowed building

Kode	Strategic Factor
W2	Direct community involvement remains concentrated among a segment of residents
O1	The development of digital media provides communication channels for destination identity and local products
O2	Collaboration in education, conservation, capacity building, and marketing represents an external opportunity
T1	Similar themes among regional mangrove destinations increase the risk of identity homogenization and the need for Tiwoho to strengthen destination differentiation

Source: Analysis based on field data and external development conditions, 2026.

Relationships among the factors produce four strategic groups. Combining S1, S2, and S3 with O1 and O2 generates an SO strategy based on integrating the mangrove area, mangrove coffee, local actors, digital communication, and collaboration. Combining W1 and W2 with O2 generates a WO strategy focused on strengthening facilities, local actor capacity, institutional coordination, and participation through collaboration. Combining S1, S2, and S3 with T1 generates an ST strategy focused on differentiation based on the mangrove area, local products, and local actors. Combining W1 and W2 with T1 generates a WT strategy focused on strengthening internal capacity and community involvement to reduce the risk of destination identity homogenization. SWOT analysis, community strengthening, facilities, and promotion have also been incorporated into mangrove destination development strategies in the region (Hutabarat et al., 2024; Kondo et al., 2025). These combinations generate strategies aligned with Tiwoho's local conditions.

Table 2. Strategy Matrix for Community-Based Mangrove Educational Tourism Development in Tiwoho Village

Combination	Strategy
SO	Develop educational tourism activities that integrate the mangrove area, mangrove coffee processing, environmental interpretation, and local actors, while using digital media and collaboration to support communication and activity development.
WO	Improve activity facilities, local actor competencies, institutional coordination, and community participation through capacity building and collaboration.
ST	Use the relationship among the mangrove area, mangrove coffee innovation, and local actors as the basis for differentiating Tiwoho within the regional mangrove tourism context.
WT	Strengthen organizational capacity, activity facilities, and community involvement progressively to reduce the risk of destination identity homogenization.

Source: SWOT analysis based on the strategic factors presented in Table 1, 2026.

The SO strategy integrates the ecological context of the mangrove area, the process of converting mangrove fruit into a local product, and the involvement of local actors in educational tourism activities. The activities include an introduction to mangroves, information on mangrove fruit and its use, a demonstration of mangrove coffee processing, product tasting, and storytelling about community

life. Clear themes, systematic content organization, and visitor-relevant information support the interpretive function of tourism activities (Ham, 2013). Local storytelling is associated with stronger place identity. Mangrove education is also associated with increased knowledge and conservation awareness (Tagulao et al., 2022; Gunawan et al., 2025; Rahayu et al., 2026). Digital media expand the communication reach of educational tourism activities, while collaboration supports capacity building among local actors responsible for managing these activities.

The WO strategy focuses on strengthening facilities and management capacity. The borrowed building is currently used for production and sales. Demonstration and interpretive activities require facilities that support production processes, visits, information delivery, and tourism services. The division of organizational responsibilities can also be expanded to include interpretation, tourism services, activity coordination, and visitor management. Strengthening physical and institutional capacity is associated with community positions in decision-making, participation, and tourism benefits (Murphy, 1985; Scheyvens, 2002; Dangi & Jamal, 2016; Khalid et al., 2019). Collaboration with educational institutions, environmental organizations, local government, and businesses can support interpretive skills, facility development, ecological information, and marketing. Institutional coordination and clearly defined relationships among local actors are associated with the sustainability of such collaboration (Nurlukman et al., 2025; Puspitaloka et al., 2025; Asril et al., 2026).

The ST strategy focuses on destination differentiation. Differentiation based solely on scenery or the presence of mangrove vegetation is limited by the similarity of mangrove themes across regional destinations. Tiwoho's differentiation derives from the relationship among the mangrove area, mangrove coffee processing, local knowledge, and community actors. Digital communication conveys information about product origins, processing activities, local actors, and the relationship between mangrove coffee and educational tourism activities. Digital marketing is associated with destination image and visit decisions. Incorporating local attributes into social media communication is also associated with stronger destination identity (Widiantoro et al., 2024; Amperawati et al., 2026). Destination identity is therefore determined by the characteristics of local activities and communicated through digital media.

The WT strategy focuses on strengthening internal capacity to maintain destination identity and management capability. Stronger organizations, facilities, and community involvement increase local actors' ability to manage tourism activities consistently and maintain destination differentiation. Resource management is an integral part of increased tourism activity because mangrove use is associated with ecosystem conditions, pressures, and management responses

(Quevedo et al., 2023). Information on site suitability and carrying capacity is important for managing tourism intensity and resource use (Tambunan et al., 2023; Prihadi et al., 2024). Relationships among conservation, livelihoods, and community involvement require governance that accounts for local interests and resource conditions (Samal & Dash, 2023; Blanton et al., 2024).

The four strategies have distinct but interrelated functions. The SO strategy integrates the components of educational tourism activities. The WO strategy strengthens the capacity required to manage these activities. The ST strategy strengthens destination differentiation based on local activity characteristics. The WT strategy strengthens internal capacity to maintain differentiation and management quality. Interpretation informs the design of educational activities (Ham, 2013). The community-based approach emphasizes local capacity and involvement in tourism management (Murphy, 1985). The empowerment framework encompasses community positions in obtaining benefits and participating in decision-making (Scheyvens, 2002). Tiwoho's development strategy therefore integrates mangrove area potential, mangrove coffee innovation, and institutional capacity in developing community-based mangrove educational tourism.

CONCLUSIONS AND SUGGESTIONS

Community-based mangrove educational tourism development in Tiwoho Village encompasses the mangrove area as a source of environmental content, mangrove coffee processing as additional interpretive content, and institutional capacity in activity management. The educational value of mangrove coffee is associated with the origin of the resources, processing activities, community productive activities, and local identity. Institutional arrangements involve the Rhizophora Karya Muda Group, the Tiwoho Village Youth Organization, and the Tiwoho Village Government. The organizational structure, division of responsibilities, and local resource support indicate collective capacity that can be strengthened through increased participation, clearer roles among institutional actors, involvement in decision-making, and stronger links between tourism benefits and community interests.

The synthesis of internal and external conditions produces four interrelated strategies. The SO strategy integrates the mangrove area, mangrove coffee, interpretation, and local actors in educational tourism activities. The WO strategy strengthens facilities, competencies, coordination, participation, and collaboration. The ST strategy strengthens Tiwoho's differentiation through the relationship among the mangrove area, local products, the community, and digital communication. The WT strategy strengthens internal capacity to maintain destination differentiation and management. At the village management level, follow-up actions include designing educational activities with clear themes and sequences, strengthening local actors' interpretive and tourism service skills, improving processing and educational facilities,

coordinating the Tiwoho Village Government, the Tiwoho Village Youth Organization, and the Rhizophora Karya Muda Group, developing digital communication based on local identity, and establishing collaboration for capacity building, ecological information, conservation, and marketing.

This study covers mangrove area potential, mangrove coffee innovation, institutional capacity, and strategy formulation. Future research should examine educational effectiveness through changes in visitor knowledge, attitudes, or conservation orientation; ecological conditions through assessments of site suitability, carrying capacity, and the relationship between fruit use and mangrove regeneration; and socioeconomic and institutional conditions through benefit distribution, household involvement, participation patterns, decision-making mechanisms, and relationships among institutional actors. Research in these three areas will provide additional data to evaluate strategy implementation and analyze relationships among conservation, tourism activities, local product innovation, and community governance in Tiwoho Village.

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