

The Planning Concept of Sustainable Marine Based Ecotourism in Kuala Sempang Village, Bintan, Indonesia

by Apmd Lumbung Desa

Submission date: 20-Oct-2023 02:34PM (UTC+0800)

Submission ID: 2201603539

File name: 20203_IOP_The_Planning_Concept_of_Sustainable_Marine_Based.pdf (1.38M)

Word count: 4137

Character count: 22470

PAPER · OPEN ACCESS

The Planning Concept of Sustainable Marine Based Ecotourism in Kuala Sempang Village, Bintan, Indonesia

To cite this article: Gusrizal *et al* 2023 *IOP Conf. Ser.: Earth Environ. Sci.* **1148** 012040

6
View the [article online](#) for updates and enhancements.

You may also like

- 7
- [Institutional model for ecotourism development in the Gunung Pangkor post-mining area](#)
A Kusumoarto, A Gunawan, Machfud et al.
- 8
- [Ecotourism e-Commerce through Android-based Marketplace](#)
M Rachmaniah, KSK Zito and IK Dinata
- 4
- [The policy plan of ecotourism development of Sakjan Lake for economic empowerment of buffering rural community in the Meru Betiri National Park Jember Indonesia](#)
Ihsannudin, N Kholiq and E Antriandarti



ECS **Connect with decision-makers at ECS**

Accelerate sales with ECS exhibits, sponsorships, and advertising!

▶ Learn more and engage at the 244th ECS Meeting!

The Planning Concept of Sustainable Marine Based Ecotourism in Kuala Sempang Village, Bintan, Indonesia

Gusrizal¹, A. Muzwardi^{2*}, A.S. Muhammad³, M. Arfandi¹, F. Kusasi²

¹Sinergi Multi Performa Consultant, Tanjungpinang, Indonesia

²Universitas Maritim Raja Ali Haji (UMRAH), Tanjungpinang, Indonesia

³Sekolah Tinggi Pembangunan Masyarakat Desa "APMD", Yogyakarta, Indonesia

Corresponding Author: ady_muzwardi@umrah.ac.id

Abstract. Kuala Sempang is a coastal village in the Bintan Regency which has the largest mangrove ecosystem. This village's advantageous location near the estuary of the Busung River gives it the opportunity to develop marine-based ecotourism. Unfortunately, this untapped potential has not yet been fully realized. Consequently, the purpose of this study is to propose a planning concept for the development of sustainable marine-based ecotourism in Kuala Sempang. This study employs both qualitative and quantitative methodologies, including interviews and observations, as well as visual analysis utilizing drone imagery and Google Earth. This study intends to generate a spatial and architectural design for potentially developable areas. In addition, a gross budget estimation plan (*RAB Global*) will also be produced, explaining the total amount will be spent on the development of each area. According to the findings, three seven locations have a good chance of becoming ecotourism destinations: *Dapur Arang* Sei Lepad, the coastal area of Busung Bridge, and the area surrounding Empat Islands. According to the *RAB Global*, a multi-years village fund would not be sufficient to cover the full expense of developing the area. Government assistance and private investment are also required for the development of these potential marine tourism destinations.

1. Introduction

Kuala Sempang is a village on northern Bintan Island. Based on its geographic location and natural resources, Kuala Sempang Village offers substantial potential for blue economy growth [1]. In terms of geography, Kuala Sempang Village sits on the coast where the Busung River empties into the open sea. The position is also particularly strategic because it is adjacent to the Roro crossing to Batam, making it a major transit point for Bintan-Batam route. In terms of nature, Kuala Sempang Village has the largest mangrove forest in the Bintan Regency. There are up to 42 species in the Kuala Sempang mangrove forest, both true mangrove species and associates [2]. Furthermore, the Kuala Sempang mangrove forest has been declared as a Community Forest (HKm) [3] by the Minister of Forestry's Decree No. SK.114/Menhut-II/2014 regarding the designation of a 295-hectare community forest working area in the protected forest region of Bintan Regency, Riau Islands Province. The granting of this HKm status allows Kuala Sempang to be more flexible in using its mangrove forest to benefit the welfare of its people.

In general, the blue economy sectors can be subdivided into the following categories: fisheries, energy, industry, conservation, scientific research, and tourism [4]. Among those blue economy aspects, four aspects are potential to be developed in Kuala Sempang Village: fisheries, science, conservation,



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

and tourism. Kuala Sempang's fishing industry is run by natives who are employed as fishermen. In addition, scientists from several universities have conducted research in Kuala Sempang Village in the scientific sector. Due to the status of the Kuala Sempang's forest as a protected forest, conservation measures have already been adopted automatically. Thus, tourism is the only area that has been implemented yet is not perfect.

Considering the previously mentioned geographical characteristics of Kuala Sempang, the Kuala Sempang has the possibility of promoting marine-based ecotourism. In light of this, the aim of this study is to propose a planning concept of marine-based ecotourism for Kuala Sempang Village. The planning approach developed in this study, however, is confined to spatial planning in the form of architectural design and gross budget and expenditure plans (*RAB Global*).

The next section will describe the theoretical basis of this study. Followed by a section describing the methods employed for data collection and analysis. The results and discussion section then follows, offering the findings and any pertinent information. This manuscript will culminate with a conclusion that summarizes the study's findings.

2. Theoretical Framework

Contextualizing ecotourism is crucial to this study. The term 'ecotourism' was allegedly coined by Ceballos-Lascuráin in 1983 [5], but more recently, Fennell [6] outlined ecotourism is a sustainable, non-invasive kind of nature-based tourism that is ethically been low-impact, non-consumptive, and community-focused (control, benefits, scale). It often inhabits natural places and should contribute to their preservation. De Witt, van der Merwe, and Saayman [7] summarize the literature and believe that ecotourism should encourage a sincere appreciation for the natural world, aid in conservation efforts, protect and preserve native cultures, make efficient but preventing utilization natural resources, provide benefits to local people, and raise awareness among visitors about conservation and community issues. Agrawal and Redford [8] propose the following two key criteria: it should have a low tourist effect and contribute to biodiversity conservation; and it should provide favorable socioeconomic benefits for local people to aid in poverty alleviation. Based on these definitions, ecotourism is defined in this study to incorporate activities that are oriented in nature and culture, sustainable, support conservation, and benefit the local population [9].

As an archipelagic nation, Indonesia consists of thousands of islands surrounded by a vast ocean. Indonesia also has a strategic geographical and climatic situation. In this circumstance, Indonesia has the potential to become a prominent marine tourism destination [10]. The term "marine-based tourism" refers to both marine and coastal tourisms [11]. Although they are two separate entities, they are indeed intrinsically linked because of the sea element. Marine tourism is a type of tourism that entirely depends on and interdependent with the marine ecosystem. Marine tourism encompasses a wide range of deep-ocean activities, with cruising and sailing being the most prevalent. Other leisure water-based activities and nautical sports related to marine tourism include scuba diving, underwater fishing, waterskiing, windsurfing, maritime park tours, and animal mammal watching [12]. Coastal tourism, on the other hand, refers to beach-based and non-beach-focused land-based leisure and tourism activities near the sea, as well as the suppliers and manufacturing businesses connected to these activities. Swimming, sunbathing, surfing, and a variety of other sports and activities are examples of beach-based activities. On the other hand, some examples of non-beach activities in coastal region include coastal walks, seeing wildlife, staying in accommodations, eating and drinking, and so on [13].

Well-planned ecotourism not only provides economic benefits that enhance the level, quality, and way of life of the local people, but also improves and preserves the environment. However, when ecotourism is not properly developed, managed, or planned, it can have severe effects on the environment, economy, and society [14]. As a result, ecotourism planning must adhere to the notion of sustainability. The sustainability concept referred to here is the sustainability principle of planning/architecture, under the restrictions stated in the first section. Sustainable ecotourism planning is an ecotourism design theme with an environment-adaptive planning approach. This ecotourism planning represents a possible strategic value for the development of tourism destination capabilities

based on the harmonious link between architecture and the natural environment as the destination's main attraction [15].

3. Methodology

The research was conducted in Kuala Sempang Village in mid-2019. A combination of quantitative and qualitative research approaches was utilized in the construction of this study's methodology. The quantitative method involves the examination of statistical data obtained from the BPS as well as data gathered from village profiles. While the qualitative approach is carried out in a descriptive manner through observation and interviews [16]. Observations were made by visiting several village areas and potential development sites. This aims to assess the availability of supporting infrastructure in Kuala Sempang, as well as residents' socio-cultural, economic, and daily activities. Besides physical observations, satellite image analysis via Google Earth is used to conduct observations [17].

Interviews were conducted with village heads and other village officials, community leaders, and villagers. This step is required to validate quantitative data and observations with existing field conditions. Additionally, this step is necessary to determine the hopes and complaints of the villagers, as well as their thoughts and ideas on the concept of a maritime-based ecotourism.

To design the potential sites at Kuala Sempang, the concept of public open space design was used [18]. A sustainable approach is also used in the design [19]. We hope that this long-term approach will result in eco- and human-friendly designs. Sustainable design considers not only aesthetics in style, but also economic, social, and cultural aspects, as well as community participation [20]. In our planning, we also strive for vernacular designs and materials [21].

4. Results and Discussion

4.1. Result

Following an in-depth analysis, three potential sites for the development of maritime-based ecotourism were identified. They are coastal area of Busung Bridge, *Dapur Arang* of Sei Lengan, and the Empat Islands. The coastal area of Busung Bridge is a football-field-sized vacant lot below the Busung Bridge. Henceforth, the Busung Bridge Coastal Area shall be referred to simply as the Coastal Area. *Dapur Arang* of Sei Lengan is a charcoal kiln employed for producing wood charcoal and located in Sei Lengan sub village. The *Dapur Arang* of Sei Lengan utilize wood from mangrove trees. The Empat Islands is a group of islands in the middle of the Busung River, close to the Busung Bridge (as shown in Figure 1).

Figures 2–4 depict the outcomes of the architectural designs for the three locations, which were produced using the approach described in the methodology section. Tables 1-3 show the *RAB Global* for each region.

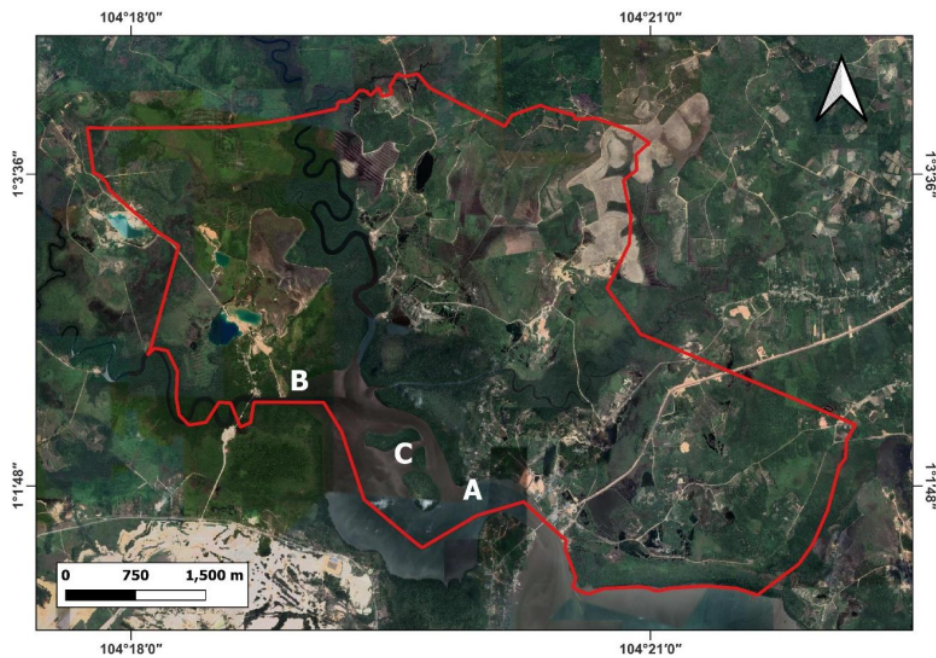


Figure 1. Kuala Sempang Village Boundary (shown by the red line) together with its prospective locations for ecotourism. Sites A, B, and C are the coastal area, the *Dapur Arang* of Sei Lapan, and the Empat Islands, respectively.

4.1.1. Coastal area. Figure 2i depicts a site plan for the coastal area. This beachfront region is designed for family recreation, relaxation, dining, and exercise. There are six visible components of the site layout, with the circular design pattern predominating. The position of the park and the coastal promenade reflect this (Figure 2ii(c-d)). The plaza comprises several elements, the most prominent of which are an open stage and a futsal field (Figure 2ii(b)). Figure 2ii (a) displays aerial photographs depicting the overall layout and design concept of this region.

The *RAB Global* from the coastal area are shown in Table 1. It shows that there are seven cost component divisions, with a total pre-tax cost of developing this coastal area in the range of 2.2 billion rupiah. The pattern concrete and architectural buildings are the high cost of development in this coastal area while the kiosks and accessories are the lowest.

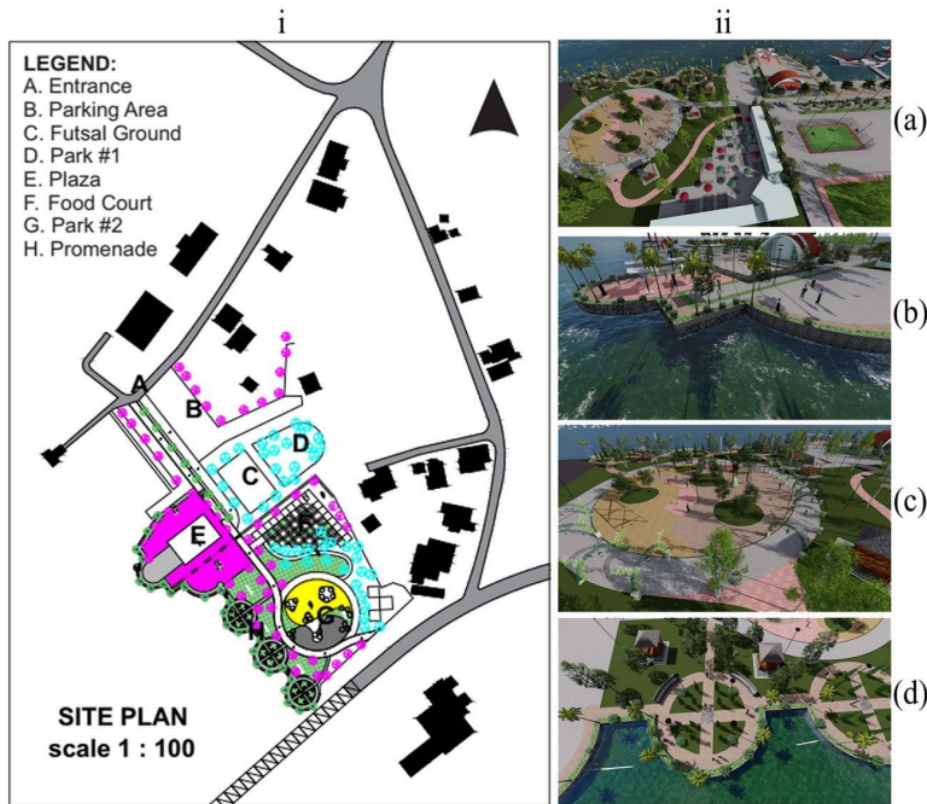


Figure 2. The architectural design of coastal area for: i. site plan, ii(a) aerial view, ii(b) open stage, ii(c) park, and ii(d) coastal promenade

Table 1. The RAB Global of Coastal Area

No	Description	Amount (in million IDR)
1	Pattern Concrete	643
2	Architectural Building	460
3	Food Court	195
4	Kiosk and Amenities	60
5	Coastal Wall	254
6	Circulation and Sports Arena	271
7	Landscape	319
	Total	2.204

The primary objective of developing this coastal ecotourism area is to establish an integrated green open space for recreation, sports, and culinary activities. The sustainable design element adopted in this coastal area is the development of parks as green open spaces from which visitors can admire the beauty of the banks of the Busung River. In regard, the construction of a promenade to serve as a platform which protrudes into the river bank protects the area's boundary from wave erosion. Additionally, by

allowing locals to sell there, the establishment of a food court will generate new economic opportunities for the community. Aside from providing economic opportunities for the community, the existence of this coastal area can also increase village original income (PAD) through parking retribution and kiosk rents. There is also the option of hiring out the stage for other purpose, such as art events or commercial promotions.

4.1.2. *Dapur Arang of Sei Lapan.* *Dapur Arang* of Sei Lapan's site plan is showed in Figure 3i. The theme of this area is natural and cultural tourism. The *Dapur Arang* is a heritage building, and it is situated in a bay area filled with mangrove and coconut trees. Figure 3i shows that there are twelve site plan components. Despite the fact that this component is more numerous than the component of the coastal area site plan, its construction is less expensive (Table 2). This is due to the natural formation of the landscape in the *Dapur Arang* of Sei Lapan, which does not cause extensive environmental adjustment. Figure 3ii (a-d) is an aerial view of the Sei Lapan region, which shows the jetty port, the amenities, and the two remnants of the charcoal kiln.

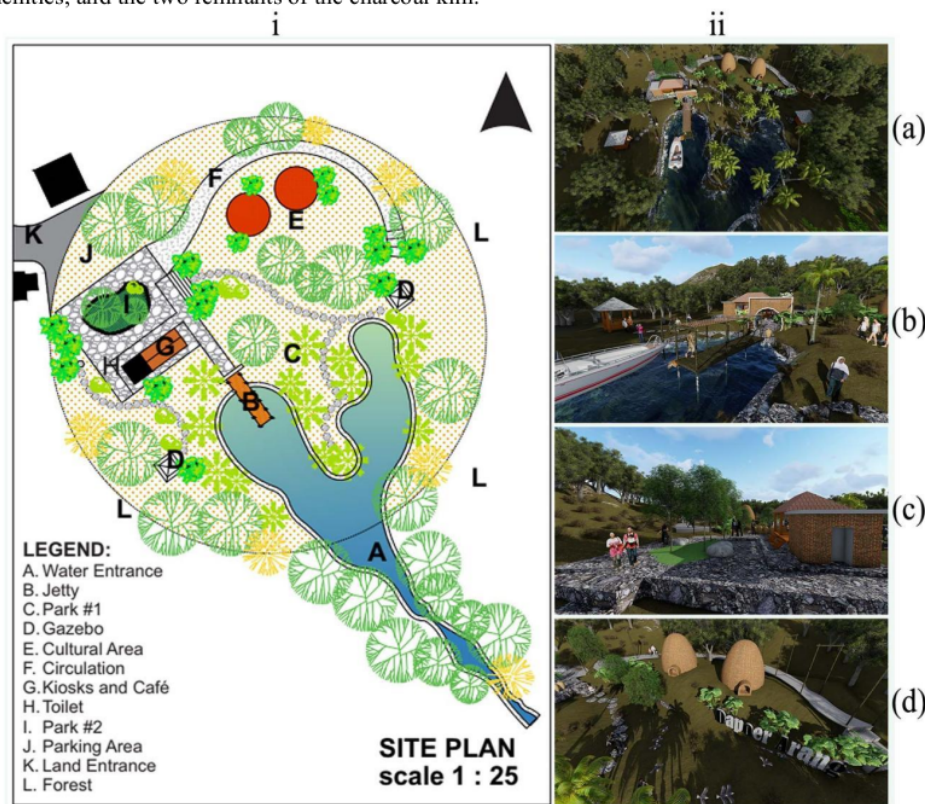


Figure 3. The architectural design of *Dapur Arang* of Sei Lapan for: i. site plan, ii (a) aerial view, ii (b) jetty, ii (c) amenities, and ii(d) charcoal kilns.

Table 2. The RAB Global of *Dapur Arang* of Sei Lapan

No	Description	Amount (in million IDR)
1	Paving Block and Circulation	56

2	Gate	36
3	Gazebos	89
4	Ship Dock	62
5	Landscape	42
	Total	288

The main objective of creating the *Dapur Arang* of Sei Lapan ecotourism park is to maintain and preserve the charcoal kiln remnants as a cultural legacy. The principle of sustainable design is fulfilled here by not cutting down the enormous trees that already exist in the region, but by incorporating them into the design. Therefore, the circulation flow and buildings follow the rhythm of trees and the landscape of the area. To add to the allure, visitors can arrive by boat and have an exhilarating cruise through a narrow strait lined with mangrove trees.

4.1.3. Empat Islands. Empat Islands is a group of four islands located in the midst of the Busung River. The island was formed from the sediment of the mangrove root system. Figure 4i displays the configuration of Empat islands taken from Google Earth. There are just three islands shown in the picture. In fact, the southernmost island is actually made up of two islands. Because of the narrow strait and dense mangroves, it looks like one island. This cluster of four islands is designed as a mangrove-themed resort. Figure 4i depicts the four components of the site plan, whereas Figure 4ii portrays the design outcomes for each sector. Figure 4ii(a-d) illustrates the resort administrative office, seeing tower, pelantar (open timber platform, usually over water body), and resorts. Although the site plan components are simpler than at the other two sites, the development costs change proportionately due to the more difficult topography. As a result, the RAB Global for creating Empat Islands Resort is around 1.2 billion rupiah (Table 3).

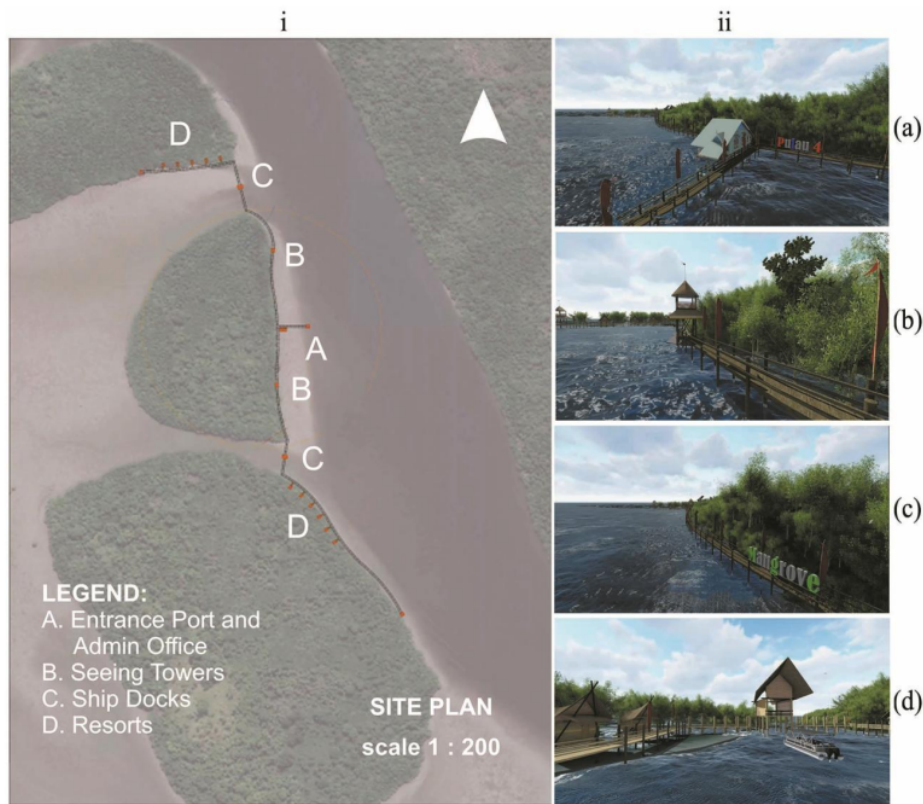


Figure 4. The architectural design of Empat Island Resort for: i. site plan, ii (a) management office, ii(b) seeing tower, ii(c) pelantar, and ii(d) resorts.

Table 3. The RAB Global of Empat Islands Resort

No	Description	Amount (in million IDR)
1	Pelantar Circulation	133
2	Gate	126
3	Cafeteria, Gazebo	58
4	Amenities	201
5	Ship Dock	643
6	Landscape	89
	Total	1.252

In contrast to the sustainable design principles applied to the previous two regions, the concept of a sustainable planning in the Empat Islands Resort emphasizes on biodiversity protection. This takes the form of protecting mangrove forests around *Empat* Islands which is a wetland habitat. With the preservation of these mangroves, the beach will be protected from seawater erosion. Additionally, this will maintain the marine fisheries' food chain. This region's main appeal is the *pelantar* circulation connects all the islands and serves as a tourist highway.

4.2. Discussion

Numerous factors were considered during the planning of the three ecotourism regions to generate an optimal layout with minimal development expenses. The coastal area is intended to serve as a stopover for visitors en route to or from Batam. Residents of Tanjung Uban and Northern Bintan also have an alternate hangout option in the coastal area. Additionally, the coastal area is also expected to be a place to relax, exercise, and perform on an outdoor stage for Kuala Sempang citizens.

The *Dapur Arang* of Sei Lepad is designed to be a cultural and ecological destination. Actually, the village of Kuala Sempang has three different spots where charcoal kiln can be found. Two are near the village office, and the third is in Sei Lepad (the places we chose). However, the selection of charcoal kitchens in the Sei Lepad region is due to environmental and geographical factors. Environmentally, *Dapur Arang* of Sei Lepad is already shaded and lovely due to the presence of big trees. While geographically, its location is jutting into the mainland with a small canal flowing to the location, makes *Dapur Arang* of Sei Lepad potential to become a coastal ecotourism area. This means that we can start developing this site at a relatively modest cost.

The Empat Islands will develop into a natural and distinctive resort using indigenous materials like coconut and nibung wood as well as Malay wisdom architecture like the *pelantar* [22]. Coconut wood is used in resort buildings, whilst nibung wood is used as a *pelantar's* pole. The *pelantar's* use addresses one of the biggest challenges on these Empat islands, specifically the presence of saltwater crocodiles. The *pelantar* is also meant to be safe, which is why nibung wood is used as a column. The longer this nibung wood is soaked in sea water, the stronger it becomes.

5. Conclusion

This study intends to explore the potential of ecotourism in Kuala Sempang Village and develop a planning concept that is in line with it. In accordance with the village's geographical characteristics, the targeted ecotourism is marine-based, specifically coastal ecotourism. The qualitative and quantitative criteria utilized in this research led to the identification of three possible coastal ecotourism locations in Kuala Sempang. These locations are the coastal area (of Busung Bridge), *Dapur Arang* of Sei Lepad, and Empat Islands. This study's architectural design concept resulted in a sustainable design by incorporating existing vegetation and landscape, utilizing local materials, and incorporating Malay-inspired patterns. Furthermore, according to the *RAB global* calculation, only *Dapur Arang* of Sei Lepad is budgetable and may be finished in a single fiscal year. Meanwhile, the other two may take years to finish. In light of this, the official of the village needs to persuade investors to provide funding for the development. It is hoped that this finding will serve as a roadmap for the development of marine-based ecotourism in the Kuala Sempang Village.

6. Acknowledgement

The author would like to thank the Kuala Sempang Village officials for allowing us to conduct this work and provided us with helpful directions. This research was conducted using corporate social responsibility (CSR) funds from CV. Sinergi Multi Performa.

References

- [1] Shah H and Ramesh R 2022 Development-aligned mangrove conservation strategy for enhanced blue economy: A successful model from Gujarat, India *Estuar. Coast. Shelf Sci.* **274** 107929
- [2] Wang L, Mu M, Li X, Lin P and Wang W 2011 Differentiation between true mangroves and mangrove associates based on leaf traits and salt contents *J. Plant Ecol.* **4** 292–301
- [3] Putraditama A, Kim Y S and Baral H 2021 Where to put community-based forestry?: Reconciling conservation and livelihood in Lampung, Indonesia *Trees, For. People* **4** 100062
- [4] Amon D, Metaxas A, Stentiford G, Escovar-Fadul X, Walker T R, Diana Z, Karathanasi F,

- Voyer M and Hemery L 2022 Blue economy for a sustainable future *One Earth* **5** 960–3
- [5] Anon View from Evaluation of Ecotourism Resources: A Case Study of Nameri National Park of Assam (India)
- [6] Fennell D A 2008 *Ecotourism* (Routledge)
- [7] Witt L de, Merwe P van der and Saayman M 2012 An Ecotourism Model for South African National Parks *Tour. Manag. Stud.* **0** 1138–42
- [8] Agrawal A and Redford K 2006 Poverty, development, and biodiversity conservation: Shooting in the dark? *Wildl. Conserv. Soc. Work. Pap.* **26**
- [9] Snyman S 2017 The role of private sector ecotourism in local socio-economic development in southern Africa *J. Ecotourism* **16** 247–68
- [10] Widiyastuti D 2018 Assessment of Natural Resources for Marine Tourism of Small Islands in the Aru Islands, Maluku *ASEAN J. Hosp. Tour.* **16** 1
- [11] Arismayanti N K 2017 DEVELOPMENT STRATEGY OF ECOTOURISM MARINE SUSTAINABLE IN INDONESIA *ASEAN J. Hosp. Tour.* **15** 15–15
- [12] Tegar D and Gurning R O S 2018 Development of Marine and Coastal Tourism Based on Blue Economy *Int. J. Mar. Eng. Innov. Res.* **2** 2548–1479
- [13] Islam M W and Sarker T 2022 Sustainable Coastal and Maritime Tourism: A Potential Blue Economy Avenue for Bangladesh *ADB I Work. Pap.*
- [14] Wiarti L Y 2017 THE IMPACT OF MARINE TOURISM : A QUALITATIVE STUDY ON THE PERSPECTIVE OF THE LOCAL COMMUNITY IN LOVINA BALI *ASEAN J. Hosp. Tour.* **15** 12–12
- [15] Page S, Haedar A W, Natsir T and Idrus R T 2021 Marine Ecotourism Architecture **5** 115–22
- [16] Yusuf M A, Ari R R, Kisnarini R, Septanti D and Santosa H R 2019 Planning for sustainable tourism. case study: Kampung of cookies, surabaya, indonesia *J. Settlements Spat. Plan.* **10** 49–60
- [17] Ang M L E, Arts D, Crawford D, Labatos B V., Ngo K D, Owen J R, Gibbins C and Lechner A M 2021 Socio-environmental land cover time-series analysis of mining landscapes using Google Earth Engine and web-based mapping *Remote Sens. Appl. Soc. Environ.* **21** 100458
- [18] Carmona M 2019 Principles for public space design, planning to do better *Urban Des. Int.* **24** 47–59
- [19] Farrelly L 2017 Sustainable Design of the Built Environment *Sustain. Futur. Built Environ. A Foresight Approach to Constr. Dev.* 137–53
- [20] Wiratno W, Withaningsih S, Gunawan B and Iskandar J 2022 Ecotourism as a Resource Sharing Strategy: Case Study of Community-Based Ecotourism at the Tangkahan Buffer Zone of Leuser National Park, Langkat District, North Sumatra, Indonesia *Sustain. 2022, Vol. 14, Page 3399* **14** 3399
- [21] Rashid M and Ara D R 2015 Modernity in tradition: Reflections on building design and technology in the Asian vernacular *Front. Archit. Res.* **4** 46–55
- [22] Zakaria A Z, Salleh I H and Rashid M S A 2013 Landscape Furniture Present in the Ancient Malay Garden According to Old Manuscripts and their Effects on the Formation of Malay Garden Design Concept Model in Malaysia *Procedia - Soc. Behav. Sci.* **91** 28–35

The Planning Concept of Sustainable Marine Based Ecotourism in Kuala Sempang Village, Bintan, Indonesia

ORIGINALITY REPORT

10%

SIMILARITY INDEX

7%

INTERNET SOURCES

6%

PUBLICATIONS

7%

STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Queensland Student Paper	2%
2	www.tandfonline.com Internet Source	2%
3	www.econstor.eu Internet Source	1%
4	I Ibrahim, N Zukhri, R Rendy. "Ecotourism Development in Bangka Islands: An Exploratory Study on Participation and Expectations of Local Stakeholders", Journal of Physics: Conference Series, 2020 Publication	1%
5	Submitted to Universitas Maritim Raja Ali Haji Student Paper	1%
6	repository.unsri.ac.id Internet Source	1%
7	ikee.lib.auth.gr Internet Source	1%

8	Submitted to Nelson Mandela Metropolitan University Student Paper	<1 %
9	Papageorgiou, Marilena. "Coastal and marine tourism: A challenging factor in Marine Spatial Planning", Ocean & Coastal Management, 2016. Publication	<1 %
10	Submitted to Rutgers University, New Brunswick Student Paper	<1 %
11	Submitted to Leeds Metropolitan University Student Paper	<1 %
12	garuda.ristekdikti.go.id Internet Source	<1 %
13	journals.itb.ac.id Internet Source	<1 %
14	mdpi-res.com Internet Source	<1 %
15	Susan Snyman. "Household spending patterns and flow of ecotourism income into communities around Liwonde National Park, Malawi", Development Southern Africa, 2013 Publication	<1 %

Exclude quotes On

Exclude matches Off

Exclude bibliography On

The Planning Concept of Sustainable Marine Based Ecotourism in Kuala Sempang Village, Bintan, Indonesia

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

/0

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11