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Research Paper

Identification of Land Adequacy for Green Open Space Development Area of Tanjung Barangan on the Condition of Land Properties in Palembang

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Abstract
The city of Palembang is one of the cities that experienced rapid development and became the center of human activity. So that the expansion of the city to the periphery causes green open space reduction. The reduction of green open space inflicted the disruption of the balance between nature and human systems. Retention ponds include reduction of green open space border that serves as a drainage system so as to prevent flooding during the rainy season and maintain groundwater reserves during the dry season. This study aims to: 1) identify the existing condition of soil properties (physical and chemical) in the green open space development area of Tanjung Barangan retention pond in plan area that will be functioned as a retention pond of Palembang City; 2) to see the relation between the physical and chemical of soil condition with the type of vegetation that will be developed in the area of green open space development plan. This research used descriptive normative method and sampling was done by sample purposive sampling. There were 4 (four) research sample points. Green open space development area Tanjung Barangan in retention pond, based on analysis of soil condition and vegetation analysis based on PerMen PU No. 5 of 2008 there are 3 types of vegetation recommended, 4 types of vegetation that can be recommended and based on the existing condition there are 7 types of vegetation.

Keywords
Green Open Space, Tanjung Barangan Retention Pond, soil condition, vegetation recommended

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1. INTRODUCTION

The city of Palembang is one of which was marked by the development of city infrastructure in the form of renovating and building sport facilities, building hotels, malls, restaurants and light rail construction project or light rail transit (LRT) Palembang, South Sumatra. Based on Indonesian Republic Law Number 26 of 2007 on Spatial Planning, every city and regency in Indonesia should have green open space at least 30% of city area, which is 20% green open space built by the government for public interest and 10% of the green open space are private that the government requires to be created/owned by every home. The change of land will threaten the existence of green open space and cause a change of micro climate that is increasing the temperature of the air and the occurrence of natural phenomena such as urban heat island (UHI) and greenhouse effect and can damage soil functions i.e. as control of pollution and soil damage (Waluyo, 2009).

The objectives of this research were: 1) identify and evaluate the existing condition of soil properties (physical and chemical) in the green open space development plan area that will be functioned as a retention pond of Palembang City; 2) to see the relation between the physical and chemical of soil condition with the type of vegetation that will be developed in the area of green open space development plan; 3) recommend the appropriate vegetation types to be developed in the green open space development plan, retention pond area in Palembang City.

2. EXPERIMENTAL SECTION

This research was conducted in May until August 2017, implemented in the administrative area of Palembang City. Sampling point are located in green open space development area of Tanjung Barangan retention pond in Bukit Baru Village, Ilir Barat 1 Sub-District of Palembang City.

The researcher chose the research location based on The Regional Regulation of Palembang City No. 2 of 2013 on Sustainable Development, besides that location had typical characteristic and heterogeneity of the area. Researchers in this study used descriptive survey method. Soil sampling was done by integrated sample. The research parameters are: (1) physical soil (effective

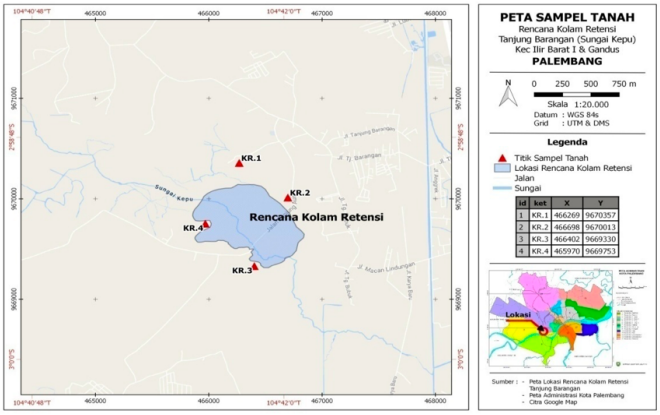

Figure 1. Research Location Sampling Point at the Green Open Space Development Plan Area of Tanjung Barangan Retention Pond

depth (soil driling), soil texture (SL-MU-TT-10, pipette), soil structure (observations), soil color (munsell soil color chart) and soil permeability (constant head permeameter)), (2) soil chemistry (pH (potensiometri), N (kjeldahl), P (bray I/II), K (bray/olsen) and C-organic (welkley black/gravimetri)). The sample of the research was tested in the field and laboratory in accordance with the existing testing procedures. Sampling method is done by sample survey method. The detail intentionally coordinate point was determined based on location extent.

The map of soil sampling in the green open space development area of Tanjung Barangan retention pond can be seen in Figure 1.

3. RESULTS AND DISCUSSION

3.1 Overview of Research Locations

The green open space development area of Tanjung Barangan retention pond is adjacent to: north borders with Sukarami and Banyuasin districts; east bordering East Ilir District I and Bukit Kecil; the south by the District Ilir Barat II; and the west by Gandus and Regency of Banyuasin [4]. Green open space of Tanjung Barangan retention pond at coordinate point 2° 59'10,8 "S and 104° 41'55,4" E is in the highest area of Palembang City located in District Ilir Barat I with an altitude of about ± 10 meters above sea level and bumpy areas. Based on the geological condition of Palembang City for the western part of the territory, the stratigraphy of the territory is alluvial and swamp units (BPS, 2014).

3.2 Vegetation in the Area of Green Open Space Development Plan Retention Pond Tanjung Barangan Palembang

Based on the results of laboratory analysis and direct observation in the field of research location at development plan area of green open space Retention Pond Tanjung Barangan, obtained the average value of physical and chemical parameters of soil can be seen in Table 1.

3.3 Recommendation of Vegetation Type for Green Open Space of Tanjung Barangan Retention Pond

Based on the result of recapitulation of the average value of soil physical and chemical parameters at Green Open Space in Tanjung Barangan Retention Pond in Table 1 and vegetation recommendation from Regulation of Minister of Public Work No. 5 of 2008, the result of vegetation type analysis recommended for Green Open Space of Tanjung Barangan retention pond can be seen in Table **??**.

Based on the table, it was known that there are 7 types of vegetation recommendations from Regulation of Minister of Public Works No. 5 of 2008, after analyzed based on land suitability and

Table 1. Recapitulation of Average Value of Physical Parameters and Soil Chemistry

No	Soil Characteristis	Green Open Space Development Plan Tanjung Barangan Retention Pond
Soil Physical Parameters		
1	Effective Depth	Moderate (60 cm - >80 cm)
2	Soil texture	clayey loam, clay and loam
3	Soil structure	Platy dan granular
4	Soil color	gray, yellowish brown to black
5	Soil permeability	medium to moderate soil permeability
Soil Chemistry Parameter		
1	pH	Very acidic
2	N-Total (Nitrogen)	Low to medium
3	P_2O_5 Available	Very low
4	K_2O Available	Very high
5	C-Organic	Low to very high

Plants	Latin Name	Soil Physical Parameters				Soil Chemistry Parameter					Desc.
		Effective Depth	Soil texture	Soil structure	Soil permeability	pH	N-Total	P_2O_5 Available	K_2O Available	C- Organic	
Casuarina	*Casuarina equisetifolia*	Moderate	Sand, loamy sand dan sandy clay	Granular	Moderate to rapid	Moderately alkaline	Low	Low	Moderate	Low	R
Munding rubber	*Ficus elastica*	Deep	Loam	Granular	Moderately rapid	Moderately acidic	Moderate	Moderate	Moderate	Low	BR
Mangosteen	*Garcinia mangostana*	Deep	Sandy clay, clay, silty clay, clay loam, sandy clay loam and silty clay loam	Granular and platy	Slow to Moderate	Acidic to moderately acidic	Moderate	High	Moderate	Low	BR
Bungur	*Lagerstroemia speciosa*	Deep	Loam and sandy loam	Granular	Moderate to moderately rapid	Moderately acidic	Low	Low	Moderate	Moderate	BR
Coconut	*Cocos nucifera*	Moderate	Sandy clay, clay, silty clay,clay loam, sandy clay loam, silty clay loam, loam, silty loam dan silt	Granular, massive and platy	Moderate	Strongly acidic to moderately alkalinne	Moderate	Moderate	Moderate	Very low	R
Resin	*Agathis loranthifolia*	Deep	Sandy loam, loam silty loam, silt, clay loam, sandy clay loam, silty clay loam	Granular and platy	Slow to moderate	Acidic, neutral and moderately alkaline	Moderate	Moderate	Moderate	Very low	BR
Fern tree	*Filicium decipiens*	Deep	Loam and sandy loam	Granular	Moderate to moderately rapid	Strongly acidic to neutral	Low	Low	Moderate	Moderate	R

Figure 2. Recapitulation of Analysis Results of Vegetation Types Recommended for Green Open Space of Tanjung Barangan Retention Pond

SR: there was conformity between result of laboratory analysis of physical and chemical factor of soil at research location with the analysis of vegetation type ; R: recommended with condition of land suitability >7 parameters ; BR: can be recommended with land suitability requirement between 4-6 parameters and land management ; TR: not recommended with condition of land suitability <3 parameter of vegetation type

laboratory analysis of soil physical and chemical factors, there are 3 (three) types of vegetation recommended for planting in the Green Open Space of Tanjung Barangan retention pond and 4 types of vegetation that can be recommended to be planted on the green open space with the condition of land management for land suitability.

The recommended vegetation types to be planted in the Green Open Space of Tanjung Barangan retention pond are casuarinas (*Casuarina equisetifolia*), coconut (*Cocos nucifera*) and fern tree (*Filicium decipiens*). The type of fern tree vegetation (*Filicium decipiens*) has the best ability to intercept the rainwater. The existence of casuarinas vegetation (*Casuarina equisetifolia*) at Karang gadung Beach, Kebumen, shows positive impact to micro climate improvement that decreased the light intensity from 1925 lux to 213 lux, decreased air temperature from 31°C to 25°C and increased air humidity from 84% to 100% (Harjadi, 2017) That the plant trembesi / Ki Rain (*Samanea saman*) is a recommendation plant to be a green open space plant because the trembesi plant has a good ability to absorb CO_2 (Martuti, 2013) and has a low evapotranspiration so it is suitable to be planted in green open space across upstream which functions as a water catchment (Budiman, 2010) In addition, trembesi plants are intended for public spaces such as parks because this plant has a very wide canopy that is popular as a shade plant and has a strong absorbent groundwater capability (Damayanti, 2016). While the type of coconut vegetation (*Cocos nucifera*) as reinforcing vegetation in critical land (Nahdi et al., 2014).

Based on direct observations of the existing conditions of vegetation types in the planned area of green space development, the Tanjung Barangan retention pond contained 7 (seven) types of vegetation, among others: gelam tree (*Melaleuca leucadendra*), tanjung (*Mimosups elengi*), nipah tree (*Nypa fruticans*), leaves leaf (*Melastoma candidum*), purun (*Lepironia articulata*), lotus flower (*Nymphaea sp*) and shrimp nails (*Stenochlaena palustris Bedd*).

There is no type of vegetation that grows in the existing conditions in the green space of the Tanjung Barangan retention pond which is included in the vegetation type recommendation from the Minister of Public Works Regulation No. 5 of 2008. If seen from the location of the RTH location the Tanjung Barangan retention pond is a type of swamp land so the vegetation dominating the area these are gelam trees (*Melaleuca leucadendra*), nipah trees (*Nypa fruticans*) and lotus flowers (*Nymphaea sp*) (Arsyad, 1989). That lotus flower (*Nymphaea sp*) vegetation in environmental waste management can reduce BOD in tofu industrial wastewater so that this vegetation is very good if it grows in the Barangan Peninsula region in retention ponds.

4. CONCLUSIONS

From the results of the research that has been done, it can be concluded that the Green Open Space area of Tanjung Barangan retention pond has characteristics of physical and chemical factors of the soil, they are: the effective depth is moderate, textured clay loam, loam and clay, granular soil structure and platy, gray and yellowish brown, moderate and moderately rapid soil permeability, soil pH is very acidic, has a low to moderate N-total, P_2O_5 content is very low, K_2O content is very high and has a

low C-organic content up to very high. From 7 (seven) types of vegetation recommendation from the Regulation of Minister of Public Works No. 5 of 2008, after analyzed based on land suitability and laboratory analysis of soil physical and chemical factors, there are 3 (three) types of vegetation recommended and 4 (four) types of vegetation classified ass the category that can be recommended but with the condition that the soil treatment should be done to increase the soil pH level by calcification on Green Open Space of Tanjung Barangan retention pond.

REFERENCES

Arsyad, S. (1989). *Konservasi Tanah dan Air*. Institut Pertanian Bogor Press

BPS (2014). Badan Pusat Statistik Kota Palembang dan BAPPEDA Kota Palembang

Budiman, A. (2010). *Analisis Manfaat Ruang Terbuka Hijau untuk Meningkatkan Kualitas Ekosistem Kota Bogor dengan Menggunakan Metode GIS*. Master's thesis, Fakultas Pertanian IPB, Bogor.

Damayanti, E. (2016). Tanaman Penyelamat Lingkungan. http://portal.bangkabaratkab.go.id/content/tanaman-penyelamat-lingkungan

Harjadi, B. (2017). PERAN CEMARA LAUT (Casuarina equisetifolia) DALAM PERBAIKAN IKLIM MIKRO LAHAN PANTAI BERPASIR DI KEBUMEN. *Jurnal penelitian pengelolaan Daerah Aliran Sungai*, **1**(2); 73–81

Martuti, N. K. T. (2013). Peranan Tanaman terhadap Pencemaran Udara di Jalan Protokol Kota Semarang. *Jurnal Biosantifika Berkala Ilmiah Biologi*, **5**(1)

Nahdi, D. Marsono, and a. M. B. Tjut. S. Djohan (2014). Struktur Komunitas Tumbuhan dan Faktor Lingkungan di Lahan Kritis, Imogiri Yogyakarta. *Jurnal Manusia dan Lingkungan*, **21**(1); 67–74

Waluyo, P. (2009). Distribusi Spasial Suhu Permukaan dan Kecukupan Ruang Terbuka Hijau Di Kota Semarang. Skripsi. Depatemen Konservasi Sumberdaya Hutan dan Ekowisata. Fakultas Kehutanan Institut Pertanian Bogor.