

## Planning for a Biodiversity Park as limited tourism area development in Seruyan Regency

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### Abstract

Biodiversity Park (Kehati) is an area with the function of preserving local biological resources outside the forest area, especially for plants whose pollination and/or seed dispersal are assisted by wildlife, with a vegetation structure and composition that supports the sustainability of pollinators and seed dispersers. One of the efforts that can be undertaken is through sustainable planning of Kehati parks. This research focuses on the location of the Kehati park in the Asam Baru village, Danau Seluluk District, Seruyan Regency. The aim is to develop an ecological and sustainable limited tourism area that supports the conservation of biological resources in Seruyan Regency. The research method used is a qualitative descriptive method with field surveys and literature reviews, including direct observations, interviews, and questionnaires. The planning stages of the Kehati park start with inventory, site analysis, followed by generating planning concepts and site plans. Based on the inventory and site analysis results, a planning concept is developed, consisting of space, circulation, vegetation, and facility concepts. The spatial concept of the Kehati park is determined by the area's functions. Circulation is designed to prioritize user convenience in accessing and engaging within the area. Vegetation planning is based on ecological and physical functions of the area, while facility planning emphasizes the grouping of facilities for each spatial function. The site plan for the Kehati park meets government regulations, with infrastructure development covering only 1.13% of the total area. The planning aims to achieve its objectives with the support of all relevant parties in the management and development of a sustainable limited tourism destination.

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## 1. Introduction

Biodiversity is an asset for national development<sup>1</sup>. According to the 2009 Law on Environmental Protection and Management<sup>2</sup>, in the explanation of Article 57 paragraph (1) letter b, to carry out the reservation of natural resources, the government, provincial government, regency/city government, or individuals may establish biodiversity parks outside forest areas. The preparation of the Biodiversity Park Planning document for Seruyan Regency is based on the Minister of State for Environmental Affairs Regulation No. 29 of 2009, concerning Guidelines for Biodiversity Conservation in the Region<sup>3</sup>, and the Minister of State for Environmental Affairs Regulation No. 03 of 2012 con-

cerning Biodiversity Parks<sup>4</sup>.

The Biodiversity Park (Kehati) is an area designated for the conservation of local biological resources outside forest areas, particularly for plants whose pollination and/or seed dispersal depends on wildlife<sup>5</sup>. Its structure and vegetation composition support the preservation of pollinating animals and seed dispersers. Kehati is a program initiated by the Ministry of Environment aimed at rescuing various native/local plant species that face high threats to their sustainability or are at risk of extinction. The establishment of Kehati follows the guidelines outlined in Minister of Environment Regulation No. 3 of 2012 concerning Biodiversity Parks. The design of Kehati specifies that 90% of the area is allocated for plant collections, while 10% is designated for infrastructure.

In an effort to ensure the sustainability of biodiversity, preservation initiatives are essential. One such effort involves the planning of Biodiversity Park (Kehati). The planning of Kehati plays a crucial role in the conservation of natural resources<sup>6</sup>. Therefore, it is imperative for various stakeholders at both the central and regional levels, including the Seruyan Regency Government, to strive towards developing a Biodiversity Park Plan in Seruyan Regency. The study location is situated in the Asam Baru Village, Danau Seluluk District, Seruyan Regency, Central Kalimantan Province. The objective of the Biodiversity Park Plan for Seruyan Regency is to create an ecological and sustainable limited tourism area that supports the conservation of biological resources in the region.

## 2. Methods

The equipment utilized in this planning activity includes a drone, laptop, GPS, and camera. The materials involve physical and biophysical data, as well as socio-cultural data obtained from literature studies. Primary data is acquired through the observation of base maps and interviews with key individuals. Subsequently, secondary data is sourced from the Environmental and Forestry Agency of Seruyan Regency, along with other literature such as base maps, topographic maps, land cover and land use maps, aerial photos, vegetation and fauna data, as well as socio-cultural data.

The required types of data include primary and secondary data. Primary data is obtained by conducting on-site ground checks in Seruyan Regency. The collected data includes recordings of land cover types, potential local plant species, and existing wildlife, along with documentation taken at the ground check locations (Figure 1). Additionally, coordinate points are recorded using GPS.



**Figure 1.** Research location

The secondary data utilized includes the administrative boundaries of Seruyan Regency, data on forest area functions, and disaster occurrence data. The scope of this activity involves landscape design, encompassing inventory, analysis and synthesis, development concepts consisting of spatial zoning, circulation, vegetation, facilities, and utilities, as well as the final design of the Biodiversity Park Planning. The design depiction is limited to specific design elements that are considered important and necessary to clarify the design.

The method employed in this activity is a qualitative descriptive method with stages of field surveys and literature reviews, involving both direct observations and interviews, along with questionnaires. There are four stages in data collection: preparation, data collection, data analysis, and design.

## 2.1. Preparation Stage

This stage includes coordination and collaboration with the Environmental and Forestry Agency of Seruyan Regency regarding the determination of the activity location, goal establishment, proposal creation for Planning, permit application, as well as the preparation of tools and materials for field surveys as references and literature studies.

## 2.2. Data Collection Stage

This stage uses data obtained from field surveys, interviews with relevant institutions, local residents, and literature related to the activity. The collected data includes both primary and secondary data. Some necessary secondary data includes the administrative boundaries of Seruyan Regency and the Regional Spatial Plan (RTRW) data for Seruyan Regency, which is in the form of soft files. Primary data is obtained from measurements and direct observations in the field. The types of data required, data collection techniques, data sources, and their purposes are detailed in Table 1.

**Table 1.** Data used in the study

No.	Data Type/Aspect	Data collection technique	Data source	Data usability
<b>Physical and biophysical aspects</b>				
1	Site area	Site survey	Seruyan Regency Environmental Service	Site boundaries
2	Topography	Site survey and literature study	Survei dan DEMNAS	Slope
3	Climate	Literature study	Meteorological, Climatological, and Geophysical Agency	Planning drainage
4	Vegetation	Site survey	Survey	Know the local plant types
5	Animal	Site survey	Survey	Identify the presence of animals
6	Circulation	Site survey	Survey	Determine the location of facilities and utilities
7	Utility	Site survey	Survey	Complete site needs
8	Facility	Site survey	Survey	planning facilities
9	Visual	Site survey	Survey	planning visuals
<b>Social and cultural aspects</b>				
10	Location information	Site survey and literature study	Local residents	Reference in designing
11	Culture	Interview and literature study	Local residents	Reference in designing
12	User activity	Interview	Local residents	Reference for dividing space

### 2.3. Data Analysis Stages

This stage involves data processing such as problem analysis, including the analysis of physical and biophysical aspects as well as social and cultural aspects. The analysis conducted examines the potential and obstacles, then provides problem-solving or solutions based on these potentials and obstacles, referred to as synthesis. The synthesis is developed into a concept for planning.

### 2.4. Design Stage

This stage is the final phase, generating output in the form of a proposed design. The design process refers to Holden<sup>7</sup>, where the stages of the design process consist of:

- (1) Project acceptance.
- (2) Research and analysis.
- (3) Design.
- (4) Construction drawings.
- (5) Implementation.
- (6) Post-construction evaluation.
- (7) Maintenance.

However, the activities are limited only up to the third stage. Then, the planned basic concept and design will be continued to address on-site problems until identified and result in a block plan. Illustrative drawings include a 3D model using CAD, SketchUp, and Lumion applications, which will be refined into animations, ultimately producing the Biodiversity Park Planning.

## 3. Results and Discussion

The The planning stages of the Biodiversity Park begin with inventorying, site analysis, followed by the subsequent stages that result in the development of planning concepts and site plans.

### 3.1. Inventory

The inventory of the study area is conducted with the aim of understanding the overall condition of the area comprehensively, so that the implementation of the Biodiversity Park Planning in Seruyan Regency can proceed smoothly and accurately. The inventory method involves site survey or direct data collection in the study area. Primary data collection is carried out through visual observation, both directly on the study area and using drone flight techniques to assess the condition of the study area from an overhead perspective. The results of this inventory can be utilized as material for considering and analyzing the site comprehensively.

The development of Natural Tourism Facilities and Infrastructure in Forest Areas must take into account the landscape type<sup>8</sup>. Based on the inventory results, the candidate Biodiversity Park area in Seruyan Regency covers an area of approximately ±52.95 hectares with a swamp/peat landscape type, resulting in water puddles dominating the study area. Additionally, there are already existing ditches around the study area. The surroundings of the study area are adjacent to swamp/peat forests and local residents' plantations. Not far from the study area, there is a bridge crossing the Seruyan River. The prospective Biodiversity Park location is situated along Sudirman Road, a major thoroughfare. Therefore, it can be said that access to the study area is relatively easy. When observing aerial photos taken using a drone, it is evident that the study area has dense and diverse swamp vegetation. The mapped inventory results can be seen in Figure 2.

### 3.2. Site Analysis

Site analysis is conducted by considering the results of the previous inventory. The purpose of the analysis is to examine the information obtained in the study area, gaining an understanding of the

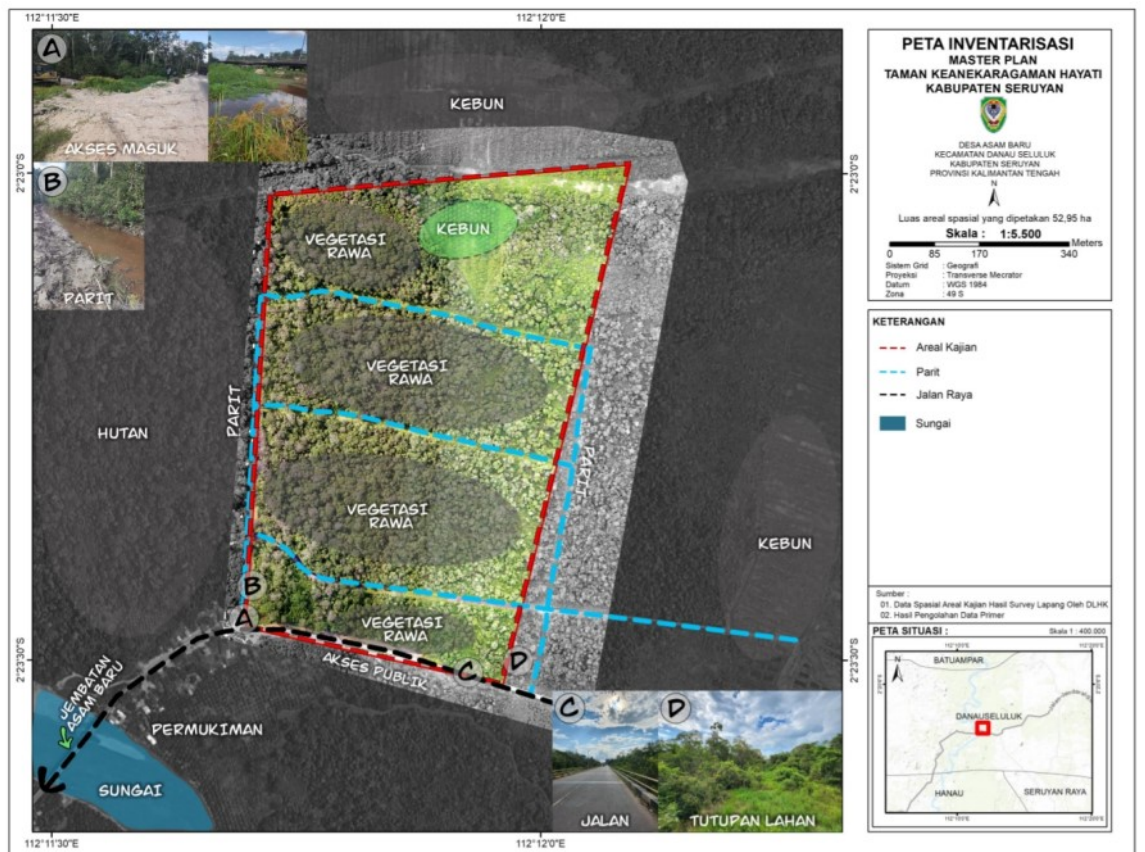


Figure 2. Inventory map

potential resources and existing constraints comprehensively. Potential is interpreted as the strengths or advantages present in the study area that have the opportunity to be developed for the better, benefiting both users and the site itself and fulfilling its function as a Biodiversity Park optimally. Meanwhile, constraints in this activity are defined as anything that disrupts park users' activities and prevents the realization of the Biodiversity Park, requiring mitigation as a solution to those issues. The type of analysis conducted in the study area is spatial analysis. Spatial analysis describes phenomena occurring in the study area based on spatial perspectives. In stages, this analysis begins with a comprehensive site information review, identifying the potential and constraints on the site. It concludes with formulating both actions regarding a potential and solutions to a constraint on the site, a stage referred to as synthesis.

### 3.3. Planning concept

**Basic Concepts.** The underlying concept behind the design of the Biodiversity Park Planning in Seruyan Regency is based on Ministerial Regulation Number 03 of 2012 concerning Biodiversity Parks. This regulation stipulates the implementation of the Basic Design of Biodiversity Parks, including vegetation design and infrastructure design in the form of working drawings regarding the layout of plant collections (vegetation) and infrastructure, with a provision of 90% for vegetation collections and 10% for infrastructure.

**Space Concept.** The development of spatial functions is adjusted according to the needs of a site. The allocation of space is tailored to the needs and potential of the site or study area. Spatial planning is adapted to the site conditions to minimize the need for new land clearing. The planned spaces are then equipped with facilities and infrastructure to create visitor comfort and optimize the utilization of tourism resources (Figure 3).



Figure 3. Space concept map

**Circulation Concept.** The circulation planning on the site aims to facilitate users in accessing the area and engaging in activities within the Biodiversity Park space. This circulation concept is planned and created based on a comprehensive analysis of the area. It begins with mapping public accessibility and then planning circulation paths within the area (Figure 4).

There are two types of circulation paths within the area, namely the primary circulation and secondary circulation. The primary circulation path functions as the main route for Biodiversity Park visitors, and the created circulation path is in the form of a boardwalk or wooden decking, adapting to the landscape type of the site, which is swamp/peat. A boardwalk is a pedestrian path typically made of wood<sup>9</sup>. The use of a boardwalk significantly contributes to preserving the natural environment. There is a circular area located in the center that serves as the focal point of circulation in this Biodiversity Park. The primary circulation path leads to the rear area, heading towards the nursery and greenhouse for the managers or visitors interested in exploring that area. The secondary circulation path serves as an alternative route for visitors or managers who wish to enjoy more spots within the Seruyan Biodiversity Park.

**Vegetation Concept.** The vegetation concept is planned in accordance with the existing conditions of the site and the basic concept of site planning. Referring to Ministerial Regulation Number 03 of 2012 on Biodiversity Parks, Chapter I, Article 3, one of the benefits of establishing a Biodiversity Park is as a Green Open Space (Ruang Terbuka Hijau or RTH).

Green Open Space serves ecological, social and cultural, economic, and aesthetic functions. In urban areas, these four main functions can be combined according to the needs, interests, and sustainability of the city, such as water management, ecological balance, and biodiversity conservation<sup>10</sup>.

According to Gunadi<sup>11</sup>, the vegetation function of the Biodiversity Park in Seruyan Regency as a Green Open Space in urban areas falls into two functions of green corridors as follows:

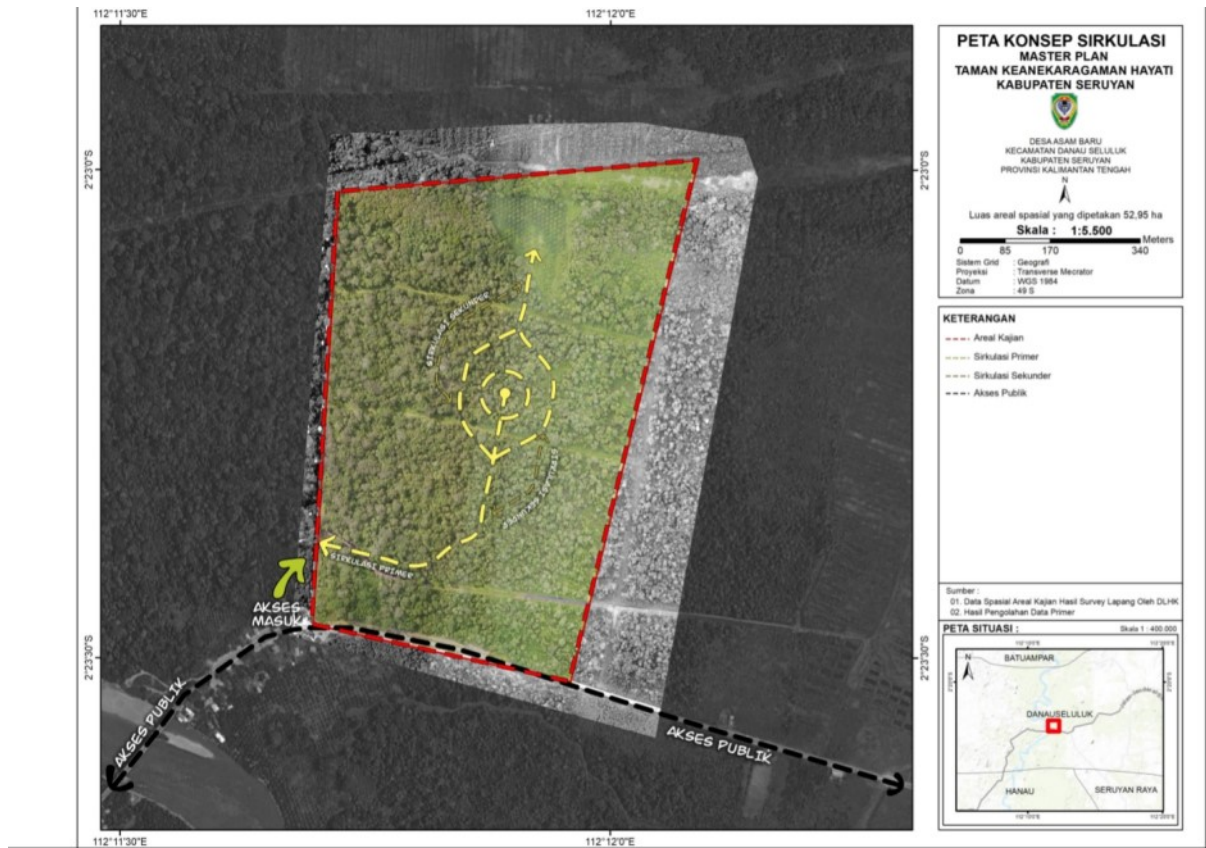


Figure 4. Circulation concept map

a. Ecological Functions

The vegetation planned for the ecological function in this Biodiversity Park serves as the city's lungs, microclimate regulator, regulator and controller of the soil system, and as a maintainer of biodiversity ecosystem. The types of vegetation used include local plants and flora whose composition can support their sustainability against the threat of extinction.

b. Physical Function

In an effort to fulfill the conservation function of the Biodiversity Park in Seruyan Regency, a composition of vegetation types is needed to serve as windbreakers, air filters, sound dampeners, and visual guides. Vegetation types with these physical functions play a crucial role in the sustainability of pollinators and seed dispersers, aiding in the reproduction of local plants in the Biodiversity Park.

The presence of such vegetation will make the park cool, beautiful, lush, and reduce pollution due to vehicular traffic, enhancing the comfort that will attract visitors <sup>12</sup>.

The arrangement of plants must be tailored to the objectives of the planning, without neglecting the functions of the selected plants. In this placement, the balance in design (unity) must also be considered. Therefore, in landscape plant planning, the selection of plant types is a crucial factor<sup>13</sup>.

**Facility Concept.** The design of facilities is planned to evoke the identity and culture of the local area (Figure 5). Additionally, the facilities are designed to facilitate and accommodate users for activities within the site. The layout of facilities is grouped according to each spatial function. This is intended to achieve the optimization of functions and services to visitors, as well as the effectiveness of maintenance. The morphological conditions of the land or natural terrain serve as a guide for placing facilities to minimize alterations to the natural landscape. The existence of pathways also forms the basis for the placement of facilities to ensure efficiency in construction.



Figure 5. Facility concept map

Biodiversity Park must, at least, have the following facilities and infrastructure (Ministerial Regulation Number 03 of 2012 concerning Biodiversity Parks):

- a. Information boards, including:
  - Biodiversity Park's name;
  - Layout plan;
  - Plant species; and
  - Fauna.
- b. Nursery; and
- c. Labels for each tree, including:
  - Individual number; and
  - Local and scientific name of the species.

**Block Plan.** The block plan is formulated based on the cumulative consideration of all the concepts planned in the previous stages, starting from the basic concept to the concept of area facilities (Figure 6). The set of concepts used is implemented into a single map, resulting in a block plan for the Biodiversity Park area.

### 3.4. Site Plan

**Planning.** Planning is a developmental stage of the concepts obtained earlier, which is then used as a guide in the design process or as a concept for construction to ensure a more planned execution in a systematic and structured manner. This planning is based on the Ministerial Regulation Number 03 of 2012 concerning Biodiversity Parks, Chapter II, Article 7, Paragraph (2). According to this regulation, it is crucial to consider that the area of infrastructure development in the planned location is





Figure 6. Block plan map

<10% of the total study area. Below is the percentage calculation of the planned infrastructure development in the prospective Biodiversity Park area in Seruyan Regency (Figure 7).

**3D Illustrations.** The 3D illustration stage involves visualizing the atmosphere or conditions of the site in three dimensions. The presentation of three-dimensional illustrations aims to provide an overview of how the atmosphere or conditions will be when the design is implemented. The 3D illustration images that visualize the ambiance from various points within the site are in Appendix.

#### 4. Conclusion

The planning of the Biodiversity Park is carried out in the village of Asam Baru, District of Danau Seluluk, Seruyan Regency, Central Kalimantan Province, covering an area of approximately ±52.95 hectares. According to Regulation of the Minister of Environment and Forestry Number 03 of 2012,

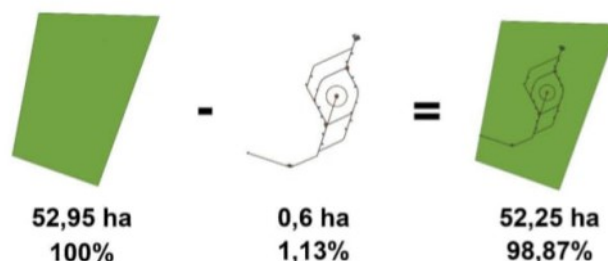


Figure 7. Calculation of infrastructure area in the study area

the site allocation consists of 90% for plant collections from the land area and infrastructure site with a maximum area of 10%, including pathways, monitoring posts, drainage, and water reservoirs. In the study area, the infrastructure site covers 0.6 hectares, or approximately 1.13% of the total site area, while the remaining 52.25 hectares constitute the plant collection site. Looking at the site allocation in the study area, it complies with the provisions of Regulation of the Minister of Environment and Forestry Number 03 of 2012. This planning is expected to develop an ecological and sustainable Biodiversity Park area, serving as a reserve for local biological resources that can be utilized for limited tourism. Additionally, this planning is hoped to serve as a model for other regions in building Biodiversity Parks, considering the role they play as miniature representations or sources of information about the biodiversity richness of a region. The achievement of this planning is expected to align with its goals, supported by all relevant parties in the management and development as a sustainable limited tourism destination.

## 5. Acknowledgments

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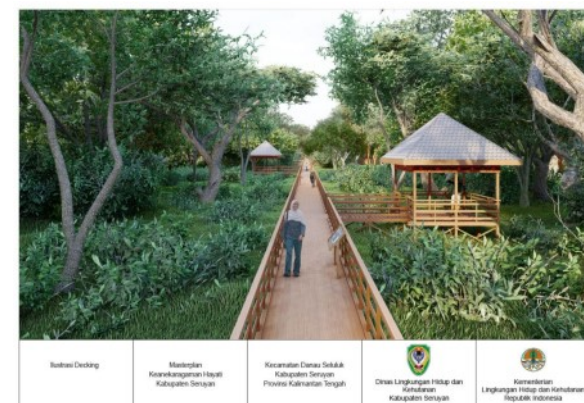
**Appendix**



(1) Main gate



(2) Welcome area



(3) Decking



(4) Decking and bird watcher



(5) Photo spot



(6) Toilet