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DESIGN OF PLANTATION AREA OF PT. PERTAMINA UBEP BLOCK LIMAU, SOUTH SUMATERA

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ABSTRACT

PT Pertamina UBEP Block Limau is an oil explorer state company located in Prabumulih city, South Sumatera Povince. As an oil company, PT Pertamina UBEP Limau has responsibility supporting biodiversity in their territory. The plantation with local plants is selected concept in order to conserve local plants; those are Meranti (*Shorea sumatrana*), Jelutung (*Dyera lowii*), Tembesu (*Fragraea fragrans*), Perupuk (*Lopothepalum javanicum*), Gaharu (*Aquilaria malaccensis*) and Pulai (*Alstonia scholaris*). Those trees are used to be plantation trees in South Sumatera but now their number is decreased. The only ex-situ tree is Jati Solomon (*Tectona grandis* Linn) as production reason. The method for obtaining biology and physical data is observation method. The base map was obtained from PT Pertamina UBEP Limau but there are no information about the old hidden underground utilities. The data collected are analyzed and used as consideration for planting design. The planting distance is 3x3 m square and the trees are arranged on non-utility open space. There are 10.850 trees planned to be planted on PT Pertamina UBEP Limau. The first part of implementation to plant 1000 trees was held on August 2012 in Niru Field. There are on field planting adjustments because of underground utilities.

Keywords: Planting Design, Plantation, South Sumatera

INTRODUCTION

Background

Indonesia is one of country with the richest biodiversity. Biodiversity is the diversity of life forms on earth between various life forms and between those life forms with the environment. The life form are from simple organisms such as fungi and bacteria standing of trees in complex life of a forest (Bappenas, 2003). The biodiversity is an important aspect to be concerned in Indonesian development. Creating plantation area in exploration zone is one of strategy to preserve biodiversity by involving stakeholders to resolve conflicts over natural resources (Bappenas, 2003).

PT Pertamina UBEP Limau is an Export Processing Zone (EPZ) oil exploration located in Prabumulih, South Sumatera province. This company has a vision to be an ecological friendly oil company by doing environmental activities such as developing plantation area surround oil exploration blocks. Planting forest

is a potential to conserve biodiversity by improvement in design and management (Hartley, 2002).

The plantation of South Sumatera is dominated by oil palm and rubber trees. It cause the number of local trees such as Meranti (*Shorea sumatrana*), Jelutung (*Dyera lowii*), Tembesu (*Fragraea fragrans*), Perupuk (*Lopothepalum javanicum*), Gaharu (*Aquilaria malaccensis*) and Pulai (*Alstonia scholaris*) are become decreased. Those trees are used to be plantation commodity in South Sumatera. For example, Jelutung wood is a high value of timber for stencil printing, drafting table, pencil, plywood and carving, and it is one of endangered tree in Sumatera (Martawijaya et al. 1981 in Utami, Anggareni and Sahwilata, 2008). It is important to conserve those local trees by planting them on plantation area of PT Pertamina UBEP Limau.

The main concept of Plantation area of PT Pertamina UBEP Limau is conserving biodiversity by planting local trees. The trees will be planted in different blocks according to their species. The advantage of planting mixture trees in plantation is complementary resource use between species that arises from development of a stratified canopy and possibly root stratification, and possibility in nutrition improvement if the nitrogen fixing species is combined with non nitrogen-fixing species (Kelty, 2006). The Planting design is needed in order to distribute various trees planting in order to support biodiversity. The design and management are needed in plantation forest development in order to optimize biodiversity conservation (Hartley, 2002).

Objectives

The objective of this research is designing the plantation forest of PT Pertamina UBEP Limau for greenery and conserves biodiversity. The main output of the plan is planting design that consist of plants arrangement pattern, 3D simulations, planting points and quantity of trees planted. The planting design is used as guideline for developing plantation of PT Pertamina UBEP Limau.

MATERIALS AND METHODS

The project was held in June to August 2012. The first two months are used for site surveying and planting design. The first step of implementation was held in August 2012 by planting 1000 trees for starting the program.

The method for obtaining data is field observation. During the observation, the primary data collected, such as soil sample, existing open spaces and built spaces and view. Beside primary data, secondary data such as authorized base map was gathered from PT Pertamina UBEP Limau. The method for defining plantation spaces ground checked survey by comparing the base map obtained from PT Pertamina EP UBEP Limau with actual condition. In ground checked survey, the suitable spaces for plantation are marked on base map. The suitable spaces are non-built spaces and non-utilities spaces.

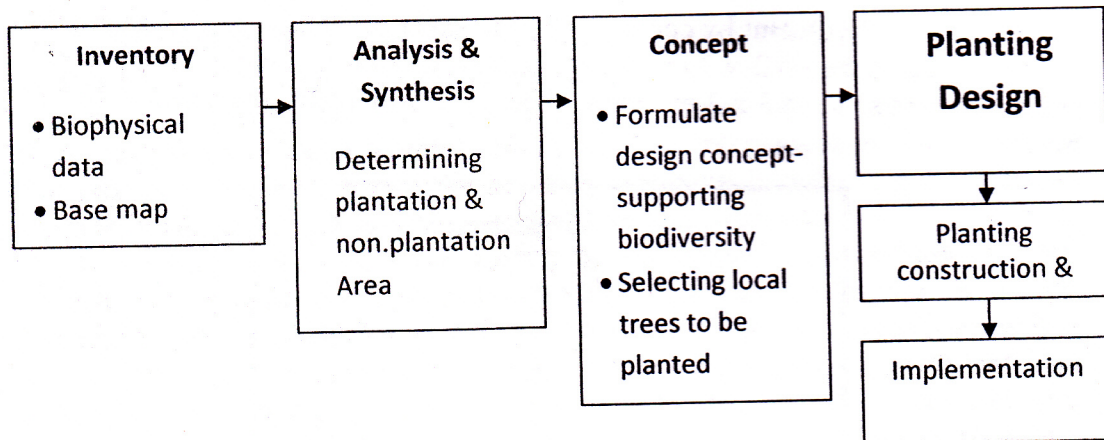


Figure 1. Step of Planting Design

RESULTS AND DISCUSSION

Results

The PT Pertamina EP UBEP Limau has several stations distribute in several locations in Prabumulih and Muara Enim, South Sumatera Province. In this study, there are 6 areas to be planned, those are Niru Rig Exploration Clusters (Niru 1 until Niru 4), Stasiun Pengumpul/SP (collecting station), and Stasiun Kompresor Gas/SKG (Gas Compressor Station). The landscape of PT Pertamina EP UBEP Limau is dominated with bare land. Only several trees and grass (ground cover) are existed in SKG cluster. According to the base map and site survey, the possible area for plantation is 97.654,53 m², distribute in Niru-1 (41.956,69 m²), Niru-2 (12.500,28 m²), Niru-3 (10.882,56 m²), Niru-4 (7.472,52 m²), SP cluster (12.000,97 m²) and SKG cluster (12.841,52 m²).

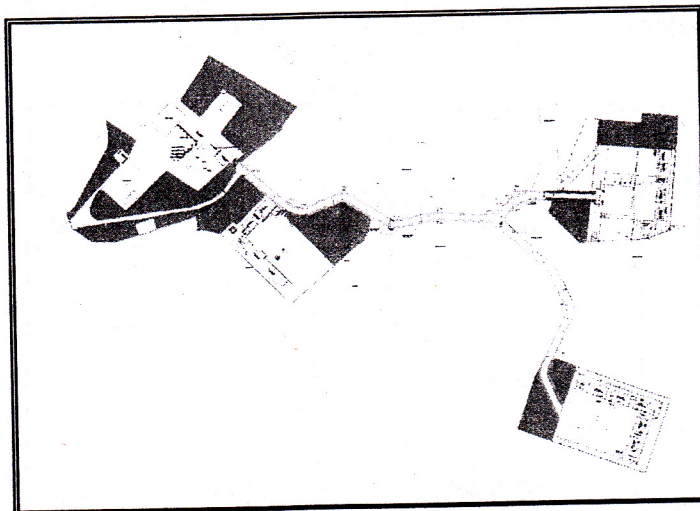


Figure 2. The Possible Area for Plantation (Green) in Niru Cluster

In order to obtain the fast result of green open space, trees spacing was set 3x3 m² meters. It is a dense trees spacing but may obtain a fast greenery visual result. For Jelutung (*Dyera lowii*), the ideal distance between trees are 5x4 m²

(Bastoni, et al. 2010). But by consulting to the expert of Jelutung, Ir. Bastoni, the tree spacing may be set $3 \times 3 \text{ m}^2$ with consideration of tree thinning in the next 5 years. By trees spacing $3 \times 3 \text{ m}^2$, the number of possible trees predicted is 10.850 trees.

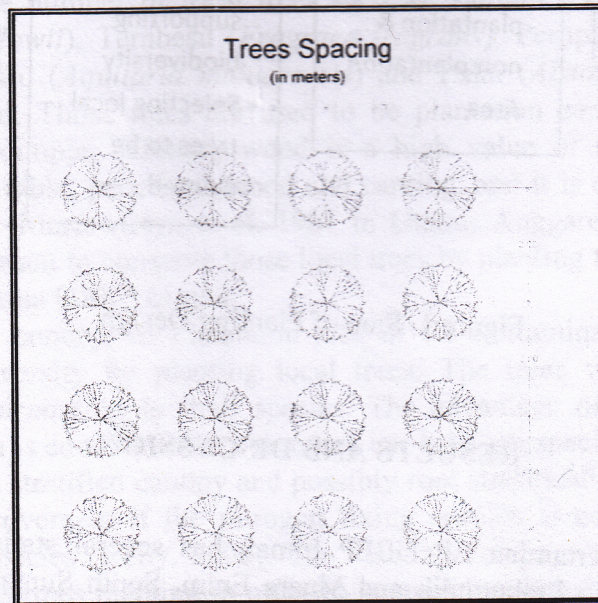


Figure 3. Trees Spacing with distance 3 meters

The soil type is red-yellow Podzolic. The physical characteristic of the soil is sandy loam texture, blocky structure and sticky consistency. During the planting implementation on August 2010, there was a long dry season with low rainfall. It is a very disadvantage situation for planting activities. The water storage polymer was added in planting points in order to keep water supply longer. Water absorbent Polymers are capable of swelling and retain large amounts of water (Yu, et al. 2012). The planting construction of selected trees is below.

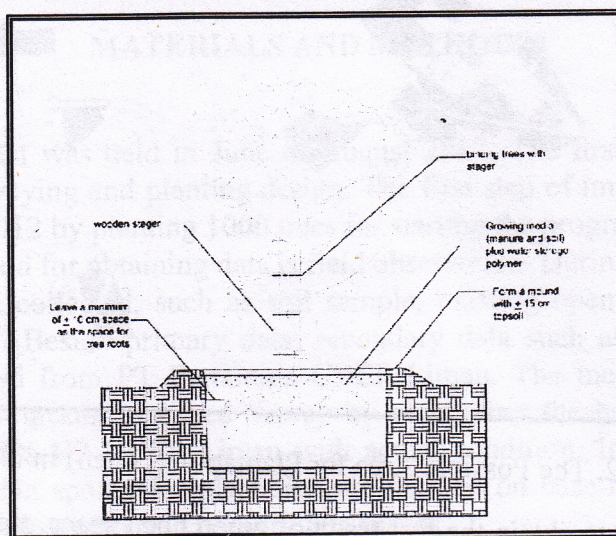


Figure 4. Planting Construction



Figure 6. Planting Jelutung tree (*Dyera lowii*)

Discussion

The plantation forest of PT Pertamina UBEP Limau follows recommendation of Hartley (2002) to plant various trees in order to obtain a better biodiversity conservation. There are some aspects influence the biodiversity surround PT Pertamina UBP Limau, such as surrounding landscape type and the effect from oil exploration itself. The next research is needed in order to identify if polyculture and using local trees in plantation forest give a better conservation for biodiversity.

Design and management can better in biodiversity conservation in plantation forest (Hartley, 2002). Planting design is very helpful media, not only to determine the number of trees to be planted, but also to determine distribution of various type of trees that will be planted. The trees composition and pattern should be planned well before implementation and it is more efficient than replacing planting points after implementation. The visualization of planting design can give a better explanation to stakeholders about the future plantation forest after implementation.

By the explanations above, we can conclude that the planting design is an important step in plantation program. But the next questions are, how to make a good and accurate planting design? What are the required data needed in planting design process? The answer is the availability of supporting data and base map. The valid base map consist of biological and physical data and also social and culture data is needed in order to be considered for creating a planting design.

CONCLUSIONS

The planting design is very important for plantation. The planting design brings several benefits, such as knowing the pattern of trees and showing how the future landscape of plantation will be. The other benefit having a planting design

is, it could be a planting design construction document, which is not only useful as a reference for implementation, but also useful for maintenance.

One of the issues that are associated with plantation sector is supporting biodiversity. There are few native trees that are useful for people of Sumatra, but its existence is threatened by a heterogeneous forest land conversion to monoculture plantations tended. By presenting plantations that use local trees like Jelutung, tembesu, Pulai, Perupuk and Meranti will support the preservation of the local plants and preserve biodiversity.

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