

Exploring The Local Potential Of Marine Ecotourism In Sabang Island As A Contextual-Based Resource For Biology Learning

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Abstrak: Penelitian ini bertujuan untuk menganalisis dan merekonstruksi potensi lokal sumberdaya alam pada kawasan ekowisata Iboih sebagai sumber belajar biologi. Target akhir penelitian ini adalah dapat dijadikan sebagai referensi bagi pendidik dan pengembang pembelajaran biologi untuk memanfaatkan potensi lokal sebagai konteks pembelajaran biologi. Metode yang akan digunakan adalah metode penelitian deskriptif dengan pendekatan kualitatif. Penelitian ini dilakukan pada kawasan ekowisata Iboih Pulau Sabang, yang terdiri dari dua tahap yaitu pertama eksplorasi potensi lokal di lokasi ekowisata, dan kedua mendeskripsikan potensi lokal sebagai sumber belajar berbasis ekoregion. Analisis data dilakukan dengan menggunakan teknik analisis deskriptif. Hasil observasi dan analisis menunjukkan bahwa materi yang dapat dijadikan sebagai sumber belajar dari kawasan ekowisata Iboih adalah terkait ekologi, dengan muatan materi tentang ekosistem, keanekaragaman hayati dan interaksi ekologi. Kajian potensi lokal pada kawasan ekowisata Iboih diketahui dapat dijadikan sebagai sumber belajar biologi berbasis kontekstual, yang erat kaitannya dengan kehidupan sehari-hari.

Kata kunci: Eksplorasi; Potensi Lokal; Sumber Belajar; Biologi; Kontekstual.

Abstract: This study aims to analyze and reconstruct the local potential of natural resources in the Iboih ecotourism areas as a source of biology learning. The final target of this study is to be used as references for educators and developers of biology learning in utilize local potential as a context for biology learning. The method used by this study is descriptive research with a qualitative approach. This study was conducted in the Iboih ecotourism areas of Sabang Island, consists of two stages, namely the first exploration of local potential in the ecotourism area, and the second describing local potential as a source of learning based on contextual. Data analysis was carried out using descriptive analysis techniques by using observation sheet that researcher developed. The results of observations and analysis showed that the material that can be used as a source of learning from the Iboih ecotourism areas is related to ecology, with material content about ecosystems, biodiversity, and ecological interactions. Therefore, the study of local potential in the Iboih ecotourism areas is known potential to be used as a source of contextual biology learning, that closely related to everyday life.

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Keyword: Exploration; Local Potential; Learning Resources; Biology; Contextual.

1. Introduction

The concept of local potential has been explored in various learning contexts with the aim of providing contextual learning experience more meaningful. Wilujeng et al., showed the effectiveness of science learning based on local potential in improving students' understanding of the nature of science [1]. Azmi et al., highlighted the local potential of North Labuhanbatu Regency as a learning resource to develop scientific literacy needed in 21st-century learning [2]. Furthermore, Imtihana & Djukri showed that the use of learning resources based on local potential in biology learning is mostly applied to the topics of biological biodiversity, ecosystems, animals, environmental change, and bacteria [3]. Sari et al., also stated that local potential integrated into the curriculum provides opportunities for students to be directly involved in experiential learning and can improve learning outcomes [4].

Based on several studies above, collectively highlighting that the use of local information and potential in various biology learning contexts is now being carried out continuously. Biology learning based on local potential by utilize natural resources deeply improve environmental knowledge and create meaningful experiences for students [5], [6], [7]. Besides that, various local potentials of flora and fauna, including mangrove ecosystems, endemic plants, fungi, and conservation areas, can be integrated into biology learning [5], [8], [9]. By incorporating local potential into biology learning, educators easily to enhance a deeper understanding of ecosystems, biodiversity and conservation, contextually and relevant in students' daily lives.

One of the environments that has a variety/diversity of local flora and fauna potential is the ecotourism environment. To maximize learning outcomes, ecotourism experiences are often used as an alternative in the learning process. Mangrove ecotourism can be used as a learning resource for science, allowing students to understand materials such as environmental pollution and plant

function structures through direct observation [10]. Yamin et al., showed that field practicum model based-ecotourism is effective in improving students' science literacy [11]. Chock et al. also stated that ecotourism education could be able to improve human behavior align/suitable with using the nature sustainably [12]. Furthermore, Samal & Dash also explained that community-based ecotourism can provide benefits for biodiversity conservation [13].

Studies in using of ecotourism as a learning resource have been conducted by several other researchers, including Abbas et al., by utilized Martapura River ecotourism as a source of social studies learning [14]. Setiawan et al., studied the use of mangrove ecotourism as a source of science learning [15]. Aswita et al., stated that natural resources in ecotourism destinations can be categorized into physical and non-physical environments that offered various learning opportunities [16]. Fatayati & Syafril showed the use of Pindul Cave as a source of social studies learning [17].

Therefore, this research quite interesting to be conducted, regarding/in order to find of local potential in the ecotourism areas as a source of biology learning which aims to explore local potential, especially natural resources in the Iboih ecotourism area of Sabang Island for biology learning, by analyzing and reconstructing these local potential sources based contextual. This research is intended to be reference for educators to find new biology learning sources through the implementation of local potential in biology learning.

2. Research Method

The method used in this study is descriptive research method with a qualitative approach. This research was conducted from May to June 2025, in the Iboih ecotourism area of Sabang Island. The steps of this research took in two stages, namely the first step is exploring of local potential at the ecotourism area, and the second step is describing local potential as learning resource based-contextual. The techniques used are exploration and direct observation, with 4 aspects of observation criteria, consists of conditions, the existence of living things, the existence of facilities, and visitor activities [1]. Subjects is various local potential of natural resources that found in the Iboih ecotourism

location of Sabang Island. Data analysis by using descriptive analysis techniques [18].

3. Results and Discussion

a. Overview of Iboih Ecotourism in Sabang Island

Geographically, the Iboih ecotourism area is located in Gampong Iboih, Sukamakmue District, Sabang City. The Iboih tourism area is famous for its beautiful natural landscape, plenty interesting local potentials, and high levels of diversity, as well as natural tranquility that blends with nature. The administrative map is shown as follows:

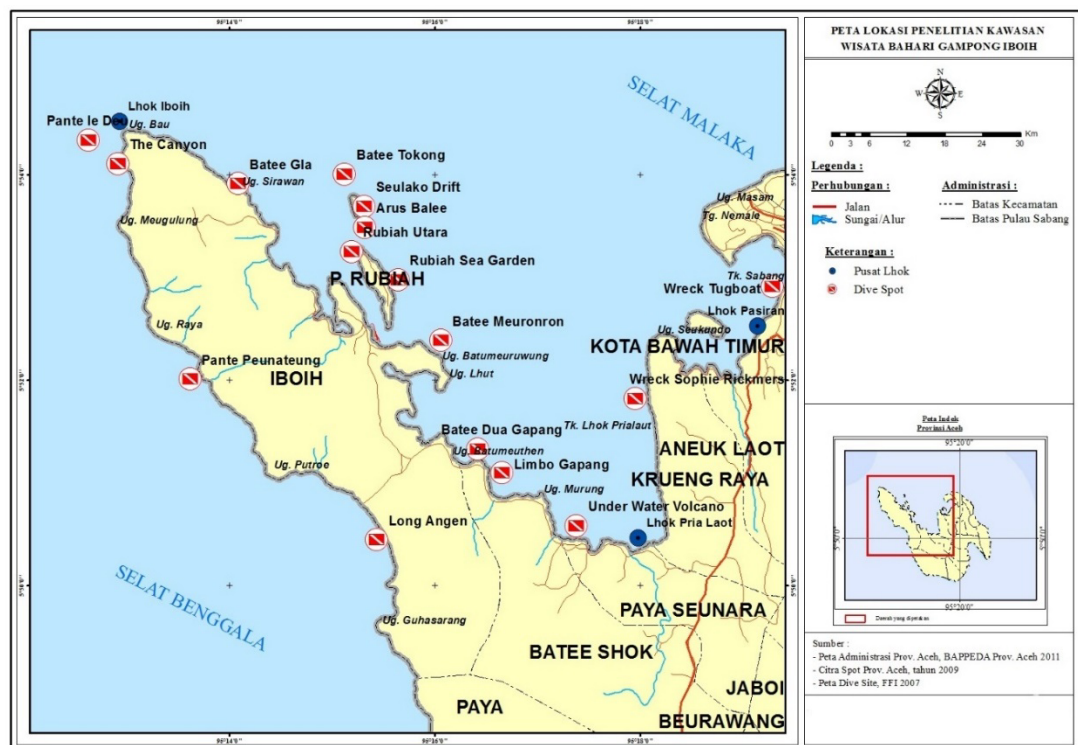


Figure 1. Administrative Map of Gampong Iboih and Its Marine Tourism Potential

Some of the potential natural tourism areas that can be found in Iboih are shown as follows:

Table 1. Potential of Iboih Natural Tourism Areas and Tourism Activities
(Source: Analyzed from various sources; Research Results, 2025)

Type of Object	Tourist Object	Tourist Activity
Nature Tourism	Teupin Layeu Iboih Beach	swimming, playing in the water, boating, snorkeling, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Rubiah Island	swimming, playing in the water, boating, diving, snorkeling, fishing, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Sea Garden Rubiah	swimming, boating, diving, snorkeling, fishing, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Gapang Beach	swimming, playing in the water, boating, diving, snorkeling, fishing, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Lhueng Angen Beach	swimming, fishing, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Calok Meunasah Beach	swimming, fishing, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Teupin Serkui Beach	swimming, playing in the water, boating, diving, snorkeling, fishing, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Teupin Reudeup Beach	swimming, diving, snorkeling, fishing, enjoying the beauty of the beach, educational marine tourism, cultural activities and traditions of coastal communities, take a photo
	Iboih Tourism Forest	exploring the forest, camping, observing flora and fauna, environmental education activities, enjoying the scenery, take a photo
	Batu Gentang	enjoy the beauty of nature, educational marine tourism, cultural activities and traditions of coastal communities, religious tourism, take a photo
	Tugu KM O	watching the sunset, observing flora and fauna, environmental education activities, enjoying the scenery, take a photo, culinary, shopping for souvenirs, historical tours
	Gua Sarang	enjoy the beauty of nature, educational marine tourism, observe flora and fauna, snorkeling, diving, environmental education activities, enjoy the view, take a photo

b. Utilization of Local Potential of Iboih Marine Ecotourism as a Contextual Biology Learning Source

Iboih Marine Ecotourism is an ecotourism area that always receives visits from tourists from various regions, both local, national, and international. This area has local potential in the form of attractive natural beauty, ranging from exotic coral reefs, diverse fish, and other marine life. A review of the utilization of local potential as a source of biology learning is carried out by observing the surrounding conditions presented in Table 2.

Table 2. Results of Observations of Environmental Conditions
(Source: Research Results, 2025)

No	Aspect	Description
1	conditions	<ul style="list-style-type: none"> The Iboih ecotourism area is located in Gampong Iboih, Sabang Island, and has several tourist locations spread out, both in the coastal areas and in the mountainous areas. Generally dominated by marine ecotourism with exotic underwater natural conditions, various aquatic biotics, and beautiful natural panoramas, with the highest interest being diving, snorkeling, swimming, and boating.
2	existence of living things	<ul style="list-style-type: none"> There are various types of trees, such as coconut trees, ketapang trees, pine trees, vines, paper flowers, Adam and Eve plants, crotons, and so on. In addition, under the sea, there are various types of coral reefs, various types of reef fish, starfish, sea cucumbers, sea urchins, and various other invertebrates.
3	existence of facilities	<ul style="list-style-type: none"> There are various supporting facilities for tourism activities, such as hotels/lodgings, restaurants/food stalls, coffee shops, places of worship, village halls, various dive shops, several cleaning facilities, boats, etc.
4	visitor activities	<ul style="list-style-type: none"> Activities carried out by visitors include playing in the water, swimming, diving, snorkeling, boating, fishing, outbound or camping, taking selfies, enjoying the natural scenery, and other educational activities.

Results of the observation indicated that the local potential in the Iboih ecotourism area can be used as a source of biology learning based-contextual. The results of the observation show that this local potential can be adapted for teaching materials such as ecology and biodiversity, ecosystem and pollution, and others. Suitable the achievements of biology learning in elementary, middle, high schools, and universities. Several other studies also mentioned the same arguments, such as research on the utilization of marine and coastal natural resource potential as a source of learning for environmental education

in ecology material [16] and the utilization of the local potential of Lake Toba as a source of learning on the topic of biodiversity [19].

One of the initial steps taken to make the local potential object as contextual learning source is to by analyze and reconstruct the local potential of natural resources at the location into biology teaching materials accordance to biology concept mapping. Results of analysis and reconstruction of the concept map through local potential of natural resources in the Iboih ecotourism areas shown as follows:

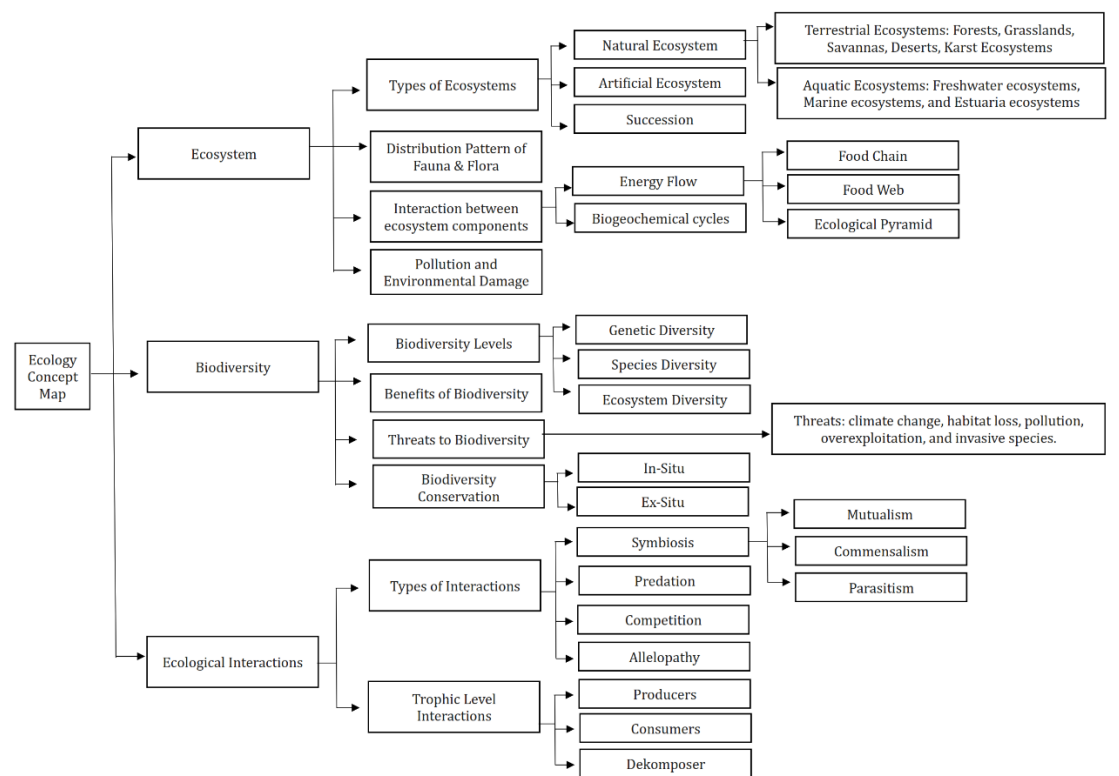


Figure 2. Concept Map of Ecology Material Through the Utilization of Local Natural Resources Potential

Exploration of local potential, especially natural resources as a source of learning, has been widely carried out by previous researchers [20], [21], but it always provides opportunities for other researchers to further explore the natural wealth owned by this nation as the most contextual learning source. The description of local potential is shown in the following:

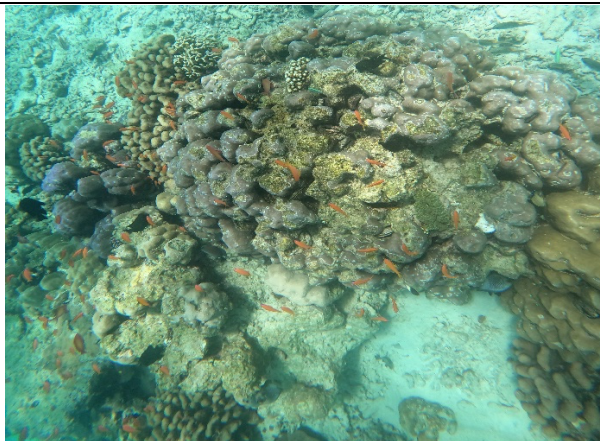
Table 3. Local Natural Resources Potential of Iboih Ecotourism as a Contextual Learning Source (Source: Research Results, 2025)



Location of the Photo Shoot: Iboih Mangrove Forest

Relevance of Objects to Biology Learning:

- a. Mangrove Ecosystem
- b. Diversity of Mangrove Fauna Species
- c. Diversity of Mangrove Species
- d. Ecological Interaction



Location of the Photo Shoot: Rubiah Island Relevance of Objects to Biology Learning:

- a. Coral Reef Ecosystem
- b. Diversity of Coral Species
- c. Diversity of Coral Fish Species
- d. Diversity of Invertebrates
- e. Ecological Interactions
- f. Distribution of Fauna & Flora



Location of the Photo Shoot: Rubiah Island Relevance of Objects to Biology Learning:

- a. Coral Reef Ecosystem
- b. Diversity of Coral Species
- c. Diversity of Coral Fish Species
- d. Diversity of Invertebrates
- e. Ecological Interactions
- f. Distribution of Fauna & Flora
- g. Environmental Pollution and Damage



Location of the Photo Shoot: Iboih Forest
Relevance of Objects to Biology Learning:

- a. Terrestrial Ecosystem
- b. Diversity of Flora Species
- c. Diversity of Fauna Species
- d. Ecological Interaction
- e. Distribution of Fauna & Flora
- f. Environmental Pollution and Damage



Location of the Photo Shoot: Iboih Tourism Forest
Relevance of Objects to Biology Learning:

- a. Terrestrial Ecosystem
- b. Diversity of Flora Species
- c. Diversity of Fauna Species
- d. Ecological Interaction
- e. Distribution of Fauna & Flora
- f. Environmental Pollution and Damage



Location of the Photo Shoot: Teupin Layeu Iboih Beach
Relevance of Objects to Biology Learning:

- a. Terrestrial Ecosystem
- b. Diversity of Flora Species
- c. Diversity of Fauna Species
- d. Ecological Interaction

Utilization of the local potential of Iboih ecotourism natural resources for biology learning is expected can be to provide a contextual learning experience and open students' insights to be better understand of the materials, the sign and problems of environmental utilization in everyday life. This contextual

learning provides meaningful understanding, aid students understand the material in depth, and be able apply it in daily life. Integrating environmental context and real-world applications in biology education is very important; it can foster improve critical thinking skills, conceptual understanding, and students' environmental responsibility [22], and overcome real-world environmental problems [23].

In addition, through utilizing ecotourism areas as learning resources based-contextual [10], [24], [25], ecotourism areas can also be used as conservation-based biology learning resources [26]. Ecotourism activities themselves offer significant potential for biology learning, especially about the environment and sustainable development, creating collaborative networks between various parties as a tool for conservation education [27], fostering environmental awareness [17], and more appreciation for local biodiversity and culture [28].

4. Conclusion

The results of the analysis showed that local potential in the Iboih Tourism Area can be used as a relevant, interesting, and meaningful contextual learning resource for students. This utilization can be done from elementary school, high school, to higher education. The meaningfulness that is formed when building student learning experiences allows for the implementation of environmental protection and management in accordance with characteristics of natural resources, ecosystems, geographical conditions, culture, and local wisdom of the local community.

Based on this study, the author's recommendation is to conduct further research related to the exploration of other local potentials that are broader and deeper, as well as research and development of biology teaching materials according to the current needs of the world of education.

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