

The Concept of Biodiversity Park Plan and Design for Abandoned Land Based on Community Participation

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Abstract—The existence of abandoned land in urban areas tends to occur on lands that function as conservation or environmental protection and preservation. The availability of abandoned land belonging to the Bandung City Government covering an area of 20 ha in Cisurupan Village has not been managed optimally. This land is very potential to be used as a Bamboo Biodiversity Park. This article demonstrates community participation in the planning and design process so that the park can be managed and used optimally by the community, while at the same time preserving the eastern KBU environment. Community involvement in the Biodiversity Park planning process is carried out through FGD activities to identify field needs, facilitating the needs and aspirations of surrounding communities, and the formulation of preliminary park design concepts. The final result of this activity is the design of the park, which completes 3 (three) components, namely softscape, hardscape, and artscape. The basic concept of vegetation design that is determined is a complex/multistrata agroforestry, equipped with hardscape components such as amphitheatre, reservoirs, performance sites, bicycle lanes, and other facilities.

Keywords: *biodiversity park, community participation, design*

I. INTRODUCTION

Many urban districts and some cities are dominated by abandoned property [1]. This condition is affected by the post-industrial economic downturn, miscalculation of real estate finances or natural disasters [2,3], which is also associated with a decrease in living standards, ineffective governance, racism, and crime growth rates [4–6]. Abandoned properties, especially those that are densely concentrated in an environment, can have an impact on property values and the quality of life of the surrounding environment [7]. This topic has become a widely studied discourse in urban studies, both in the context of planning and design. Much of the research examining abandoned property is in the form of buildings and infrastructure [1,7]. Meanwhile, in the context of developing countries (such as Indonesia), much of the abandoned property is in the form of urban land. Many variables, both social, economic, geological, and even political affect these conditions. The existence of abandoned land in urban areas represents a weak market demand for the land. This condition tends to occur on lands that function as conservation or environmental protection and preservation. The characteristics of land use in urban areas are quite complex. The development

of social and economic activities of the population affects the dynamics of land use in urban areas. These conditions require the optimization of land use whereas land has limited capacity and carrying capacity. In many cases, cities experience the impact of land use imbalances, such as flooding which ultimately threatens the sustainability of urban activities. For decades, sociologists and urban ecologists have highlighted the uneven distribution of land use, where the process of social differentiation can produce significant space [1].

The existence of abandoned land in Cisurupan Village is belonging to the Bandung City Government covering an area of 20 hectares. Cisurupan Village is located in the North Bandung Region (KBU) in the east, part of the delineation of the Eco-Region upstream-downstream conservation of Techno polis. Development in East Bandung is increasing rapidly, marked by the presence of the Techno polis Silicon Valley Asia and Kota Baru Tegal Luar Project. This threatens the existence of the eastern part of KBU and makes the condition of east Bandung prone to flooding. That abandoned land has not been managed optimally. This land is very potential to be used as a Bamboo Biodiversity Park. Ecologists and conservation experts think that the existence of Biodiversity Parks as an innovative and positive approach, a means to conserve natural resource conservation in urban and semi-urban areas [8,9]. This park can provide 3 (three) benefits at once, namely conservation, sustainability, and resource use. Biodiversity parks are a form of nature conservation today, dealing with social and economic problems in their implementation [10]. For this reason, social considerations and community preferences in the Biodiversity parks planning process are important.

The priority problem that this study wants to overcome is the problem of an abandoned area of 20 hectares that has the potential to be used as a Biodiversity Park. Thus, this study seeks to produce planning and design for the land by promoting the concept of sustainability. This article also shows the participation of the community in the planning and design process. The aim is that land can be utilized optimally so that it can provide space for productive community activities in the environment, agriculture and tourism sectors which are expected to have an impact on improving the economy of local communities. The Biodiversity Park also functions as a means of education, research, and development of knowledge about

the concepts of conservation and protection of native species and local ecology [8].

II. METHOD

The research approach is qualitative [11]. Involve specific data exploration efforts from partners as participants through the FGD process and analyse data inductively on which to base the planning and design of this biodiversity park. The implementation of community service activities is carried out in 4 (four) stages, namely:

A. Preparation Phase

Which includes team consolidation, technical preparation for implementing community service activities, and preparation at the partner level.

B. Data Collection Phase

Including detailed survey activities and FGD to identify field conditions, explore the needs and aspirations of partner communities in the formulation of preliminary design concepts for the park.

C. Analysis Phase

Including data processing and site analysis activities to finalize the initial design concepts that have been formulated together.

D. Final Phase

Socialization and refinement of the final design with partners through FGD. Counselling was also conveyed to partners about the use and creation of added value Bamboo which is the main flora in the Biodiversity Park.

III. RESULTS AND DISCUSSION

A. Present Land Condition

In the Bandung City spatial plan, this study case area is included in the Sundapolis Region. Sundapolis is a spatial model based on Sundanese local wisdom as an effort to prevent natural and cultural damage in East Bandung. The area is also directed as an ecoregion zone for upstream techno polis preservation with the direction of land use as plantations or production forests. Current land use is in the form of dry fields, several types of productive plants managed by local communities such as cassava, crops, vegetables, avocados, jackfruit, teak, banana, and mahogany. Whereas 70% of the vegetation dominates are bamboo with varieties of awi gombong, awi tali, and awi petung.

The location of study case area is at an altitude of 835-945 meters above sea level, hilly morphology in the north with a slope of 15-25% covering an area of 169,734 m² while the southern part is a plain at an angle of 8-15% covering an area of 30,266 m². Having a total area of 200,000 m², this land meets the minimum standard requirements for Type C Biodiversity Parks (Minister of Environment Regulation No. 03/2012 concerning Biodiversity Parks).

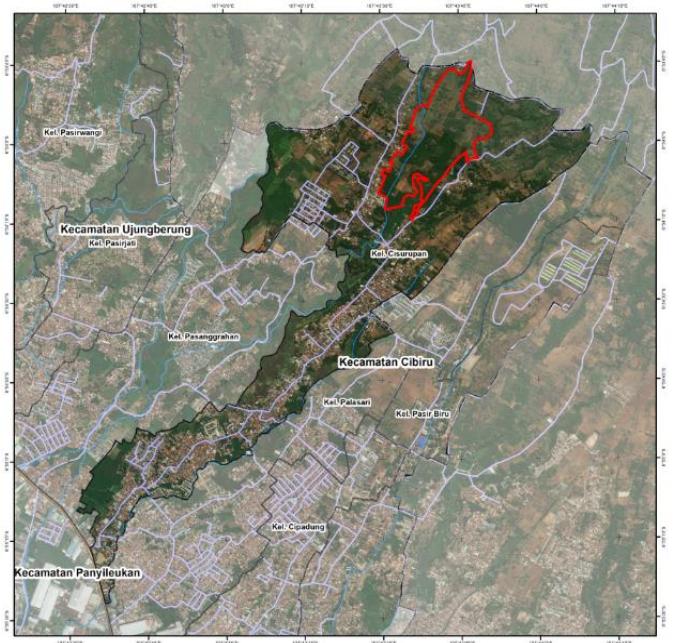


Fig. 1. Location of case study area.

The socioeconomic problems that exist around the location of the case study area are:

- **Social community:** Sundanese culture in Cisurupan Village has not been well-organized due to the lack of space that can accommodate the creativity and activities of the people which is one of the factors in the underdeveloped culture and economy of the community.
- **Water availability:** The geological condition in the PKM area is a type of hard rock (old volcanic sedimentary rock formations buried by molten lava) so that to get groundwater is very difficult. Residents use springs from the mountains which are then channelled into houses through pipes.
- **Economy:** East Bandung people, one of them is Cisurupan Village, which can be said to be a low economic community in the city of Bandung, where the dominance of the work sector is in the primary sector (agriculture and animal husbandry). Public knowledge about ways to increase the added value of a commodity is still minimal.
- **Land use:** There is a non-productive land owned by the City Government of ± 20 ha, where the dominant vegetation is Bamboo. The land is independently planted with food crops such as cassava and fruit trees (bananas, jackfruit). However, the community has not been able to take advantage of Bamboo vegetation which is more dominant in the land. Though Bamboo has great potential to improve the community's economy.



Fig. 2. Current land use conditions.

B. Biodiversity Park Design Concept

The development of the Biodiversity Park is expected to be able to solve the problems that occur in the case study environment, and therefore it is carried out to assist the land planning to form the biodiversity park design that suits the community's needs and land conditions. The solution to the problems offered by biodiversity park planning is:

1) *Social community*: The existence of biodiversity parks will provide plenty of space for the community to carry out activities both economic and social. Moreover, the development site is quite extensive, which is 20 ha.

2) *Water availability*: The presence of bamboo in biodiversity parks will provide ecological benefits, with its characteristics that can store 240% of groundwater and its resistance to dry land.

3) *Economy*: Communities will be encouraged to utilize Bamboo grown in biodiversity parks to be made into high-value products that are expected to be able to improve the community's economy.

4) *Land use*: Land is utilized as a Bamboo Forest Park with a variety of benefits. It can function as a means of education, research, science development, and ecotourism.

The park design is divided into 3 (three) parts, namely Softscape, Hardscape, and Artscape.

- **Vegetation Design Concepts (softscape)**; Softscape design concepts consist of determining the types of plants used. Vegetation variations are planned to follow the current cropping patterns, especially bamboo and other tree species (non-bamboo) which are considered suitable for planting on these lands. The planned softscape component consists of a bamboo garden, cassava garden, teak garden, banana garden, and jackfruit garden. The types of bamboo plants that will be preserved in the Cisurupan Biodiversity Park include Eul-eul Bamboo, Tutul Bamboo, and Haur Gereng Bamboo.

- **Infrastructure Design Concepts (hardscape)**; The concept of infrastructure design consists of hardscape components which are parts of the park made from pavement materials, as a supporter of the beauty of the park and forms of infrastructure supporting activities in the park. The planned hardscape component consists of amphitheatre, entrance, retention pond, place for silat performances, WWTP, bicycle lane, green parking, etc. The concept of hardscape/infrastructure design can be seen in the following figure:



Fig. 3. Design of entrance.



Fig. 4. Design of amphitheater.



Fig. 5. Design of retention pond.



Fig. 6. Design of saung kaulinan.

- **Artscape Design Concepts**; the concept of artscape design is the final result of the park related to the concept of the park, planting patterns, and viewing art.

The basic concept of the design of the park that is set as complex multistrata agroforestry system. Land use is dominated by two or more tree strata which constitute a complex agroforestry system with structures such as forest [12]. This complex system requires developing vegetation in the form of bamboo plants, fruit, wood, and tubers. It is expected that later the existence of this vegetation will be able to overcome various existing problems, both in the form of social, economic, infrastructure, and ecological problems.

The concept of a park structure can be seen in the following figure:



Fig. 7. Concept of planting patterns.



Fig. 8. Concept of site plan.

IV. CONCLUSION

- The existence of a biodiversity park will provide plenty of space for the community to carry out activities both economic and social. Moreover, the development site is quite extensive, which is 20 ha.

- The presence of bamboo in a biodiversity park will provide ecological benefits, with its characteristics which can store 240% of groundwater and its resistance to dry land.
- The community can utilize bamboo planted in biodiversity parks to be made into high-value products so that it is expected to be able to improve the community's economy.
- The land is utilized as a Bamboo Biodiversity Park with various benefits. It can function as a means of education, research, science development, and ecotourism.

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