



Biodiversity of Amarumatena Tourism Hamlet: Potential for Local Wisdom-Based Educational Tourism on Ambon Island

^{1*}Merlin Renny Sitanala, ²Yosevita Latupapua, ³Ronny Loppies

^{1,3}Forestry Study Program, Department of Forestry, Faculty of Agriculture, Universitas Pattimura, Ambon, Indonesia.

²Forest Management Study Program, Department of Forestry, Faculty of Agriculture, Universitas Pattimura, Ambon, Indonesia.

*Corresponding Author e-mail: merlin.sitanala@lecturer.unpatti.ac.id

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Abstract: This study aims to identify the diversity of flora and fauna and to analyze their potential use as educational tourism attractions based on local wisdom that support conservation and environmental education. The study employed a mixed-methods approach with an exploratory-descriptive design. Biodiversity data were obtained through vegetation inventories and fauna observations, while social data were collected through semi-structured interviews. The results showed that Amarumatena Tourism Hamlet possesses high biodiversity, consisting of 51 species of family medicinal plants (*Tanaman Obat Keluarga* [TOGA]), 27 ornamental plant species, 14 multipurpose tree species (MPTS), and 10 food crop species, as well as fauna belonging to the bird, herpetofauna, and invertebrate groups. This biodiversity functions not only as a visual attraction but also as an educational medium for ethnobotany, conservation, and local food security. The integration of biodiversity with local wisdom practices, such as the *dusung* system and sago processing, indicates that this landscape serves as a community-based ecological learning space. Theoretically, this study contributes to enriching the concept of educational tourism by integrating biodiversity and local wisdom within the context of traditional agroforestry. Practically, it offers a conceptual framework for the development of *dusung*-based educational tourism that can be applied in island regions.

Keywords: Biodiversity; tourism hamlet; educational tourism; local wisdom

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INTRODUCTION

Nature-based tourism has grown rapidly as a sustainable development strategy that integrates biodiversity conservation, environmental education, and the improvement of local community welfare. Over the past decade, global tourism orientation has shifted from mass tourism toward experiential and learning-based tourism, in which tourists not only enjoy natural landscapes but also acquire knowledge about ecosystems, local culture, and sustainable resource management practices (Ballantyne & Packer, 2016; UNWTO, 2018). Educational tourism has emerged as a strategic approach that bridges recreation and learning through the use of biodiversity as a medium for contextual education (Fennell, 2020). As a megabiodiverse country, Indonesia has substantial potential to develop conservation-based educational tourism, particularly through cultural landscapes and traditional management systems that have proven capable of sustaining ecological and social functions over time (van Noordwijk et al., 2018; Kay et al., 2019).

Nevertheless, the use of biodiversity as a foundation for educational tourism in many regions still faces fundamental challenges. Biodiversity is often positioned merely as a visual tourist attraction without being accompanied by systematic and education-oriented environmental interpretation strategies (Putri & Nurhidayah, 2018;

Kadafi et al., 2022). At the local level, weak community institutional capacity, limited field-based learning media, and the declining transfer of ecological knowledge to younger generations constitute major constraints in the management of conservation-based tourism (Salampessy et al., 2017; Tahitu et al., 2021). Studies from various countries indicate that, without the integration of environmental education and community participation, nature-based tourism development may degrade ecosystem quality and weaken conservation values (Catibog-Sinha, 2019; Kontogeorgopoulos et al., 2020). In contrast, community-based educational tourism approaches that combine biodiversity, local wisdom, and environmental interpretation have been shown to enhance conservation awareness while strengthening community socio-economic benefits (Rumangkit et al., 2024).

The main research gap addressed in this study lies in the limited integration of biodiversity data with educational approaches grounded in local wisdom, particularly in the context of traditional agroforestry systems such as *dusung* in Maluku. Most agroforestry studies have focused primarily on production and ecological aspects (Sasaoka et al., 2014; Wijayanto et al., 2023), without developing the educational tourism and environmental education dimensions that could utilize biodiversity as a medium for ecological and social learning. In many international studies, the success of educational tourism is determined by innovative interpretation methods, such as thematic zoning, visual-interactive media, and the involvement of local communities as facilitators (Ham & Weiler, 2015; Janczko, 2021). However, such approaches have rarely been applied in the context of Indonesia's small islands, where cultural and ecosystem diversity is high, yet the integration of conservation, education, and community empowerment remains limited.

This study offers scientific novelty by developing a biodiversity-based educational tourism model that integrates biodiversity inventory, educational zoning, environmental interpretation, and local wisdom within a unified framework. This model addresses a gap in the literature regarding traditional agroforestry as a community-based educational resource. Accordingly, the study makes a theoretical contribution to the development of a holistic biodiversity-based educational tourism model that connects ecological practices, environmental education, and local culture within a mutually reinforcing system.

Based on this background, the study aims to identify the biodiversity of Amarumatena Tourism Hamlet as an attraction and educational tourism asset grounded in local wisdom, and to analyze its utilization in supporting biological resource conservation and environmental education. The variables examined include: (1) the composition and richness of flora and fauna biodiversity as educational tourism assets; (2) the forms of biodiversity utilization as educational media and tourism attractions; and (3) the role of local wisdom and community participation in the management of sustainable educational tourism (Fennell, 2020; Atamimi et al., 2024).

The contribution of this article can be clearly classified into three forms. First, it makes a theoretical contribution by extending educational tourism into the context of traditional agroforestry in the Maluku archipelago, particularly the *dusung* system, thereby enriching the literature on the relationship among biodiversity, local wisdom, and environmental education. Second, it offers a methodological contribution by integrating biodiversity inventory with educational zoning focused on the development of community-based environmental interpretation to enhance learning quality. Third, it provides a practical contribution by formulating an operational model for the development of *dusung*-based interpretation packages that can be adopted in other areas of Maluku to support conservation and sustainable tourism. Thus, this study

provides both a practical and theoretical approach that can be used to manage conservation-based educational tourism in archipelagic regions by integrating local wisdom and ecological practices as instruments for conservation and environmental education.

METHOD

This study employed a mixed-methods approach with a convergent mixed-methods design. This approach integrated quantitative data on biodiversity with qualitative data on local wisdom and its utilization as a local wisdom-based educational tourism attraction. It was selected because it provides a more comprehensive understanding of the ecological and socio-cultural potential involved in managing *dusung* as a conservation landscape and an environmental education setting (Creswell & Plano Clark, 2019; Fennell, 2020).

The quantitative data collected included an inventory of MPTS (multi-purpose tree species) to analyze species richness and their functions within the concept of *dusung* landscape management as part of conservation-based educational tourism. In contrast, data on other multi-purpose plants were collected qualitatively to explore their roles in local culture, particularly in relation to the sustainable management of natural resources.

Qualitative data were collected through interviews with site managers to explore the educational value of the *dusung*, as well as community participation related to the existing plant species and their benefits in the context of environmental education and conservation. Quantitative and qualitative data were analyzed separately at the initial stage and then integrated during interpretation to produce more holistic findings regarding the potential of *dusung* as an educational tourism attraction based on biodiversity and local wisdom.

Study Site and Period

The study was conducted in Amarumatena Tourism Hamlet, Suli Village, Central Maluku Regency, from September to October 2025. The study site was selected purposively because it represents an active *dusung* system that has been utilized as a nature-based tourism destination and still maintains considerable biodiversity richness. This study complements previous findings by Narahawarin et al. (2025), who also examined the agrotourism potential and biodiversity of the same area, with a particular emphasis on biodiversity management and community-based conservation.

Research Design

A convergent mixed-methods design was used in this study to collect quantitative and qualitative data simultaneously. These data were then analyzed separately and integrated at the interpretation stage to generate more holistic findings.

Data triangulation was carried out by comparing findings from the quantitative and qualitative datasets to ensure the validity of the study results. Quantitative data were used to assess biodiversity richness and composition, whereas qualitative data were used to analyze community perceptions regarding the role of biodiversity in everyday life and the educational values that could be derived from it. The results from both types of data were analyzed concurrently to determine the potential of *dusung* as a conservation-based educational tourism attraction.

At the analysis stage, quantitative and qualitative data related to the diversity of flora and fauna species were combined with qualitative data obtained from interviews concerning local wisdom and the educational potential provided by biodiversity in Amarumatena Tourism Hamlet. These integrated data were analyzed using a

convergent approach to obtain deeper insights into the role of biodiversity in managing educational tourism based on local wisdom.

The research stages included: (1) inventory of flora and fauna biodiversity, (2) collection of social data related to local wisdom and the educational value of the *dusung*, and (3) integrated analysis to assess the potential of the *dusung* as a conservation-based educational tourism attraction.

Sample and Research Subjects

The study sample included biological and social components selected purposively according to the research objectives. Vegetation data were collected using a combination of sampling approaches tailored to site characteristics. The area of the site and the distribution of vegetation were calculated and mapped using Google Earth satellite imagery, which provided an initial overview of vegetation distribution within the area. Measurements showed that the total area of Amarumatena Tourism Hamlet was 0.43 ha, and satellite image analysis indicated that sago vegetation dominated approximately 0.22 ha of the area. Field verification was conducted to ensure the accuracy of the spatial data obtained from the satellite imagery. Direct observations confirmed that Amarumatena Tourism Hamlet was dominated by a homogeneous population of sago plants, which play an important role in the local ecosystem, and that the concentrated vegetated area covered 0.05 ha. However, some vegetation was also distributed randomly. Therefore, plot sampling was not applied across the entire site because it was considered less relevant for monocultural vegetation.

For the vegetated area containing MPTS, one sample plot measuring 20 × 20 m was established to obtain a representative estimate of vegetation composition and structure (Kent, 2012; Magurran, 2004). In contrast, for vegetation types and other plants that were unevenly distributed across the study area (TOGA, ornamental plants, and other multi-purpose plants), data were collected using a complete survey method, and species identity and plant condition were recorded. This combined approach integrates the strengths of plot sampling for components that can be systematically estimated with complete surveys, which are more appropriate for randomly distributed vegetation (Mueller-Dombois & Ellenberg, 1974; Franklin, 2010).

Faunal samples included birds, herpetofauna, and invertebrates. Bird observations were conducted at five point-count stations randomly distributed across the study site, with an observation duration of 10 minutes per point. Herpetofauna and invertebrates were inventoried using the visual encounter survey (VES) method, conducted simultaneously with the complete flora observations.

The social component involved the managers of Amarumatena Tourism Hamlet and community leaders, who were selected purposively based on their knowledge and involvement in *dusung* management and local wisdom practices. A total of 10 informants were included in the social data collection, depending on the availability of community leaders who played active roles in *dusung* management and local traditions. The criteria for selecting social subjects were as follows: (1) at least 3 years of involvement in *dusung* management; (2) extensive knowledge of local wisdom practices related to biodiversity and conservation; and (3) active participation in educational and environmental preservation activities in Amarumatena Tourism Hamlet.

Research Instruments and Procedures

The research instruments consisted of biological and social instruments. The biological instruments included inventory recording sheets used to document all plant individuals based on species identity (for TOGA, MPTS, ornamental plants, and other

multi-purpose plants), number of individuals, stem diameter, height, and phenological condition (for MPTS). Additional instruments included a camera for documenting observed flora and fauna, binoculars for bird observation, and the PlantNet identification application as a field identification aid. Identification validity was strengthened through the use of the standard bird identification guide for the Wallacea region (Coates, 2016) and relevant tropical flora identification references. Taxonomic verification was carried out when necessary to ensure the taxonomic validity of species identified in the field. The reliability of biological data was maintained through the use of standardized methods, repeated observations, and cross-verification of identification results using both online and offline literature sources (Kent, 2012).

The social instruments consisted of semi-structured interview guidelines and a simple questionnaire developed by the researchers based on a review of the literature on community-based educational tourism and environmental education (Ham & Weiler, 2015; Fennell, 2020). Content validity of the instruments was assessed through discussions with experts, including academics and local practitioners, whereas reliability was maintained through question consistency and triangulation of data sources.

The research procedure began with a preliminary survey and coordination with the *dusung* managers. This was followed by an inventory of flora and fauna biodiversity, including direct observations of existing vegetation and fauna in the area. In-depth interviews and questionnaire administration were then conducted to collect social data.

Data Analysis

The research data were analyzed using descriptive qualitative and quantitative approaches. Biodiversity data on flora and fauna were analyzed descriptively to characterize species composition as an indicator of the potential for biodiversity-based educational tourism (Kent, 2012; Udawatta et al., 2019). Bird data were analyzed based on species and frequency of occurrence at each observation point as indicators of agroforestry habitat quality. Herpetofauna and invertebrate data were analyzed based on species presence and their association with microhabitat conditions. Data on multi-purpose plants were analyzed descriptively. In addition, social data were analyzed qualitatively through data reduction, thematic grouping, and conclusion drawing to identify forms of local wisdom, the educational values of the *dusung*, and opportunities for its development as an educational tourism attraction.

Interpretation of the analytical results was based on the alignment among biodiversity potential, local wisdom practices, and the principles of sustainable educational tourism, namely conservation, education, and community participation. This integrated analytical approach enabled a comprehensive assessment of the role of *dusung* as both a conservation landscape and a community-based ecological learning space.

RESULTS AND DISCUSSION

Flora Biodiversity

The results showed that Amarumatena Tourism Hamlet has high floristic diversity, reflected in a vegetation composition consisting of four main groups: family medicinal plants (TOGA), ornamental plants, multi-purpose tree species (MPTS), and food crops. A total of 102 plant species belonging to 51 families were recorded, comprising 51 TOGA species, 27 ornamental plant species, 14 MPTS species, and 10 food crop species. Together, these groups contribute substantially to the floristic complexity of the area.

This floristic composition indicates a relatively balanced proportion, with TOGA dominating the area at 50%, followed by ornamental plants at 26.47%, MPTS at 13.73%, and food crops at 9.80%. These findings are consistent with previous studies showing that multipurpose plants, including TOGA and MPTS, play important roles in agroforestry systems (Kent, 2012; Sasaoka et al., 2014). Several key MPTS, such as *Syzygium aromaticum* and *Myristica fragrans*, as well as sago, which dominates an area of approximately 0.22 ha, play important ecological roles while also holding strong cultural value in Maluku. The presence of these plant resources reinforces local identity and enhances the potential for environmental interpretation in the context of educational tourism (Wijayanto et al., 2023; Narahawarin et al., 2025).

The plant families recorded in Amarumatena Tourism Hamlet are presented in Table 1.

Table 1. Plant families found in Amarumatena Tourism Hamlet

No	Family	Number of species
1	Euphorbiaceae	9
2	Araceae	7
3	Arecaceae	6
4	Asparagaceae	5
5	Asteraceae	5
6	Myrtaceae	5
7	Lamiaceae	4
8	Melvaceae	4
9	Rutaceae	4
10	Zingiberaceae	4
11	Piperaceae	3
12	Apocynaceae	2
13	Malvaceae	2
14	Marantaceae	2
15	Poaceae	2
16	Polypodiaceae	2
17	Solanaceae	2
18	Amaranthaceae	1
19	Amaryllidaceae	1
20	Anacardiaceae	1
21	Annonaceae	1
22	Apiaceae	1
23	Araliaceae	1
24	Balsaminaceae	1
25	Cactaceae	1
26	Campanulaceae	1
27	Caricaceae	1
28	Clusiaceae	1
29	Commelinaceae	1

No	Family	Number of species
30	Crassulaceae	1
31	Fabaceae	1
32	Gesneriaceae	1
33	Iridaceae	1
34	Lythraceae	1
35	Meliaceae	1
36	Moraceae	1
37	Moringaceae	1
38	Musaceae	1
39	Myristicaceae	1
40	Nyctaginaceae	1
41	Orchidaceae	1
42	Passifloraceae	1
43	Phyllanthaceae	1
44	Plantaginaceae	1
45	Portulacaceae	1
46	Pteridaceae	1
47	Rosaceae	1
48	Rubiaceae	1
49	Sapindaceae	1
50	Talinaceae	1
51	Urticaceae	1
Total		102

Based on Table 1, 17 families were dominant, each represented by more than one species, and Euphorbiaceae was the most species-rich family. This family is a very large and diverse taxon, comprising approximately 300 genera and more than 7,500 species, including trees, shrubs, herbs, and climbers with distinctive morphological forms. Members of this family often exude white latex and characteristically bear trilobed, dehiscent capsules. Euphorbiaceae is one of the major angiosperm families and exhibits high diversity not only in morphology but also in the secondary metabolites it produces, which is reflected in its relative dominance in the vegetation of Amarumatena Tourism Hamlet (Wuart, 2021).

The high floristic richness recorded in Amarumatena Tourism Hamlet indicates that the *dusung* system constitutes an agroforestry landscape with high ecological complexity. The occurrence of 102 plant species from 51 families reflects a high degree of vegetation heterogeneity that plays an important role in maintaining ecosystem stability. High species diversity in a landscape is known to increase ecosystem resilience to environmental disturbances, including climate change, pest outbreaks, and anthropogenic pressures (Tilman et al., 2014; Uduwatta et al., 2019).

The dominance of TOGA in the vegetation composition suggests that the *dusung* system functions not only as a production system but also as a space for conserving community ethnobotanical knowledge. The abundance of medicinal plants reflects the close relationship between biodiversity and traditional health practices, which are

integral components of local wisdom in Maluku. This finding is in line with previous studies showing that traditional agroforestry often serves as an important reservoir for the conservation of local plant germplasm with medicinal and cultural value (Sasaoka et al., 2014).

In the context of agroforestry, the diversity of families and species reflects the community's adaptive strategy for sustainable land use. The *dusung* system allows the integration of various plant species within the same space, thereby increasing the efficiency of resource use such as light, water, and nutrients. According to van Noordwijk et al. (2018), agroforestry systems with high species diversity tend to be more productive and sustainable than monoculture systems because they optimize interspecific interactions.



Figure 1. (1) Clove plant; (2, 3) vegetation strata in Amarumatena Tourism Hamlet.

Fauna Biodiversity

Faunal observations in Amarumatena Tourism Hamlet revealed the presence of several major groups, namely birds, herpetofauna, and invertebrates, reflecting an agroforestry ecosystem that remains functionally intact. Although this study did not quantitatively record species richness, the identification of fauna encountered in the field provides an initial overview of habitat quality within the *dusung* system.

The bird species observed included the Moluccan munia (*Lonchura molucca*), Moluccan starling (*Aplonis mysolensis*), black sunbird (*Nectarinia aspasia*), olive-backed sunbird (*Nectarinia jugularis*), Willie wagtail (*Rhipidura leucophrys*), spotted dove (*Streptopelia chinensis*), and swiftlet (*Collocalia infuscata*). The occurrence of these bird species is ecologically significant because birds function as indicators of habitat quality in agroforestry landscapes.

Sunbirds act as natural pollinators, while insectivorous birds such as the Willie wagtail contribute to controlling insect populations. Frugivorous birds such as starlings contribute to seed dispersal, thereby supporting vegetation regeneration. In addition, the presence of swiftlets (*Collocalia* sp.) indicates the availability of aerial insects as food resources and open space conditions that support flight and foraging activity. Swiftlets are generally sensitive to changes in environmental quality; therefore, their presence may serve as an indicator that the ecosystem in this area remains relatively supportive of faunal life.

The presence of various bird groups with different ecological functions, including nectarivores, insectivores, and frugivores, indicates that the *dusung* system provides a heterogeneous and ecologically productive habitat. This finding is consistent with studies reporting that agroforestry systems with complex vegetation structures are able to support greater bird diversity than monoculture systems (Jose, 2012; Udawatta et al., 2019). Thus, the occurrence of birds in this study may be used as an indicator that habitat quality in Amarumatena Tourism Hamlet remains relatively good. These findings further reinforce the role of *dusung* as an agroforestry system capable of supporting faunal biodiversity while maintaining ecosystem balance.

The herpetofaunal groups observed, such as lizards, frogs, and snakes, also indicate the existence of balanced microhabitats in the area. These organisms are generally sensitive to environmental change, and their presence therefore reflects relatively stable habitat conditions. Frogs, for example, are often used as bioindicators because they are highly dependent on humidity and environmental quality. Meanwhile, reptiles such as lizards and snakes function as predators in the food chain and help regulate populations of other organisms.

In addition, invertebrate groups such as butterflies, bees, grasshoppers, and soil insects play important roles in ecosystem functioning. Bees and butterflies serve as pollinators that support plant reproduction, while soil insects contribute to decomposition processes and nutrient cycling. The presence of these invertebrates indicates that the *dusung* system has relatively complete ecological functions, particularly in supporting vegetation productivity and ecosystem sustainability. The fauna presence-based approach used in this study is commonly applied in exploratory biodiversity studies, particularly under conditions of limited quantitative data. Although it does not provide information on abundance or diversity indices, this approach remains relevant for identifying ecological functions and general habitat quality (Kent, 2012).

From an educational tourism perspective, the presence of this fauna has high educational value. Visitors can learn about the ecological roles of different organisms, such as the role of birds in pollination and seed dispersal, as well as the role of insects in maintaining ecosystem balance. Therefore, faunal biodiversity in Amarumatena Tourism Hamlet functions not only as an ecological indicator but also as an environmental learning medium that supports the development of conservation-based educational tourism.

Table 2. Faunal groups found and their educational value

No	Faunal group	Species/groups found	Ecological indicator	Educational tourism potential
1	Birds	Moluccan munia, Moluccan starling, black sunbird, olive-backed sunbird, Willie wagtail	Habitat quality	Bird diversity education
2	Herpetofauna	Lizards, frogs, snakes	Microhabitat balance	Food chain education
3	Invertebrates	Butterflies, bees, grasshoppers, soil insects	Ecosystem function	Pollination education

Integration of Local Wisdom in the Development of Biodiversity-Based Educational Tourism

Interview results showed that the management of Amarumatena Tourism Hamlet is still strongly influenced by local wisdom, particularly knowledge related to the use of medicinal plants, the regulation of planting seasons, and the spatial arrangement of the *dusung*. These practices have been passed down from generation to generation and form part of the community's social interactions. However, their use as educational tourism material remains unstructured. This condition is largely attributable to limited interpretive capacity and the absence of systematic educational guidelines.

Table 3. Local wisdom and its integration into educational tourism

No	Biodiversity component	Local wisdom practice	Educational tourism activity	Educational value	Development status
1	Sago	Traditional sago management for food	Demonstration of sago harvesting and processing	Local food security, culture	Already implemented (not yet structured)

No	Biodiversity component	Local wisdom practice	Educational tourism activity	Educational value	Development status
2	TOGA	Traditional medicine	Introduction to medicinal plants, herbal tea preparation	Ethnobotany, natural health	Developing (semi-structured)
3	MPTS (nutmeg, clove)	<i>Dusung</i> system (mixed planting pattern)	Agroforestry interpretation and spice history	Ecology, economy, history	Not yet optimally developed
4	<i>Dusung</i> vegetation	Spatial organization and seasonal knowledge	Interpretation of the <i>dusung</i> system	Local ecology, environmental adaptation	Oral/not yet documented

Table 3 shows that the integration of biodiversity, local wisdom, and educational tourism activities in Amarumatena Tourism Hamlet has developed organically, although most of it remains unstructured. Each biodiversity component is directly linked to local wisdom practices and therefore has the potential to be further developed into experience-based educational tourism activities.

The sago ecosystem, for example, functions not only as a primary food source but also as an educational medium through which tourists can directly understand the process of local food production. This demonstrates that biodiversity can serve as a contextual learning medium connecting ecological and cultural dimensions (Fennell, 2020; Narahawarin et al., 2025). In addition, the presence of medicinal plants actively managed by local caretakers indicates a transformation in the function of biodiversity from a mere resource into a medium for botanical education. Based on interviews with local managers, the community frequently uses several medicinal plants for traditional treatment, such as *hanjuang* and *jarak*. Activities such as herbal tea preparation also provide visitors with direct experience regarding the use of plants in everyday life. This condition further strengthens the role of the *dusung* as a living laboratory for community-based environmental education (Jose, 2012; Salampessy et al., 2017).

Nevertheless, most educational tourism activities remain incidental and have not yet been developed into systematic educational packages. This indicates a gap between the area's high biodiversity potential and the still-limited implementation of educational tourism. Previous studies have emphasized that the success of educational tourism is strongly influenced by the quality of interpretation and the design of learning experiences for visitors (Ham & Weiler, 2015).

Local wisdom practices that are still maintained by the community (Table 3) show strong potential to be developed into educational tourism content based on local knowledge. However, the findings indicate that these practices remain informal, undocumented, and not yet integrated into a structured tourism interpretation system. As a result, the educational value embedded in biodiversity and local wisdom has not been optimally utilized.

Empirically, several factors contribute to this lack of structured integration. First, there is limited institutional capacity among managers to design systematic environmental interpretation programs. Second, there are no educational guidelines or field-based curricula capable of directing tourism activities into structured learning experiences. Third, human resource limitations remain evident, particularly in interpretive communication and the delivery of educational content to visitors. These findings are consistent with the study by Sam Ham & Betty Weiler (2015), which emphasized that the success of educational tourism is strongly determined by the

quality of environmental interpretation and the capacity of guides to communicate educational messages effectively.

In addition, research by Kontogeorgopoulos et al. (2020) showed that local institutions and community capacity strengthening are key factors in the success of community-based ecotourism development. In the context of Amarumatena Tourism Hamlet, local wisdom has long been practiced and continues to be maintained, but it has not yet been transformed into an organized educational tourism product. If this condition is not addressed, there is a risk that local wisdom practices will persist only as internal cultural activities without generating added value for tourism development and environmental education. Likewise, the potential of biodiversity as a learning medium will not be fully utilized, thereby reducing the effectiveness of community-based conservation functions.

Therefore, local wisdom needs to be transformed from everyday practice into structured educational content through the development of thematic educational tourism packages, interpretive media, and training for local guides. This transformation will not only improve the quality of the tourism experience but also strengthen the role of the community as the main actor in biodiversity-based environmental education. In this way, Amarumatena Tourism Hamlet has the potential to be developed as a model of educational tourism based on local knowledge, in which the community acts as environmental educator and biodiversity serves as a contextual learning medium. This model is particularly relevant for supporting sustainable tourism development in island regions.

Biodiversity- and Local Wisdom-Based Educational Tourism Model

Based on the research findings, the development of educational tourism in Amarumatena Tourism Hamlet can be formulated into a conceptual model integrating three main components: biodiversity, local wisdom, and a community-based educational interpretation system. This model was developed to address the gap between the area's high biodiversity potential and its still-unstructured utilization in educational tourism activities.

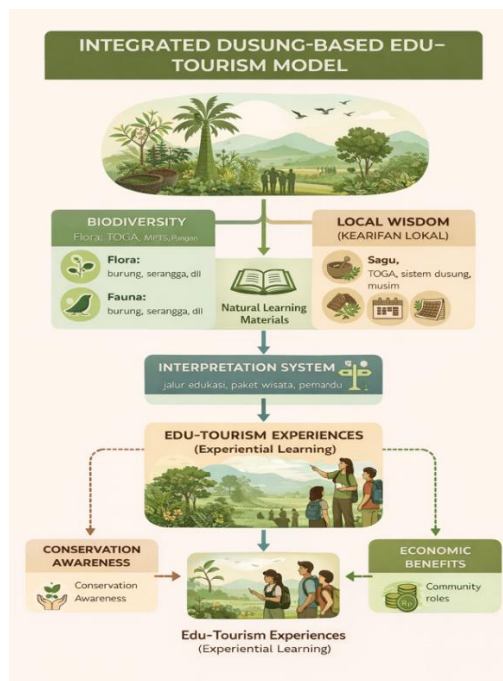


Figure 2. Conceptual model for the development of educational tourism in Amarumatena Tourism Hamlet

In Figure 4, the first component of the conceptual model is biodiversity, which includes flora (TOGA, MPTS, food crops, and ornamental plants) and fauna as sources of learning material. Biodiversity within the *dusung* system functions not only as an ecological element but also as an educational medium that enables visitors to understand the relationships among ecosystems, food production, and conservation. High species diversity forms the basis for developing thematic educational content such as ethnobotany, local food security, and ecosystem functions.

The second component is local wisdom, which includes traditional practices such as sago processing, the use of medicinal plants, the *dusung* system, and seasonal knowledge. Local wisdom functions as interpretive content connecting biodiversity with the community's sociocultural values. In this model, local wisdom is positioned not merely as a cultural practice but as educational material that can be systematically conveyed to visitors.

The third component is the educational interpretation system, which acts as a bridge between biodiversity and local wisdom and the tourism experience itself. This system includes the development of interpretive trails, thematic educational tourism packages, learning media, and local guides as educational facilitators. The existence of an interpretation system is a key factor in improving both the quality of the tourism experience and the effectiveness of environmental learning (Sam Ham & Betty Weiler, 2015).

The interaction among these three components produces outputs in the form of educational tourism experiences (*experiential learning*), including increased environmental knowledge, conservation awareness, and appreciation of local culture. In addition, this model contributes to strengthening the role of the community as the main actor in tourism management while also enhancing local economic value. The model expands the concept of traditional agroforestry, which has previously been studied mainly in the context of production and conservation (Shibu Jose, 2012; Sasoka et al., 2014), into an integrative approach that combines ecological, social, and educational functions within a single community-based framework. Accordingly, Amarumatena Tourism Hamlet can be positioned as an adaptive, participatory, and sustainable *dusung*-based educational tourism model.

CONCLUSION

This study shows that Amarumatena Tourism Hamlet possesses high floristic and faunal biodiversity, supported by local wisdom that remains actively practiced. Together, these elements provide a strong basis for developing conservation-based educational tourism within the traditional *dusung* agroforestry system. However, the educational use of biodiversity remains limited because ecological potential and local knowledge have not yet been integrated into a structured interpretation system. Accordingly, Amarumatena Tourism Hamlet can be positioned as a community-based educational tourism model in Maluku that integrates ecological, cultural, and educational functions to support sustainable tourism and environmental learning.

RECOMMENDATION

Future efforts should focus on translating biodiversity and local wisdom into more structured educational tourism programs through thematic interpretation media, *dusung*-based educational packages, and capacity building for local guides. Further studies are needed to evaluate the effectiveness of this model in improving visitors' environmental knowledge, conservation attitudes, and learning experiences, as well as to assess its ecological, social, and economic impacts. Strengthening local

institutions, policy support, and collaboration among communities, government, and academics will be essential to ensure the long-term sustainability of *dusung*-based educational tourism.

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