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Designing Living Lab Area With Sustainable Architecture Concept

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Abstract*. Educational and research facilities are important for a university. Universitas Pembangunan Panca Budi (UNPAB) wants to provide the best educational and research facilities for its academic community. Living lab and Industrial Park is one of the facilities that UNPAB wants to provide and will greatly support educational and research activities within the university. Based on this, a good Living Lab and Industrial Park area masterplan is needed to create an efficient area. The concept offered in the planning of the Living Lab and Industrial Park Area is Tropical Sustainable while still considering local cultural values. The facility plans provided are livestock areas, agricultural and plantation areas, product processing areas, sports facilities areas, management offices, and ecotourism areas. The living lab and industrial park area is expected to become a superior educational and research facility and can be a producer of products and innovations of UNPAB academics and researchers.*

Keywords*: Campus facilities, Field laboratory, Local culture, Natural campus, Sustainable.*

INTRODUCTION

Universitas Pembangunan Panca Budi will create an area that is projected to become a center for field laboratories and workshops that accommodate all study programs at UNPAB. In addition, this area is also planned to be the location of Ecoedutourism (Ecoedutourism) based on agriculture and processing of agricultural products. This area will be named Al Amin Science And Industrial Park (Living Lab). Eco-tourism in this area is expected to attract visitors to enjoy the location of Al Amin Science and Industrial Park (Living Lab). With field-based attractions from study

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programs at UNPAB such as horticultural gardens, nurseries, animal husbandry, waste management for the use of renewable energy to packaging processing of garden and livestock products Al Amin Science and Industrial Park (Living Lab). In addition to aiming at income generating UNPAB campus, this Ecoedutourism activity also aims to educate visitors and improve community welfare through MSME development.

Thus, a good design concept planning of the Al Amin Science and Industrial Park (Living Lab) area is needed by thinking about accommodation for all UNPAB Study Program activities and facilities for eco-education activities. Making a design concept is expected to make the area function well and aesthetically so that it can attract visitors to tour the location.

LITERATURE REVIEW

Sustainable Architecture

Sustainable architecture also known as green architecture is an architectural concept that seeks to minimize the negative environmental impact of buildings with efficiency and moderation in the use of materials, energy, and development space and ecosystems at large. Sustainable architecture uses a conscious approach to energy and ecological conservation in the design of the built environment or the theory, science and style of buildings designed and built in accordance with environmentally friendly principles.

Sustainable architecture has many notions from various parties. Some of them are the understanding quoted from James Steele's book, sustainable architecture is. "Architectures that meet the needs of today, without jeopardizing the ability of future generations, to meet their own needs. Those needs differ from one community to another, from region to region and are best determined by the communities concerned."

Sustainable development requires three sectors that are equally strong and mutually supportive, namely; economic growth, protection from the adverse effects of development and improvement of people's quality of life (Danusastro, 2010, p. 9).

Ecotourism

Ecotourism is a concept of sustainable tourism development that aims to support efforts to preserve the environment (natural and cultural) and increase community

participation in conservative management, thus providing economic benefits to local communities (Directorate General of Tourism, 1995).

Ecotourism is a tourism activity that is responsible for the welfare of local communities and environmental conservation. Ecotourism can provide many benefits, such as funding sources for conservation areas, protection of conservation areas, alternative sources of livelihood for local communities, options to promote conservation and encouragement of conservation efforts specifically.

Ecotourism was initially only carried out by nature-loving tourists who wanted tourist destinations, culture and the welfare of their people to be maintained. In its development, there are several scopes of ecotourism, namely for education, community empowerment, economic improvement, and efforts in conservation activities.

Al Amin Science and Industrial Park (Living Lab)

There is non-productive land owned by the Prof. Dr. H Kadirun Yahya Foundation in the Glugur Rimbun area of 20 ha, in order to change the land to be more productive, UNPAB is currently building a use plan for 10 ha and is expected to cultivate all 20 ha of the land. In this planning, UNPAB involves all study programs (study programs) in its nature. Basic Concepts The land development meets the needs of UNPAB's learning, practicum, research and innovation center which can become an income generator.

Living Lab or Panca Budi Science EcoPark Glugur Rimbun (PSE-GR) has 4 main themes: 1. Tri Dharma of Higher Education UNPAB 2. Eco-Tech-Edu Tours 3. Fitrah (Islamic) based education 4. Economic mutualism symbiosis Therefore, PSE-GR has rooms and activities that are mutually sustainable internally and externally. Tri Dharma of Higher Education UNPAB Tri Dharma PT has 3 points, namely Education and Teaching, Research and Development, and Community Service.

PSE-GR was developed as a land for educational and learning applications, research and trials of the UNPAB academic community, therefore there are facilities such as workshops, research land provided and can be seen by visitors as UNPAB educational show cases. It is also hoped that with the cooperation of villages and the surrounding community, Community Service can be carried out in the form of cooperation, counseling, and even services so that surrounding villages can become part of PT UNPAB's Tri Dharma application. Eco-Tech-Edu Tourism The combination and

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integration of learning across programs that are applicative is expected to be part of PSE-GR educational tours for general visitors.

RESEARCH METHOD(S)

This research material is the location of the site in Sampecita Village, Kutalimbaru District, Deli Serdang Regency, the needs of the academic community of Panca Budi Development University for research land and the potential for regional development as a tourist facility. With research time for 1 (one) year.

The Parameters Observed in this study are:

a. Physical Condition of the Design Site (Regional Contour, Climate, Architectural Form, etc.)
b. Non-Physical Conditions (needs of UnPaB academic community, local culture, regional development potential, etc.)

Figure 1. Research Location

FINDINGS AND DUSCUSSION

Al Amin Living Lab and Industrial Park

The development of land that is the object of research is to meet the needs of learning, practicum, research and UNPAB innovation center which can become an income generator. Therefore, PSE-GR has rooms and activities that are mutually sustainable internally and externally. This is aligned with the understanding of UNPAB

Living Lab which adheres to the concept of circular economy education based on Islamic and humanitarian values. PSE-GR Development Opportunities Areas with the Eco-Tech-Edu Tourism concept that has an understanding of circular economy education (CED) are still very minimal in SUMUT, PSE-GR can be a pioneer in spreading this CED understanding where there is an integration of economic and educational activities that at the same time help preserve nature. Encouraged by the development of the Independent Learning Curriculum (KMB), it is hoped that PSE-GR can become a place for research, service and practicum of the UNPAB academic community that increases awareness of the need for nature conservation. Because Green Technology from across fields of science is still very minimally discussed and is still often partially researched, UNPAB can be an example of integration of fields of science into practical, dynamic, educational and economic value innovations.

Al Amin Living Lab and Industrial Park Area Design Concept

1. Problem Solving Strategy for Al Amin Living Lab and Industrial Park Area Design

The problem-solving strategy for designing the Al Amin Living Lab and Industrial Park area is divided into three stages, namely making an area master plan, making zoning that is integrated with the area and making an environmentally friendly area design and has local cultural values.

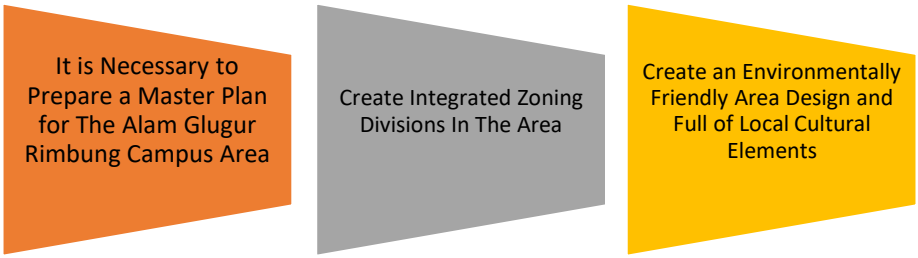

Figure 2. Problem Solving Strategy Scheme

2. Concept of Activities in Al Amin Living Lab and Industrial Park Area

Activities within the Al-Amin Living Lab and Industrial Park area are divided into three major activity groups. The group of activities are Academic, Production, and Tourism activities.

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Academic activities are activities related to lectures or the tri dharma of higher education. Activities in it include educational / lecture activities, student practicum and student and lecturer research. Production Activities are all activities that include the productivity of the area producing certain commodities, product processing, to product sales. These production activities include agricultural production (starch, fruits, herbs), livestock production (milk, meat, eggs), product processing and processing, product packaging, and product sales. Tourism activities at the location will be carried out by utilizing academic and production land, as well as utilizing natural areas within the area. These tourism activities can be in the form of edutourism, agrotourism, and ecotourism.

3. Zoning Concept of Al Amin Living Lab and Industrial Park Area

The Al-Amin Living lab and Industrial Park zoning area uses a single entrance access for users. The main gate access will go directly to the reception area (welcome area) and facilitated with vehicle parking pockets concentrated in the area. The reception area is also equipped with a regional information center that will provide information about the entire area to visitors and users of the area. The reception area is connected to all other areas, namely agrotourism, edutourism, production areas, residential areas, and service areas with ring roads and transportation facilities in environmentally friendly areas.

Figure 3. Area Zoning Scheme

ZONING CONCEPT

A. Reception Zone, Sports Center, and simple flats for rent
B. Product Processing Plaza Zone and Marketplace
C. Main Plaza Zone and Area Management Office
D. Agricultural and Plantation Zone
E. Livestock Zone
F. Nature Tourism Zone and Outdoor Recreation
G. Service Zones
H. Al-Amin Mosque Zone

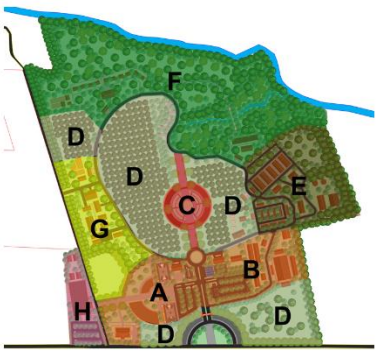

Figure 4. Regional Zoning Concepts

4. Circulation Concept of Al Amin Living Lab and Industrial Park Area

The concept of circulation in this area uses a regional ring road system that connects the main gate, parking pockets, and all areas within the area. This is intended to facilitate the movement of visitors and managers to access the entire area in the area. In addition, there is a smaller circulation in each area, which is intended to facilitate the production process and visitor activities to enjoy the facilities in each area. Circulation facilities within the area will be equipped with bicycle lanes and pedestrian paths on the regional ring road to maintain the safety and comfort of users.

CIRCULATION CONCEPT

- Make one main entrance the center of circulation in and out of the area
- The secondary Entrance is only for operational and maintenance lines of the Area
- Circulation within the one-way Region surrounding the entire Region

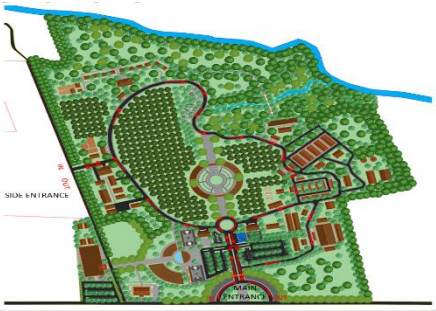

Figure 5. Regional Circulation Concepts

5. Site Plan for Al Amin Living Lab and Industrial Park

The Site Plan of the Al Amin Living Lab and Industrial Park area is adjusted to the zoning concept that has been made. The reception zone is equipped with parking pockets, information centers, and integrated with shuttle car shelters. The reception zone is directly adjacent to the sports center, and simple rental flats for students.

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SITE PLAN

A. Reception Zone, Sports Center, and simple flats for rent
B. Product Processing Plaza Zone and Marketplace
C. Main Plaza Zone and Area Management Office
D. Agricultural and Plantation Zone
E. Livestock Zone
F. Nature Tourism Zone and Outdoor Recreation
G. Service Zones
H. Al-Amin Mosque Zone

Figure 6. Site Plan for Al-Amin Living Lab and Industrial Park

6. Direction for the Development of Al Amin Living Lab and Industrial Park Area Design

The development of Al-Amin Living Lab and Industrial Park is adjusted to the plans and concepts that have been made. The detailed design of the area to be made must follow the principles of the concept of sustainability and the value of local wisdom. Every building to be built in this area must have an environmentally friendly and energy-efficient concept.

The construction of the Al Amin Living Lab and Industrial Park area will be carried out in stages starting with productive zones. The first zone to be built is the livestock zone and followed by the agricultural and plantation zones. The minimum facilities and infrastructure to be developed in this zone are Management and Laboratory Buildings, Warehouses and Animal Feed Processing, Slaughterhouses, Goat Sheds, Cowsheds, Chicken and Rabbit Coops, Biodigesters, Grazing Areas, and Animal Feed Planting Lands.

The development of building designs in this area is only allowed to use 1-2 storey buildings. This is based on local spatial directives that only allow buildings up to 2 floors. In addition, the building concept used must be tropical and sustainable / environmentally friendly, and have local cultural values. The design of animal cages and supporting facility buildings is adjusted to certain standards or nationally applicable in Indonesia.

The development of landscape design in this area is adjusted to the functions needed by the area. Planting tree buffers and making monitor roads around the area are needed for safety reasons and maintaining ecological functions around. In addition, the plants

used in the landscape are also adapted to the function and aesthetics needed in each zone within the area. The type of plant used is a plant that is in accordance with the tropical climate and microclimate of the region. Local plant species and rare plant species collections are also possible to do in this area, adapted to the microclimate of the location.

CONCLUSION AND RECOMMENDATION

Conclusion

1. Facilities Area Al Amin Living Lab and Industrial Park consist of:
   a. Education
   b. Production
   c. Tourism
2. Zone Division The Al Amin Living Lab and Industrial Park area consists of:
   a. Reception Zone, Sport Centre, and Rusunawa
   b. Product Processing Zone and Marketplace
   c. Main Plaza Zone
   d. Agricultural and Plantation Zone
   e. Livestock Zone
   f. Nature Tourism Zone and Outdoor space recreation
   g. Service Zone
   h. Al-Amin Mosque Zone
3. The direction for the development of the Al Amin Living Lab and Industrial Park area meets the following criteria:
   a. Have minimum facilities and infrastructure Management Building and Laboratory, Warehouse and Animal Feed Processing, Slaughterhouse, Goat Shed, Cowshed, Chicken and Rabbit Coop, Biodigester, Grazing Area, and Animal Feed Planting Land.
   b. The design of the 1-2 storey building with a tropical concept is in accordance with the climate at the design site.
   c. The design of the animal cage is adjusted to applicable standards.
   d. Regional landscape design adapted to the tropical concept of the design location
   e. Circulation in a circular area surrounds the area and can only be passed by production vehicles, management vehicles, shuttle cars, and bicycles

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Recommendation

The Al Amin Living Lab Farm area will be able to be used by the academic community of Panca Budi University as a means of research and teaching, besides that it can be a model for other farmers, especially those around the research site. Therefore,

1. The construction of buildings and livestock areas is expected to follow well the design results of this study.
2. The detailed design of each zone of the Al Amin Living Lab and Industrial Park livestock area can be continued and developed in further researches.

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